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GNRO-2012/00001

January 23, 2012

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

SUBJECT: License Amendment Request - Standby Liquid Control System

Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

REFERENCE: Entergy Operations, Inc. letter to the NRC (GNRO-2010/00056), *License Amendment Request - Extended Power Uprate*, September 8, 2010 (ADAMS Accession No. ML102660403)

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests approval of an amendment to Grand Gulf Nuclear Station, Unit 1 (GGNS) Technical Specification (TS) 3.1.7, "Standby Liquid Control (SLC) System." The proposed license amendment request (LAR) reflects the enrichment of the boron-10 (B-10) isotope in the sodium pentaborate (SPB) solution, which is the credited neutron absorber. Increasing the enrichment of the B-10 isotope in the SPB solution effectively increases the available negative reactivity inserted by the SLC system without having to increase the system's storage capacity. The proposed change is needed to ensure appropriate shutdown margin can be maintained during reload design for future cycles beginning with Cycle 19.

Attachments 1 through 3 include a description of the proposed changes, marked-up pages of TS 3.1.7, and a clean copy of those pages. Attachment 4 provides a markup of the related changes to the TS Bases for information only.

The SLC system LAR has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c). Entergy has determined that this LAR involves no significant hazards consideration. The bases for this determination are included in Attachment 1.

These changes to TS 3.1.7 were originally included as part of the GGNS Extended Power Uprate (EPU) LAR submitted via the referenced letter. Due to delays in obtaining approval of the EPU LAR and the need for the SLC system changes to support operation with the Cycle 19 core design, Entergy is submitting this request separately. In addition, Entergy requests this LAR be processed as an exigent change and approved within 75 days from the date of submittal in order to support startup from the spring 2012 refueling outage. Once approved, the resulting license amendment will be implemented prior to startup from the outage.

This SLC system LAR contains no new commitments. There were no commitments associated with this change made in the EPU LAR.

The proposed changes incorporate the related changes that had been proposed in the EPU LAR. On this basis, those portions of the EPU LAR related to the SLC system TS are hereby withdrawn; these include:

1. Attachment 1 - Section 4.1.6, Standby Liquid Control (SLC) System (TS 3.1.7) on Pages 12 and 13 of 29

2. Attachment 2 - Marked-up TS pages contained on Pages 5 – 9 of 37

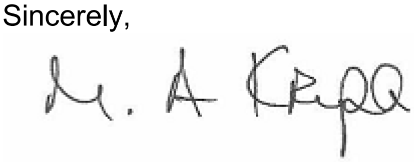
3. Attachment 3 - Marked-up TS Bases pages contained on Pages 3 – 10 of 51

The modifications and related post-modification testing described in Attachments 8 and 9 of the EPU LAR are to be implemented during the spring 2012 refueling outage.

If you have any questions or require additional information, please contact Guy Davant at (601) 368-5756.

I declare under penalty of perjury that the foregoing is true and correct; executed on January 23, 2012.

Sincerely,



MAK/ghd

Attachments:

1. Analysis of Proposed Technical Specification Changes

2. Proposed Technical Specification Changes (Mark-up)

3. Proposed Technical Specification Changes (Clean Pages)

4. Changes to Technical Specification Bases Pages – For Information Only

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Attachment 1

GNRO-2012/00001

Grand Gulf Nuclear Station, Unit 1

Analysis of Proposed Technical Specification Changes

ANALYSIS OF PROPOSED TECHNICAL SPECIFICATION CHANGES

1.0 DESCRIPTION

Entergy Operations, Inc. (Entergy) requests an amendment to the Grand Gulf Nuclear Station, Unit 1 (GGNS) Operating License (NPF-29). The proposed changes revise Technical Specification (TS) 3.1.7, "Standby Liquid Control (SLC) System," to support the use of a sodium pentaborate (SPB) solution that has been enriched with the boron-10 (B-10) isotope. Changes to the temperature range, SPB storage volume requirements, and pump discharge pressure are also proposed. Increasing the B-10 enrichment allows a decrease in the SPB concentration, which allows for the existing SLC system tank heater and piping heat tracing to be abandoned in place. This change is needed to ensure appropriate shutdown margin can be maintained during reload design for future cycles beginning with Cycle 19.

Supporting documentation for the proposed changes is included in the following attachments:

- Attachment 2 provides a markup of the changes to the GGNS TS.
- Attachment 3 provides a clean copy of the proposed changes to the GGNS TS pages.
- Attachment 4 provides a markup of the proposed changes to the TS bases for information only. Entergy plans to implement these changes in accordance with GGNS TS 5.5.11, "Technical Specifications Bases Control Program," once this license amendment request (LAR) is approved.

2.0 PROPOSED CHANGE

The proposed changes to the SLC system increase the B-10 enrichment in the SPB solution and operating temperature range, and decrease the solution volume. Specifically, the following changes are proposed to TS 3.1.7:

- Existing Action A Condition, Required Action A.1, and the associated Completion Time are being revised to reflect that the product of the SPB solution concentration (C) and the B-10 enrichment (E) in the SPB solution be greater than or equal to 420 or be restored within 8 hours.
- New Action B Condition, Required Action B.1, and the associated Completion Time are being added to address the SPB solution volume. The proposed SPB solution volume is required to be greater than or equal to 4,200 gallons. A Completion Time of 8 hours to restore the SPB volume when found to be less than 4,200 gallons is proposed. This completion time is consistent with the Completion Time allowed for the restoration of one SLC subsystem when two SLC subsystems are inoperable.
- New Action C Condition, Required Action C.1, and the associated Completion Time are being added to address the SPB solution temperature. A temperature range of greater than or equal to 45°F and less than or equal to 150°F is proposed. A Completion Time of 8 hours to restore temperature to within its specified limits is proposed. This completion

time is consistent with the Completion Time allowed for restoring one SLC subsystem when two subsystems are inoperable.

- Existing Action B Condition and Required Action B.1 are being renumbered as Action D and Required Action D.1, respectively.
- Existing Action C Condition and Required Action C.1 are being renumbered as Action E and Required Action E.1, respectively.
- Existing Action D Condition and Required Action D.1 are being renumbered as Action F and Required Action F.1, respectively.
- Renumbered Conditions D and E are being revised to clarify that they are applicable only when subsystems are inoperable for reasons other than Conditions A, B, or C.
- SR 3.1.7.1 is being revised to verify the available volume of the SPB solution is greater than or equal to 4,200 gallons. This change eliminates the reference to Figure 3.1.7-1.
- SR 3.1.7.2 is being revised to verify the temperature of the SPB solution is greater than or equal to 45°F and less than or equal to 150°F. This change eliminates the reference to Figure 3.1.7-2.
- SR 3.1.7.3, which currently requires verification of the temperature of the pump suction piping, is being deleted. Verification of pump suction piping temperature will be performed as part of the proposed SR 3.1.7.2, as described in the TS Bases markup. A new SR 3.1.7.3 is proposed that requires verification that the product (C)(E) is greater than or equal to 420. A new note is being added to address the association of SRs 3.1.7.5 and 3.1.7.9 to this SR. The proposed Frequency is 31 days and is consistent with the Frequency of SR 3.1.7.5, which requires verification of the concentration of the SPB solution.
- SR 3.1.7.5 is being revised to verify the concentration of SPB solution is less than or equal to 9.5 weight percent (w/o). The temperature listed in the Frequency associated with performing the SR anytime the solution low temperature is restored to within limits is being revised to greater than or equal to 45°F. The change in temperature is consistent with the proposed operating temperature band.
- SR 3.1.7.7, which requires verification of pump flow rate and discharge pressure, is being revised to reflect a higher discharge pressure criterion. The current pressure of 1,300 psig will be changed to 1,340 psig in preparation for implementing an extended power uprate (EPU) at GGNS. This 40-psig increase remains well below the SLC piping design pressure of 1,700 psig.
- SR 3.1.7.9, which required verification of SLC piping heat tracing, is being deleted since boron precipitation is precluded by the maximum concentration limit in SR 3.1.7.5 and the lower temperature limit in SR 3.1.7.2. A new SR 3.1.7.9 is proposed, which requires the B-10 enrichment to be determined once within 24 hours after boron is added to the solution.

With the proposed revisions described above, Figures 3.1.7-1 and 3.1.7-2 are no longer needed and are proposed for deletion. A note will be added to page 3.1-23 stating that the next page is 3.1-26. This is an administrative change that allows the current TS page numbering to remain the same.

In summary, the proposed changes to TS 3.1.7 and associated TS Bases, which are described in more detail in Section 4.0, support an increase in the B-10 enrichment of the SPB solution contained in the SLC system.

3.0 BACKGROUND

The SLC system is described in Section 9.3.5 of the GGNS Updated Final Safety Analysis Report (UFSAR). The SLC system is designed to provide the capability of bringing the reactor, at any time in a fuel cycle, from full power and minimum control rod inventory (which is at the peak of the xenon transient) to a subcritical condition with the reactor in the most reactive xenon-free state without taking credit for control rod movement. In addition, the SLC system is designed and analyzed to:

- Provide negative reactivity to shutdown the reactor in the event of an Anticipated Transient Without Scram (ATWS), and

- Buffer the post-accident suppression pool chemistry and prevent iodine re-evolution (i.e., suppression pool pH control) as reflected in the Loss of Coolant Accident (LOCA) dose analysis

The SLC system consists of an SPB solution storage tank, two positive displacement pumps, two explosive valves (provided in parallel for redundancy), and associated piping and valves used to transfer the SPB solution from the storage tank to the reactor pressure vessel. The SPB solution is discharged through the High Pressure Core Spray system sparger, which is located in the reactor pressure vessel, to assure adequate mixing.

These proposed changes were originally included as part of the GGNS EPU LAR submitted via Entergy Operations, Inc. letter GNRO-2010/00056 to the NRC, *License Amendment Request - Extended Power Uprate*, September 8, 2010 (ADAMS Accession No. ML102660403). Due to delays in obtaining approval of the EPU LAR and the need for the SLC system changes to support operation with the Cycle 19 core design, Entergy is submitting this request separately.

4.0 TECHNICAL ANALYSIS

Implementation of the GGNS Cycle 19 core design results in increased core reactivity, which requires a corresponding increase in negative reactivity to be provided by the SLC system.

In order to maintain the desired shutdown margin and current core design flexibilities, Entergy proposes to increase the enrichment of the B-10 isotope dissolved in the SPB solution contained in the SLC storage tank.

Natural boron contains 19.8 atom percent (a/o) of the B-10 isotope. B-10, with its large neutron-absorption capability, is the active neutron absorber component in SPB. Because of this characteristic, the use of the B-10-enriched SPB solution, which will be chemically and physically similar to the current solution, provides a faster negative reactivity insertion rate than the same quantity of SPB with natural boron.

4.1 Impact of the Proposed Change on SLC System Design Functions

4.1.1 Shutdown Requirements

Adequate shutdown margin is currently accomplished by injecting a quantity of boron that produces the equivalent of a concentration of at least 660 ppm of natural boron in the reactor core at 68°F. To allow for potential imperfect mixing and leakage in the reactor system, the solution concentration and enrichment (i.e., natural boron) were selected to produce an in-vessel boron concentration at least 25% greater than that for the required shutdown margin, thereby increasing the concentration level from 660 ppm to 825 ppm.

The concentration of natural boron required for 1% shutdown margin for the upcoming Cycle 19 and future fuel cycle changes is greater than the current system design of 660 ppm. A concentration of 780 ppm of natural boron was determined to provide adequate shutdown margin for the expected future fuel and core designs. The system design requirement to maintain the 25% margin above 780 ppm equates to 975 ppm (i.e., 780 ppm × 1.25). Entergy is proposing to make the changes described in Section 2.0 to produce the required equivalent in-vessel boron concentration.

The shutdown margin analysis for Cycle 19, which was analyzed at a boron concentration of 780 ppm of natural boron at 68°F, is 2.94% delta-K. In comparison, the Cycle 18 shutdown margin, which was analyzed at 660 ppm, assuming the current licensing basis (i.e., current licensed thermal power and an 18-month fuel cycle), was 1.12% delta-K.

The B-10 inventory in the SLC storage tank can be calculated using the following formulas:

$$m_{SPB} = V \times 0.1337\ ft^3/\ gal \times \rho(T) \times SG(C) \times (C/100)$$

$$m_{B\text{-}10} = m_{SPB} \times F_B(E) \times F_{B\text{-}10}(E)$$

Where:
m_{SPB} = mass of SPB (lbs)
V = tank volume (gallons)
$\rho(T)$ = water density as a function of temperature (lbs/ft^3)
$SG(C)$ = specific gravity as a function of concentration
C = Concentration (w/o)

$m_{B\text{-}10}$ = mass of B-10 (lbs)
$F_B(E)$ = weight fraction of boron element in SPB (function of enrichment)
$F_{B\text{-}10}(E)$ = weight fraction of B-10 in boron element (function of enrichment)

For the proposed SLC changes in Section 2.0, the minimum B-10 inventory can be calculated to be 253.4 lbs based on: (i) an SPB concentration of 4.2 w/o with a boron enrichment of 100%; (ii) a tank volume of 4,200 gallons (V); and (iii) a tank temperature of 150°F.

m_{SPB} = 4,200 gal × 0.1337 ft^3/ gal × 61.19 lbs / ft^3 × 1.021 × 4.2/100
= 1,473.5 lbs

$m_{B\text{-}10}$ = 1,473.5 lbs × (0.17197) × (100%)
= 253.4 lbs

Since as much as 138 gallons of the SPB solution may remain in the SLC system piping after the injection terminates, at least 245.06 lbs of B-10 would be injected into the reactor coolant system.

Considering the weight fraction of B-10 in natural boron is 18.34 w/o, the 245 lbs of B-10 are equivalent to injecting ~1,336 lbs of natural boron. Since the mass of the reactor coolant system at 68°F is 1.2591 E6 lbs, the final boron concentration can be calculated to be 1,061 ppm. The 1,061 ppm bounds the target 975 ppm discussed above.

Therefore, the proposed changes in Section 2.0 continue to satisfy shutdown margin requirements. The function of the SLC system, method of operation, redundancy, and system configuration remains unchanged as a result of the proposed changes.

4.1.2 ATWS Requirements

ATWS is defined as an anticipated operational occurrence (AOO) followed by the failure of the reactor trip portion of the protection system specified in 10 CFR 50, Appendix A, General Design Criterion (GDC) 20. 10 CFR 50.62, *Requirements for reduction of risk from anticipated transients without scram (ATWS) events for light-water-cooled nuclear power plants*, requires, in part, that:

> "Each BWR have a SLC system with the capability of injecting into the reactor vessel a borated water solution with reactivity control at least equivalent to the control obtained by injecting 86 gpm of a 13 weight-percent sodium pentaborate decahydrate solution at the natural boron-10 isotope abundance into a 251-inch inside diameter reactor vessel. The SLC system initiation must be automatic (for plants granted a construction permit after July 26, 1984)."

The 86-gpm boron injection equivalency requirement of 10 CFR 50.62 is satisfied by the following relationship:

$$(Q/86) \times (M251/M) \times (C/13) \times (E/19.8) \geq 1$$

Where: Q = Expected SLCS flow rate (gpm)
M251/M = Mass of water in a 251-inch diameter reactor vessel and recirculation system (lbs) divided by the mass of water in the reactor vessel and recirculation system at hot rated condition (lbs)
C = Sodium pentaborate solution concentration (weight percent)
E = B-10 isotope enrichment (atom-percent)

For GGNS at current licensed thermal power (CLTP):

Q = 82.4 gpm (i.e., 41.2 gpm / pump)
M251/M = 1 (GGNS has a 251-inch diameter reactor vessel)
C = 13.6%
E = 19.8% (i.e., natural boron enrichment)

Therefore, the 86-gpm equivalency requirement for CLTP is satisfied as follows:

$$(Q/86) \times (M251/M) \times (C/13) \times (E/19.8) \geq 1$$

$$(82.4/86) \times (1) \times (13.6/13) \times (19.8/19.8) = 1.0 \geq 1$$

Enriching the B-10 content allows the SPB concentration to be reduced and still significantly increase the SLC system performance margin for the ATWS requirement. No changes are proposed to SLC system flow rate (Q) or to the vessel diameter so that Q = 82.4 gpm and M251/M = 1. Using these values, the above equation may be rewritten as follows:

$$(C)(E) \geq 268.65$$

Therefore, any combination of the product of the SPB concentration and the B-10 enrichment that results in a value greater than or equal to 268.65 will satisfy the 86-gpm equivalency requirement. Thus, the proposed change requiring (C)(E) to be greater than or equal to 420 exceeds the 86-gpm equivalency requirement.

4.1.3 Post-LOCA Suppression Pool pH Control

In addition to controlling reactivity by injecting SPB solution into the reactor pressure vessel, the SLC system SPB solution is used to maintain the suppression pool pH greater than 7.0. During a LOCA, combining irradiated cable jacket material and suppression pool water in the containment/wetwell forms hydrochloric acid (HCl) and nitric acid (HNO_3). These two acids, together with iodine released from the core, lower the pH of suppression pool water over the duration of the accident. Injecting SPB adds a chemical base to the water maintaining a pH greater than 7.0.

A post-LOCA suppression pool pH analysis was performed considering the impact of the changes to the SLC system. The analysis, using an NRC-approved methodology (Reference 2), demonstrated that the suppression pool pH will remain greater than 7.0.

4.2 Basis of Proposed TS Changes

The proposed change, as reflected in SR 3.7.1.3 and Action A, requires (C)(E) to be greater than or equal to 420, which satisfies the system requirements as described in Sections 4.1.1 and 4.1.2, above.

SR 3.1.7.5 verifies that the w/o of SPB in solution is less than or equal to 9.5. Performing this SR after the boron is added to the tank ensures the sample used to determine the B-10 enrichment is a homogeneous mixture of the solution.

The planned modification to the SLC system is to include a B-10 enrichment of 96 a/o, which will allow for a SPB concentration (C) of at least 4.4 w/o (420 / 96). The proposed change allows the SPB concentration to be as high as 9.5 w/o, which would enable the use of a B-10 enrichment (E) as low as 44.2 a/o (420 / 9.5).

The proposed change to the available SPB solution volume, as reflected in SR 3.1.7.1 and Action B, ensures a minimum volume of 4,200 gallons of SPB solution. This volume, in conjunction with the proposed change to SPB concentration and B-10 enrichment, ensures that upon completion of injection, the reactor core is subcritical. The new Actions and SRs ensure the volume of SPB solution available for injection provides the negative reactivity required to shutdown the reactor and compensates for the positive reactivity effects due to temperature decrease and xenon decay during cooldown.

The operating temperature range for the SPB solution is reflected in the proposed changes associated with Action B and SR 3.1.7.2. The minimum solution temperature (45°F) provides margin to the SPB saturation temperature and precludes precipitation for SPB solution concentrations that are less than 9.5 w/o. The upper temperature limit (150°F) ensures adequate net positive suction head is available for two pump operation.

The proposed Completion Time for Actions A, B, and C is 8 hours. This Completion Time is conservatively based on the Completion Time allowed for restoring one SLC subsystem when two SLC subsystems are inoperable. Because of the low probability of an ATWS event, the proposed Completion Time is reasonable and provides adequate time to restore the solution to within limits.

The proposed change to SR 3.1.7.7 to increase the discharge pressure at which each pump is tested is a conservative change. The test confirms one point on the pump design curve and confirms operability.

4.3 SLC Tank Heater and Piping Heat Tracing

The purpose of the SLC storage tank operating heater and piping heat tracing is to ensure the solution in the SLC storage tank and piping stays above the precipitation temperature.

As a result of increasing the enrichment of the B-10 isotope, the concentration of the SPB solution will be reduced to a value such that the precipitation temperature of the highly-enriched B-10 solution is below that of the ambient temperature in the area, which ranges from 60°F to 105°F with an average of 90°F. Specifically, the proposed minimum solution temperature (45°F) provides margin to the saturation temperature (40°F) corresponding to the SPB concentration at 9.5 w/o and precludes precipitation for SPB solution concentrations that are less than 9.5 w/o.

Therefore, the SLC system will still be able to inject the required amount of solution without the tank operating heater and the heat tracing on the piping.

4.4 Conclusion

The proposed changes continue to ensure that the design functions of the SLC system are met.

5.0 REGULATORY ANALYSIS

5.1 Applicable Regulatory Requirements/Criteria

Entergy has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the Technical Specifications (TS), and do not affect conformance with any General Design Criterion (GDC) differently than described in the Updated Final Safety Analysis Report (UFSAR).

General Design Criterion 26

The shutdown capability requirement of the standby liquid control (SLC) system during normal operations is specified in 10 CFR Part 50, Appendix A General Design Criterion (GDC) 26, *Reactivity control system redundancy and capability.* Compliance with GDC 26 requires two independent reactivity control systems of different design principles be provided, with one of the systems being capable of holding the reactor core subcritical under cold conditions. The control rods provide the normal method for reactivity control and are capable of maintaining the reactor subcritical, including allowance for a stuck rod, without the addition of any soluble neutron absorber (i.e., boron) to the reactor coolant.

The SLC system functions as a backup to inserting control rods providing a diverse means of rendering the reactor subcritical. To comply with GDC 26, the SLC system must have an adequate amount of neutron absorber in solution, and the capability to inject at a rate sufficient to bring the reactor from rated power to cold shutdown at anytime in core life with the control rods remaining withdrawn. The SLC system must also take into account the reactivity gains from complete decay of the xenon inventory derived from rated power operation, an allowance for imperfect mixing and leakages, and dilution by the residual heat removal system.

10 CFR 50.62

The SLC system is also required to comply with paragraph (c) (4) of 10 CFR 50.62, *Requirements for reduction of risk from anticipated transients without scram (ATWS) events for light-water-cooled nuclear power plants*. Paragraph (c)(4) of 10 CFR 50.62 states:

> "Each boiling water reactor must have a standby liquid control system (SLCS) with the capability of injecting into the reactor pressure vessel a borated water solution at such a flow rate, level of boron concentration and boron-10 isotope enrichment, and accounting for reactor pressure vessel volume, that the resulting reactivity control is at least equivalent to that resulting from injection of 86 gallons per minute of 13 weight percent sodium pentaborate decahydrate solution at the natural boron-10 isotope abundance into a 251-inch inside diameter reactor pressure vessel for a given core design. The SLCS and its injection location must be

designed to perform its function in a reliable manner. The SLCS initiation must be automatic and must be designed to perform its function in a reliable manner for plants granted a construction permit after July 26, 1984, and for plants granted a construction permit prior to July 26, 1984, that have already been designed and built to include this feature."

Suppression Pool pH Control

NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition*, Section 6.1.1, *Engineered Safety Features Materials* and Section 6.5.2, *Containment Spray as a Fission Product Cleanup System*, require the pH of the suppression pool water be controlled to maintain a minimum pH value of 7.0 following a Loss of Coolant Accident (LOCA). This is to prevent re-evolution of iodine that has been removed from the containment and the drywell atmosphere after having been released from the core during the LOCA.

Conclusion

The function of the SLC system, method of operation, redundancy and system configuration remain unchanged as a result of the proposed changes. The proposed changes to the SLC system TS continue to satisfy GDC 26, 10 CFR 50.62(c)(4), and the NRC review criteria referenced in NUREG-0800.

5.2 No Significant Hazards Consideration

Entergy Operations, Inc. (Entergy) proposes a change to Grand Gulf Nuclear Station (GGNS) Technical Specifications (TS) 3.1.7, "Standby Liquid Control (SLC) System." The proposed change increases the boron-10 (B-10) enrichment of the sodium pentaborate (SPB) solution that is in the SLC system and revises the SPB volume, operating temperature, and pump discharge pressure. The SPB solution is available for injection into the reactor core at any time in a fuel cycle to ensure a subcritical condition with the reactor in the most reactive xenon-free state without taking credit for control rod movement.

Entergy has evaluated whether or not a significant hazards consideration is involved with the proposed changes by focusing on the three standards set forth in 10 CFR 50.92, *Issuance of amendment*, as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The SLC system is designed to provide the capability of bringing the reactor, at any time in a fuel cycle, from full power and minimum control rod inventory to a subcritical condition with the reactor in the most reactive xenon-free state without taking credit for control rod movement. The SLC system design satisfies the requirements of 10 CFR 50.62, *Requirements for the Reduction of Risk from Anticipated Transients without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants*. The proposed changes to the SPB solution requirements maintain the capability of the SLC system to perform this reactivity control function and ensure continued compliance with the requirements of 10 CFR 50.62.

The SLC system is not considered to be an initiator of any event. The use of the proposed SPB solution enriched with the B-10 isotope does not alter the design, function, or operation of the SLC system or increase the likelihood of a system malfunction that could increase the consequences of an accident.

Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   The proposed changes to the SLC system do not alter the design, function, or operation of the SLC system. The proposed change in SPB concentration, B-10 enrichment, SPB storage volume, and pump discharge pressure will continue to ensure shutdown of the reactor in the most reactive xenon-free state without taking credit for control rod movement. The proposed change in solution temperature continues to ensure the boron remains in solution and does not precipitate out of the SLC storage tank or in the SLC piping. The change in solution temperature also ensures adequate net positive suction head is available for SLC pump operation.

   Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No

   In the event of injection, the proposed change results in an increase in the margin between the final B-10 concentration in the reactor vessel and concentration required for shutdown. Thus, the proposed change results in additional safety margin being provided.

   Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based on the above, Entergy concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c).

5.3 Environmental Considerations

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. 10 CFR 50.62, *Requirements for the Reduction of Risk from Anticipated Transients without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants*

2. NRC Safety Evaluation, Amendment No. 145, *Implementation of the Alternate Source Term at Grand Gulf Nuclear Station*, March 14, 2001.

Attachment 2

GNRO-2012/00001

Grand Gulf Nuclear Station, Unit 1

Proposed Technical Specification Changes (Mark-up)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Standby Liquid Control (SLC) System

LCO 3.1.7 Two SLC subsystems shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ~~Concentration of boron in solution in Limited Operation region.~~ (C)(E) < 420	A.1 ~~Restore concentration of boron in solution to Normal Operation region.~~ Restore (C)(E) ≥ 420 ~~AND~~ ~~A.2 Perform SR 3.1.7.2.~~	~~72 hours~~ 8 hours ~~Once per 4 hours~~
B. Sodium pentaborate solution volume < 4,200 gallons.	B.1 Restore Volume to ≥ 4,200 gallons.	8 hours
C. Temperature < 45°F or > 150°F.	C.1 Restore temperature ≥45°F and ≤150°F.	8 hours
~~B.~~ D. One SLC subsystem inoperable for reasons other than Conditions A, B or C.	~~B.1~~ D.1 Restore SLC subsystem to OPERABLE status.	7 days
~~C.~~ E. Two SLC subsystems inoperable for reasons other than Conditions A, B or C.	~~C.1~~ E.1 Restore one SLC subsystem to OPERABLE status.	8 hours
~~D.~~ F. Required Action and associated Completion Time not met.	~~D.1~~ F.1 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Verify available volume of sodium pentaborate solution is ~~within the limits of Figure 3.1.7-1.~~ ≥ 4,200 gallons.	24 hours
SR 3.1.7.2	Verify temperature of sodium pentaborate solution is ~~within the limits of Figure 3.1.7-2.~~ ≥45°F and ≤150°F.	24 hours
SR 3.1.7.3	~~Verify temperature of pump suction piping is ≥ 75°F and ≤ 130°F.~~ -------NOTE------- Sodium pentaborate concentration (C), in weight percent, is determined by the performance of SR 3.1.7.5. Boron-10 enrichment (E), in atom percent, is determined by the performance of SR 3.1.7.9. ---------- Verify SLC System satisfies the following equation: (C)(E) ≥ 420	~~24 hours~~ 31 days
SR 3.1.7.4	Verify continuity of explosive charge.	31 days
SR 3.1.7.5	~~Verify the concentration of boron in solution is within the limits of Figures 3.1.7-1 and 3.1.7-2.~~ Verify the percent weight of sodium pentaborate in solution is ≤9.5%.	31 days AND Once within 24 hours after water or boron is added to solution AND Once within 24 hours after solution temperature is restored to ≥ ~~75°F~~ 45°F

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.7.6	Verify each SLC subsystem manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, is in the correct position, or can be aligned to the correct position.	31 days
SR 3.1.7.7	Verify each pump develops a flow rate ≥ 41.2 gpm at a discharge pressure ≥ ~~1300~~ psig. [1340]	In accordance with the Inservice Testing Program
SR 3.1.7.8	Verify flow through one SLC subsystem from pump into reactor pressure vessel.	18 months on a STAGGERED TEST BASIS
SR 3.1.7.9	~~Verify all heat traced piping between storage tank and pump suction is unblocked.~~ Determine Boron-10 enrichment.	~~18 months~~ ~~AND~~ ~~Once within 24 hours after pump suction piping temperature is restored to ≥ 75°F~~ Once within 24 hours after boron is added to the solution.

Next page is 3.1-26.

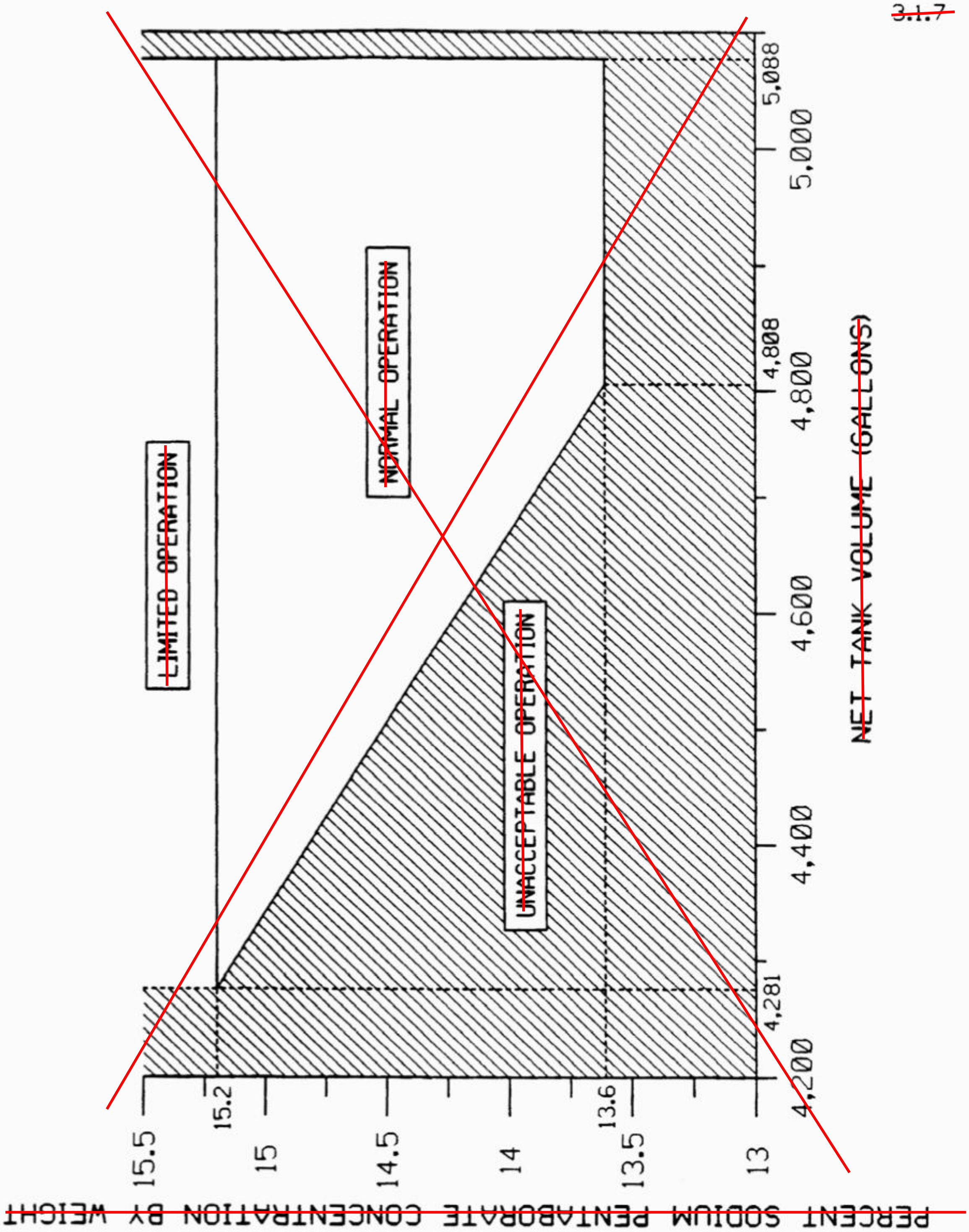

FIGURE 3.1.7-1
SODIUM PENTABORATE SOLUTION CONCENTRATION/AVAILABLE VOLUME REQUIREMENTS

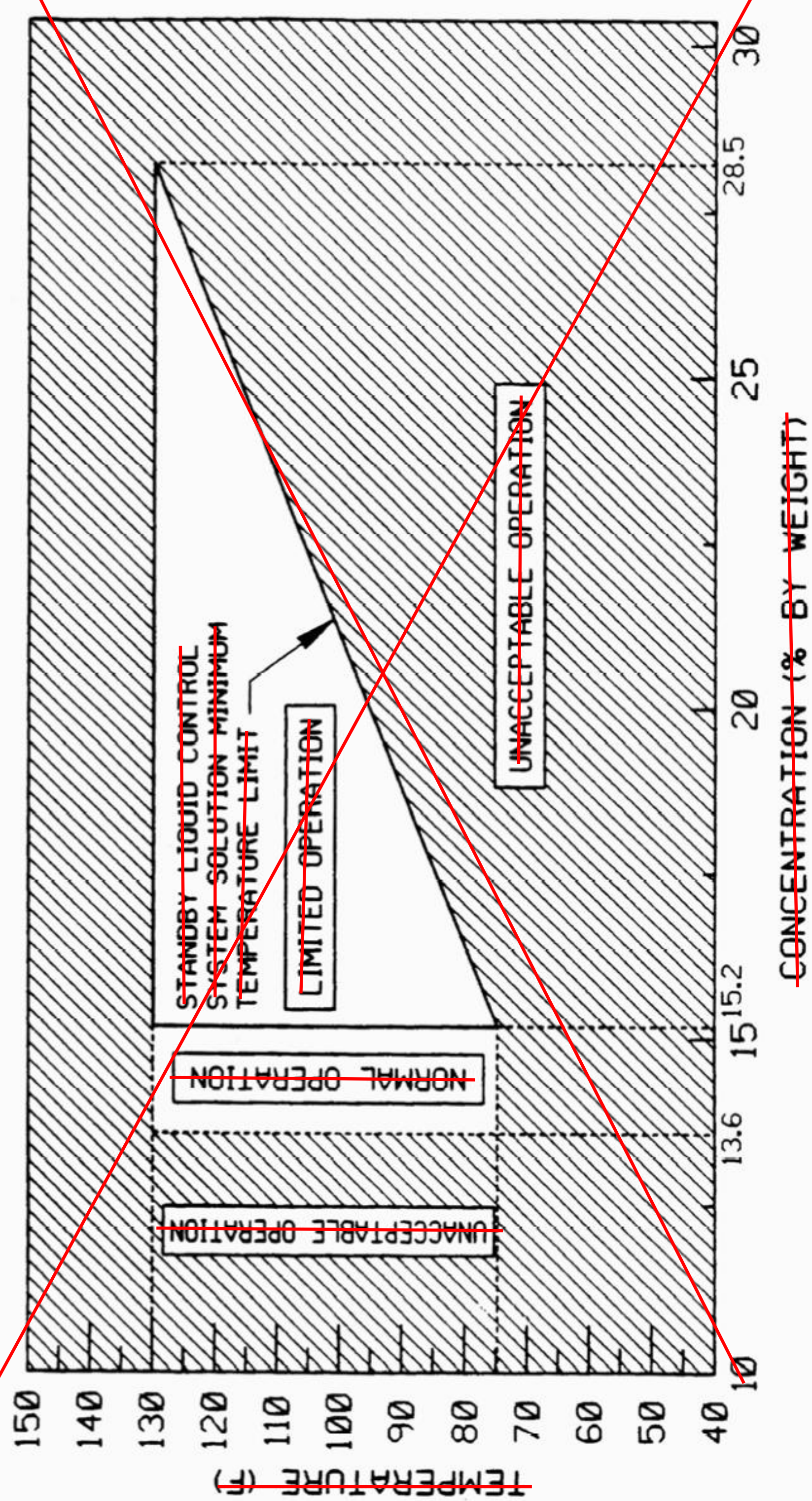

FIGURE 3.1.7-2
SODIUM PENTABORATE SOLUTION TEMPERATURE/CONCENTRATION REQUIREMENTS

Attachment 3

GNRO-2012/00001

Grand Gulf Nuclear Station, Unit 1

Proposed Technical Specification Changes (Clean Pages)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Standby Liquid Control (SLC) System

LCO 3.1.7 Two SLC subsystems shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (C)(E) < 420	A.1 Restore (C)(E) ≥ 420	8 hours
B. Sodium pentaborate solution volume < 4,200 gallons.	B.1 Restore volume to ≥ 4,200 gallons.	8 hours
C. Temperature < 45°F or > 150°F.	C.1 Restore temperature to ≥ 45°F and ≤ 150°F.	8 hours
D. One SLC subsystem inoperable for reasons other than Conditions A, B or C.	D.1 Restore SLC subsystem to OPERABLE status.	7 days
E. Two SLC subsystems inoperable for reasons other than Conditions A, B or C.	E.1 Restore one SLC subsystem to OPERABLE status.	8 hours
F. Required Action and associated Completion Time not met.	F.1 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Verify available volume of sodium pentaborate solution is ≥ 4,200 gallons.	24 hours
SR 3.1.7.2	Verify temperature of sodium pentaborate solution is ≥ 45°F and ≤ 150°F.	24 hours
SR 3.1.7.3	-------------------NOTE-------------------- Sodium Pentaborate Concentration (C), in weight percent is determined by the performance of SR 3.1.7.5. Boron-10 enrichment (E), in atom percent is determined by the performance of SR 3.1.7.9. --- Verify SLC System satisfies the following equation: (C)(E) ≥ 420	31 days
SR 3.1.7.4	Verify continuity of explosive charge.	31 days
SR 3.1.7.5	Verify the percent weight of sodium pentaborate in solution is ≤ 9.5%.	31 days <u>AND</u> Once within 24 hours after water or boron is added to solution <u>AND</u> Once within 24 hours after solution temperature is restored to ≥ 45°F

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.7.6	Verify each SLC subsystem manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, is in the correct position, or can be aligned to the correct position.	31 days
SR 3.1.7.7	Verify each pump develops a flow rate ≥ 41.2 gpm at a discharge pressure ≥ 1340 psig.	In accordance with the Inservice Testing Program
SR 3.1.7.8	Verify flow through one SLC subsystem from pump into reactor pressure vessel.	18 months on a STAGGERED TEST BASIS
SR 3.1.7.9	Determine Boron-10 enrichment.	Once within 24 hours after boron is added to the solution.

Next page is 3.1-26.

Attachment 4

GNRO-2012/00001

Grand Gulf Nuclear Station, Unit 1

Changes to Technical Specification Bases Pages
For Information Only

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.7 Standby Liquid Control (SLC) System

BASES

BACKGROUND

The SLC System is designed to provide the capability of bringing the reactor, at any time in a fuel cycle, from full power and minimum control rod inventory (which is at the peak of the xenon transient) to a subcritical condition with the reactor in the most reactive xenon free state without taking credit for control rod movement. The SLC System satisfies the requirements of 10 CFR 50.62 (Ref. 1) on anticipated transient without scram (ATWS).

The SLC System consists of a boron solution storage tank, two positive displacement pumps, two explosive valves, which are provided in parallel for redundancy, and associated piping and valves used to transfer borated water from the storage tank to the reactor pressure vessel (RPV). The borated solution is discharged through the high pressure core spray system sparger.

APPLICABLE SAFETY ANALYSES

The SLC System is manually initiated from the main control room, as directed by the emergency operating procedures, if the operator believes the reactor cannot be shut down, or kept shut down, with the control rods. The SLC System is used in the event that not enough control rods can be inserted to accomplish shutdown and cooldown in the normal manner. A SLC injection is also credited in the LOCA dose analysis to buffer the post-accident suppression pool chemistry and prevent iodine re-evolution. The SLC System injects borated water into the reactor core to compensate for all of the various reactivity effects that could occur during plant operation. To meet this objective, it is necessary to inject a quantity of boron that produces a concentration of at least ~~660~~ an equivalent of 780 ppm of natural boron in the reactor core at 68°F. To allow for potential leakage and imperfect mixing in the reactor system, an additional amount of boron equal to 25% of the amount cited above is added (Ref. 2). The ~~temperature versus~~ concentration limits ~~in Figure 3.1.7-1~~ are calculated such that the required concentration is achieved accounting for dilution in the RPV with normal water level and including the water volume in the residual heat removal shutdown cooling piping and in the recirculation loop piping. This quantity of borated solution is the amount

(continued)

ACTIONS

A.1 ~~and A.2~~

~~When the boron concentration is in the Limited Operation region (between 15.2 weight percent and 28.5 weight percent), the SBLC System contains sufficient boron to perform its design basis functions. But the associated solution temperatures required to prevent precipitation of the boron from solution is potentially greater than the primary containment's ambient temperature. As a result, the non safety tank heaters may be required to maintain the tank~~

In this condition, the concentration must be restored to within limits in 8 hours. It is not necessary under this condition to enter Condition E for both SLC subsystems inoperable, since they are capable of performing their original design basis function. Because of the low probability of an ATWS event and that the SLC System capability still exists for vessel injection under this condition, the allowed Completion Time of 8 hours is acceptable and provides adequate time to restore concentration to within limits.

(continued)

ACTIONS

B.1
If the volume of the sodium pentaborate solution is less than 4,200 gallons, the volume must be restored to greater than or equal to 4,200 gallons within 8 hours. When in Condition B.1, it is not necessary to enter Condition E for both SLC subsystems inoperable. The subsystems are capable of performing their original design basis function. Because of the low probability of an ATWS event and that the SLC System capability still exists for vessel injection under this condition, the allowed Completion Time of 8 hours is acceptable and provides adequate time to restore the volume to within limits.

C.1
If the temperature of the sodium pentaborate solution is less than 45°F or greater than 150°F, the temperature must be restored to within limits within 8 hours. When in Condition C.1, it is not necessary to enter Condition E for both SLC subsystems inoperable. The subsystems are capable of performing their original design basis function. Because of the low probability of an ATWS event and that the SLC System capability still exists for vessel injection under this condition, the allowed Completion Time of 8 hours is acceptable and provides adequate time to restore the temperature to within limits.

~~A.1 and A.2 (continued)~~

~~temperatures above the precipitation temperature. As a result of this potential reliance on the heaters to maintain the solution temperature operation in the Limited Operation region is only allowed for up to 72 hours and SR 3.1.7.2 is required to be performed once per 4 hours. The SR 3.1.7.2 is performed once per 4 hours to compensate for the reduced range of acceptable temperatures to preclude precipitation at the higher concentrations while remaining below the upper temperature limit (Reference 3). It is not necessary in the Limited Operation region to declare both SLC subsystems inoperable, since they are capable of performing their design basis functions. Because the SLC System capability still exists for vessel injection under these conditions, the allowed Completion Time of 72 hours is acceptable and provides adequate time to restore concentration to within limits.~~

~~B.1~~ D.1

If one SLC subsystem is inoperable [for reasons other than Conditions A, B or C], the inoperable subsystem must be restored to OPERABLE status within 7 days. ~~It is not necessary to enter this condition due to operation in the Limited Operation region.~~ In this condition, the remaining OPERABLE subsystem is adequate to perform the shutdown function. However, the overall reliability is reduced because a single failure in the remaining OPERABLE subsystem could result in reduced SLC System shutdown capability. The 7 day Completion Time is based on the availability of an OPERABLE subsystem capable of performing the intended SLC System function and the low probability of a Design Basis Accident (DBA) or severe transient occurring concurrent with the failure of the Control Rod Drive System to shut down the plant.

~~C.1~~ E.1

If both SLC subsystems are inoperable [for reasons other than Conditions A, B or C], at least one subsystem must be restored to OPERABLE status within 8 hours. ~~It is not necessary to enter this condition due to operation in the Limited Operation region.~~ The allowed Completion Time of 8 hours is considered acceptable, given the low probability of a DBA or transient occurring

(continued)

ACTIONS

E.1 ~~C.1~~ (continued)

concurrent with the failure of the controls rods to shut down the reactor.

F.1 ~~D.1~~

If any Required Action and associated Completion Time is not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.7.1 and SR 3.7.1.2

SR 3.1.7.1 and SR 3.1.7.2 are 24 hour Surveillances, verifying certain characteristics of the SLC System (e.g., the volume and temperature of the borated solution in the storage tank), thereby ensuring the SLC System OPERABILITY without disturbing normal plant operation. These Surveillances ensure the proper borated solution and temperature, including the temperature of the pump suction piping, are maintained. Maintaining a minimum specified borated solution temperature is important to ensuring that the boron remains in solution and does not precipitate out in the storage tank or in the pump suction piping. Maintaining the temperature less than 150°F ensures the pump net positive suction head requirements for two pump operation and SLC System piping qualifications. The 24-hour Frequency of these SRs is based on operating experience that has shown there are relatively slow variations in the measurement parameters of volume and temperature.

~~SR 3.1.7.1 is a 24 hour Surveillance to verify the volume of the borated solution in the storage tank. This Surveillance ensures the proper amount of sodium pentaborate (boron) solution is available to maintain the required minimum weight of 5800 pounds of boron in the solution. This required volume is identified as a required range of solution volumes ranging from 4281 gallons to 5088 gallons as a function of the boron concentration. The lower volume bound is the volume required to assure that the solution, at a concentration of 15.2 weight percent boron, will contain the 5800 pounds of boron approved by the NRC as the quantity conservatively needed for cold shutdown during an ATWS event. The upper bound on the required volume is limited by the tank volume of 5088 gallons (Reference 3). The 24 hour Frequency of this SR is based on operating experience that has shown there are relatively slow variations in the measured parameters.~~

~~SR 3.1.7.2~~

~~SR 3.1.7.2 is a 24 hour Surveillance to verify the temperature of the borated solution in the storage tank. When the boron concentration is ≤ 15.2 weight percent the corresponding saturation temperature is ≤ 70°F which is below the corresponding minimum allowable temperature of 75°F, this at least 5°F difference is maintained when the~~

(continued)

SURVEILLANCE REQUIREMENTS

~~SR 3.1.7.2 (continued)~~

~~boron concentration is > 15.2 weight percent. The upper temperature limit of 130°F is set to meet the pump net positive suction head requirements for two pump operation and to ensure the temperature is below the 150°F temperature rating of the SLC System piping (Reference 3).~~

~~This Surveillance ensures the proper boron solution temperature is maintained. Maintaining a minimum specified boron solution temperature is important in ensuring that the boron remains in solution and does not precipitate out in the storage tank or in the pump suction piping (Reference 3). The 24 hour Frequency of this SR is based on operating experience that has shown there are relatively slow variations in the measured parameters.~~

SR 3.1.7.3 and SR 3.1.7.5

The requirements of 10 CFR 50.62 are met by the use of a sodium pentaborate solution enriched in the boron-10 (B-10) isotope. SR 3.1.7.3 determines whether the sodium pentaborate concentration, in conjunction with the boron enrichment, is within limits to meet the requirements of 10 CFR 50.62. SR 3.1.7.5 ensures that the parameters used in the determination of sodium pentaborate concentration are within limits. The available solution volume is the solution volume above the pump suction penetration. This surveillance requires an examination of the sodium pentaborate solution by using chemical analysis to ensure the proper weight of B-10 exists in the storage tank. SR 3.1.7.5 must be performed anytime boron or water is added to the storage tank solution to establish that the weight of B-10 is within the specified limits. This SR must be performed anytime the solution temperature is restored to ≥45°F, to ensure no significant boron precipitation occurred. The 31 day Frequency of these surveillances is appropriate because of the relatively slow variation of boron concentration between surveillances.

~~SR 3.1.7.3 is a 24 hour Surveillance to verify the temperature of the pump suction piping. The minimum acceptable temperature is such that when the boron solution temperature is in the acceptable range, the boron concentration is ≤ 28.5 weight percent, and the pump suction piping at 70°F (which is below the corresponding minimum allowable temperature of 75°F) the SLC System will still be able to inject the required amount of solution without excessive precipitation. The upper temperature limit of 130°F is set to meet the pump net positive suction head requirements for two pump operation and to ensure the temperature is below the 150°F temperature rating of the SLC System piping. Maintaining a minimum specified pump suction piping temperature is important in ensuring that the boron remains in solution and does not precipitate out in the pump suction piping (Reference 3). The 24 hour Frequency of this SR is based on operating experience that has shown there is relatively slow variation in the measured parameter.~~

SR 3.1.7.4 and SR 3.1.7.6

SR 3.1.7.4 verifies the continuity of the explosive charges in the injection valves to ensure proper operation will occur if required. ~~Other administrative controls, such as those that limit the shelf life of the explosive charges,~~

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.1.7.4 and SR 3.1.7.6 (continued)

must be followed. The 31 day Frequency is based on operating experience that has demonstrated the reliability of the explosive charge continuity.

SR 3.1.7.6 verifies each valve in the system is in its correct position, but does not apply to the squib (i.e., explosive) valves. Verifying the correct alignment for manual, power operated, and automatic valves in the SLC System flow path ensures that the proper flow paths will exist for system operation. A valve is also allowed to be in the nonaccident position, provided it can be aligned to the accident position from the control room, or locally by a dedicated operator at the valve controls. This is acceptable since the SLC System is a manually initiated system. This Surveillance does not apply to valves that are locked, sealed, or otherwise secured in position, since they were verified to be in the correct position prior to locking, sealing, or securing. This verification of valve alignment does not apply to valves that cannot be inadvertently misaligned, such as check valves. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct positions. The 31 day Frequency is based on engineering judgment and is consistent with the procedural controls governing valve operation that ensure correct valve positions.

SR 3.1.7.5

This Surveillance requires an examination of the sodium pentaborate solution by using chemical analysis to ensure the proper concentration of boron exists in the storage tank. SR 3.1.7.5 must be performed anytime boron or water is added to the storage tank solution to establish that the boron solution concentration is within the specified limits. This Surveillance must be performed anytime the solution temperature is restored to ≥ 75°F after the solution temperature has been < 75°F, to ensure no significant boron precipitation occurred. The 31 day Frequency of this Surveillance is appropriate because of the relatively slow variation of boron concentration between surveillances.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.7.7

Demonstrating each SLC System pump develops a flow rate ≥ 41.2 gpm at a discharge pressure ≥ ~~1300~~ 1340 psig without actuating the pump's relief valve ensures that pump performance has not degraded during the fuel cycle. This minimum pump flow rate requirement ensures that, when combined with the sodium pentaborate solution concentration requirements, the rate of negative reactivity insertion from the SLC System will adequately compensate for the positive reactivity effects encountered during power reduction, cooldown of the moderator, and xenon decay. This test confirms one point on the pump design curve, and is indicative of overall performance. Such inservice inspections confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. The Frequency of this Surveillance is in accordance with the Inservice Testing Program.

SR 3.1.7.8 ~~and SR 3.1.7.9~~

~~These Surveillances ensure~~ This Surveillance ensures that there is a functioning flow path from the boron solution storage tank to the RPV, including the firing of an explosive valve. The replacement charge for the explosive valve shall be from the same manufactured batch as the one fired or from another batch that has been certified by having one of that batch successfully fired. Other administrative controls, such as those that limit the shelf life of the explosive charges, must be followed. The pump and explosive valve tested should be alternated such that both complete flow paths are tested every 36 months, at alternating 18 month intervals. The Surveillance may be performed in separate steps to prevent injecting boron into the RPV. An acceptable method for verifying flow from the pump to the RPV is to pump demineralized water from a test tank through one SLC subsystem and into the RPV. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance test when performed at the 18 month Frequency; therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

(continued)

SURVEILLANCE REQUIREMENTS

~~SR 3.1.7.8 and~~ SR 3.1.7.9 ~~(continued)~~

Enriched sodium pentaborate solution is made by mixing granular, enriched sodium pentaborate with water. Isotopic tests on the sodium pentaborate solution to determine the actual B-10 enrichment must be performed once within 24 hours after boron is added to the solution in order to ensure that the B-10 enrichment is adequate. Enrichment testing is only required when boron addition is made since enrichment change cannot occur by any other processes.

~~Demonstrating that all heat traced piping between the boron solution storage tank and the suction inlet to the injection pumps is unblocked ensures that there is a functioning flow path for injecting the sodium pentaborate solution. An acceptable method for verifying that the suction piping is unblocked is to pump from the storage tank to the test tank and then draining and flushing the piping with demineralized water. The 18 month Frequency is acceptable since there is a low probability that the subject piping will be blocked due to precipitation of the boron from solution in the heat traced piping. This is especially true in light of the daily temperature verification of this piping required by SR 3.1.7.3. However, if, in performing SR 3.1.7.3, it is determined that the temperature of this piping has fallen below the specified minimum, SR 3.1.7.9 must be performed once within 24 hours after the piping temperature is restored ≥ 75°F after the piping temperature has been < 75°F.~~

REFERENCES

1. 10 CFR 50.62.

2. UFSAR, Section 9.3.5.3.

3. GNRI-91/00153, Issuance of Amendment No. 79 to Facility Operating License No. NPF-29 - Grand Gulf Nuclear Station, Unit 1, Regarding Standby Liquid Control System Technical Specifications, dated July 30, 1991.