P.O. Box 63
Lycoming, New York 13093

Constellation Energy Group

Nine Mile Point
Nuclear Station

August 28, 2003
NMP2L 2097

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

SUBJECT: Nine Mile Point Unit 2
Docket No. 50-410
Facility Operating License No. NPF-69

License Amendment Request: Revise Standby Liquid Control System Sodium Pentaborate Solution Requirements, Technical Specification 3.1.7

Gentlemen:

Pursuant to 10 CFR 50.90, Nine Mile Point Nuclear Station, LLC (NMPNS) hereby requests an amendment to Nine Mile Point Unit 2 (NMP2) Operating License NPF-69. The proposed change revises Technical Specification Section 3.1.7, "Standby Liquid Control (SLC) System," to support a transition to GE14 fuel in the NMP2 reactor core. Specifically, the required average boron concentration in the reactor core, resulting from injection of sodium pentaborate solution by the SLC system, is being raised from 660 ppm natural boron to a concentration equivalent to 780 ppm natural boron. This will be accomplished by the use of sodium pentaborate solution enriched with the Boron-10 isotope. A similar change has previously been approved by the NRC for Brunswick Steam Electric Plant in a safety evaluation dated March 25, 2003 (TAC Nos. MB5680 and MB5681).

NMPNS plans to begin loading GE14 fuel during the next refueling outage (RFO9), currently scheduled to begin in March 2004. To support this schedule, NMPNS requests approval of this license amendment request by no later than February 27, 2004, with implementation prior to startup from RFO9. This letter contains no new commitments, as reflected in Attachment 4.

Pursuant to 10 CFR 50.91(b)(1), NMPNS has provided a copy of this license amendment request and the associated analyses regarding no significant hazards consideration to the appropriate state representative.

A001

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 28, 2003.

Very truly yours,

Peter E. Katz
Vice President Nine Mile Point

PEK/DEV/bjh

Attachments:
1. Evaluation of Proposed Technical Specification Changes
2. Proposed Technical Specification Changes (Mark-up)
3. Changes to Technical Specification Bases Pages
4. List of Regulatory Commitments

cc: Mr. H. J. Miller, NRC Regional Administrator, Region I
Mr. G. K. Hunegs, NRC Senior Resident Inspector
Mr. P. S. Tam, Senior Project Manager, NRR (2 copies)
Mr. J. P. Spath, NYSERDA

ATTACHMENT 1

EVALUATION OF PROPOSED TECHNICAL SPECIFICATION CHANGES

Subject: ***License Amendment Request: Revise Standby Liquid Control System Sodium Pentaborate Solution Requirements, Technical Specification 3.1.7***

1.0 DESCRIPTION

2.0 PROPOSED CHANGE

3.0 BACKGROUND

4.0 TECHNICAL ANALYSIS

5.0 REGULATORY SAFETY ANALYSIS

6.0 ENVIRONMENTAL CONSIDERATION

1.0 DESCRIPTION

This letter is a request to amend Operating License NPF-69 for Nine Mile Point Unit 2 (NMP2) as a result of transition to the GE14 fuel design. To support this transition, the proposed change raises the required average boron concentration in the reactor core, resulting from injection of sodium pentaborate solution by the Standby Liquid Control (SLC) system, from 660 ppm natural boron to a value equivalent to 780 ppm natural boron. This will be accomplished by the use of sodium pentaborate solution enriched with the Boron-10 isotope. As a result, (1) a new Technical Specification (TS) Surveillance Requirement (SR) 3.1.7.10 is added to verify the sodium pentaborate solution Boron-10 enrichment prior to addition to the SLC tank; and (2) TS Figure 3.1.7-1, "Sodium Pentaborate Solution Volume/Concentration Requirements," is revised to add a notation regarding the required Boron-10 enrichment, and to make a minor adjustment to one of the coordinates that define the Acceptable Operation region on the figure.

Nine Mile Point Nuclear Station, LLC (NMPNS) plans to begin loading GE14 fuel during the next refueling outage (RFO9), currently scheduled to begin in March 2004. To support this schedule, NMPNS requests approval of this license amendment request by no later than February 27, 2004.

2.0 PROPOSED CHANGE

To support transition to the GE14 fuel design, NMPNS proposes to raise the required neutron absorber concentration in the reactor core from 660 ppm natural boron to a value equivalent to 780 ppm natural boron. This will be accomplished by the use of sodium pentaborate solution enriched with the Boron-10 isotope. As a result, a new SR 3.1.7.10 to verify the sodium pentaborate solution Boron-10 enrichment is being added. The proposed SR states:

	SURVEILLANCE	FREQUENCY
SR 3.1.7.10	Verify sodium pentaborate enrichment is ≥ 25 atom percent B-10.	Prior to addition to SLC tank

This proposed change is consistent with NUREG-1434, "Standard Technical Specifications General Electric Plants, BWR/6," Revision 2.1, dated March 27, 2002.

NMP2 TS SR 3.1.7.1 and SR 3.1.7.5 require that the available volume and concentration of sodium pentaborate solution in the SLC tank be within the limits of TS Figure 3.1.7-1. Figure 3.1.7-1 consists of a graph that defines acceptable SLC tank volume and concentration values, such that the required boron concentration in the reactor core will be achieved. The proposed change revises Figure 3.1.7-1 by adding a notation regarding the required Boron-10 enrichment, consistent with the proposed new SR 3.1.7.10. In addition, a minor adjustment is being made to one of the coordinates that define the Acceptable Operation region of Figure 3.1.7-1. The current concentration/volume coordinate of 14.4 percent/4275 gallons is changed to 14.4 percent/4288 gallons. This adjustment resulted from different roundoff techniques utilized in the prior volume calculation versus the present calculation.

The proposed changes are indicated on the marked-up TS pages provided in Attachment 2. Supporting changes to the TS Bases are shown in Attachment 3. The TS Bases pages are being submitted for information only and do not require issuance by the NRC.

3.0 BACKGROUND

The SLC system is described in Section 9.3.5 of the NMP2 Updated Safety Analysis Report (USAR). The SLC system is designed to provide the capability for controlling the reactivity difference between the steady-state rated reactor operating condition, with voids, and the cold shutdown condition, including shutdown margin, to assure complete reactor shutdown from the most reactive condition at any time in core life, without taking credit for control rod movement. Currently, in order to meet this objective, it is necessary for the SLC pumps to inject a quantity of sodium pentaborate solution that produces an average concentration of 660 ppm of natural boron in the reactor coolant, including recirculation loops, at 68°F and reactor vessel water level at level 8. An additional 20 percent of that quantity is also injected to allow for imperfect mixing and leakage. Additional sodium pentaborate solution is provided to accommodate dilution by the Residual Heat Removal (RHR) system operating in the shutdown cooling mode. The shutdown capability of the SLC system is evaluated for each fuel cycle and is reported in the cycle-specific Supplemental Reload Licensing Report (SRLR).

The SLC system satisfies the 10 CFR 50.62 requirements for anticipated transients without scram (ATWS) events.

4.0 TECHNICAL ANALYSIS

To continue to meet the shutdown objective of the SLC system with GE14 fuel (to be initially loaded during RFO9), it is necessary to raise the minimum average concentration of natural boron in the reactor core from the current value of 660 ppm to 780 ppm natural boron equivalent. This is due to the higher uranium content of GE14 fuel. This concentration was determined by Global Nuclear Fuel (GNF) using the approved methods described in Revision 14 of General Electric Standard Application for Reactor Fuel (GESTAR II), NEDE 24011-P-A. The analysis assumes NMP2 operation with an equilibrium core of GE14 fuel, operating at 3467 megawatts thermal (MWt) with 24 month operating cycles. The GNF analysis demonstrates that, with a minimum concentration equivalent to 780 ppm natural boron at 68°F, sufficient shutdown margin is maintained in the reactor to assure that the SLC system design function of bringing the reactor to a subcritical condition is achieved. This analysis is bounding for Operating Cycle 10, which will utilize GE11 and GE14 fuel designs, and for currently planned future core designs. This is because the required cold shutdown boron concentration is directly proportional to the reactivity in the core. Since the GE14 fuel bundle design contains more uranium than the GE11 design and tends to be more reactive (at similar enrichments), an equilibrium core of GE14 fuel is more limiting than a partial core of GE14 fuel. As noted in Section 3.0 above, the shutdown capability of the SLC system is evaluated for each fuel cycle and is reported in the cycle-specific SRLR.

Natural boron contains 19.8 atom percent of the Boron-10 isotope. Boron-10, with its large neutron absorption capability, is the active component in sodium pentaborate. In order to achieve the increased neutron absorber concentration equivalent to 780 ppm natural boron, NMPNS has elected to use sodium pentaborate solution enriched with the Boron-10 isotope, which is chemically and physically similar to the current solution. The use of sodium pentaborate enriched with the Boron-10 isotope provides a faster negative reactivity insertion rate than the same quantity of sodium pentaborate with natural boron. Accordingly, a new TS SR 3.1.7.10 is added to verify that sodium pentaborate enrichment is ≥ 25 atom percent Boron-10 prior to addition to the SLC tank, and a corresponding notation is added to TS Figure 3.1.7-1 regarding the required Boron-10 enrichment. In addition, a minor adjustment is being made to one of the coordinates that define the Acceptable Operation region of Figure 3.1.7-1. The current concentration/volume coordinate of 14.4 percent/4275 gallons is changed to 14.4 percent/4288 gallons. This adjustment resulted from different roundoff techniques utilized in the prior volume calculation versus the present calculation. The change in the volume value is small (an 0.3 percent increase) and is in a portion of the Acceptable Operation region that falls below the low level alarm volume of 4418 gallons. Operation with the SLC tank volume less than 4418 gallons is not expected, and the operators would restore the volume to a value greater than 4418 gallons in response to the low level alarm. Thus, this change does not have any impact on SLC system operation or the ability of the system to perform its shutdown function. Operation within the Acceptable Operation region of TS Figure 3.1.7-1, with a sodium pentaborate enrichment of ≥ 25 atom percent Boron-10 in accordance with SR 3.1.7.10, will achieve the required concentration equivalent to 780 ppm natural boron in the reactor core.

The current SLC boron solution concentration requirements comply with the requirements of 10 CFR 50.62(c)(4). The proposed change to use sodium pentaborate solution enriched with the Boron-10 isotope, to support a transition to the GE14 fuel design, does not affect the SLC system flow rate or the acceptable solution volumes and concentrations depicted on TS Figure 3.1.7-1. Thus, the SLC system will continue to comply with the requirements of 10 CFR 50.62(c)(4) for plant operation with a core containing GE14 fuel.

The existing SLC system design requires injection of a quantity of boron that includes an additional 20 percent above that needed for an in-vessel boron concentration of 660 ppm, to allow for imperfect mixing and leakage. As part of this proposed change, the additional quantity of boron included to allow for imperfect mixing and leakage is being increased from 20 percent to 25 percent. Thus, an additional 25 percent (rather than 20 percent) of the quantity of boron required to achieve a minimum in-vessel boron concentration equivalent to 780 ppm natural boron will also be injected. This change is consistent with the Bases for TS 3.1.7 contained in NUREG-1434, "Standard Technical Specifications General Electric Plants, BWR/6," Revision 2.1, dated March 27, 2002.

Current TS SR 3.1.7.2 and SR 3.1.7.3 require verification that the temperature of the SLC system sodium pentaborate solution and pump suction piping up to the pump suction valve is greater than or equal to 70°F, to ensure that the boron remains in solution and does not precipitate out in the storage tank or in the pump suction piping. Since the atomic weights of naturally occurring boron and boron enriched to 25 atom percent Boron-10 differ only slightly (less than one percent), there will be no significant impact on the solubility limit of enriching the sodium

pentaborate solution with the Boron-10 isotope. In addition, the maximum solution concentration is not changing. Thus, the minimum solution and piping temperature of 70°F to maintain the boron in solution remains unchanged.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

The proposed change raises the required average boron concentration in the reactor core, resulting from injection of sodium pentaborate solution by the Standby Liquid Control (SLC) system, to support a transition to the GE14 fuel design. This will be accomplished by the use of sodium pentaborate solution enriched with the Boron-10 isotope. The proposed change adds a new Technical Specification (TS) surveillance requirement to verify the required Boron-10 enrichment of the sodium pentaborate solution prior to addition to the SLC tank. The proposed change also revises the TS figure that depicts acceptable values of SLC storage tank volume and sodium pentaborate solution concentration by adding a notation regarding the required Boron-10 enrichment, and by making a minor adjustment to one of the coordinates that define the Acceptable Operation region on the figure.

Nine Mile Point Nuclear Station, LLC (NMPNS) has evaluated whether or not a significant hazards consideration is involved with the proposed amendment 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 sufficient negative reactivity to bring the reactor from full power to a subcritical condition at any time in a fuel cycle, without taking credit for control rod movement. The proposed changes to the SLC sodium pentaborate solution requirements maintain the capability of the SLC system to perform this reactivity control function, and assure continued compliance with the requirements of 10 CFR 50.62 for anticipated transients without scram (ATWS). The SLC system is provided to mitigate ATWS events and, as such, is not considered to be an initiator of the ATWS event or any other analyzed accident. The use of sodium pentaborate solution enriched with the Boron-10 isotope, which is chemically and physically similar to the current solution, does not alter the design 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 change does 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.

   Injection of sodium pentaborate solution into the reactor vessel has been considered in the plant design. The proposed changes revise the SLC boron solution requirements such that the capability of the SLC system to bring the reactor to a subcritical condition without taking credit for control rod movement is maintained, considering operation with an equilibrium core of GE14 fuel. The use of sodium pentaborate solution enriched with the Boron-10 isotope, which is chemically and physically similar to the current solution, does not alter the design, function, or operation of the SLC system. The correct Boron-10 enrichment is assured by the proposed revisions to the TS surveillance requirements. The impact on the solubility limit of enriching the sodium pentaborate solution with the Boron-10 isotope is insignificant; thus, the existing minimum solution and piping temperature specified in the TS will ensure that the boron remains in solution and does not precipitate out in the SLC storage tank or in the SLC pump suction piping. Therefore, the proposed change does 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.

   The proposed changes revise the SLC boron solution requirements to maintain the capability of the SLC system to bring the reactor to a subcritical condition without taking credit for control rod movement. These changes support operation with an equilibrium core of GE14 fuel and assure continued compliance with the requirements of 10 CFR 50.62. The minimum required average boron concentration in the reactor core, resulting from the injection of sodium pentaborate solution by the SLC system, has been determined using approved analytical methods. The analysis demonstrates that sufficient shutdown margin is maintained in the reactor such that the reactivity control function of the SLC system is assured. The additional quantity of boron included to allow for imperfect mixing and leakage is being increased from 20 percent to 25 percent. Thus, additional safety margin is provided to bring the reactor subcritical in the event of an ATWS. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above evaluation, NMPNS concludes that the proposed amendment involves no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

Conformance with the NRC General Design Criteria (GDC) for Nuclear Power Plants, Appendix A to 10 CFR 50, is described in Section 3.1 of the NMP2 USAR. In particular, GDC 26, "Reactivity control system redundancy and capability," and GDC 27, "Combined reactivity control systems capability," continue to be met.

In 10 CFR 50.62, requirements for reduction of risk from ATWS events are specified. Paragraph (c)(4) of 10 CFR 50.62 states, in part:

> "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 SLC system sodium pentaborate solution requirements will continue to comply with the requirements of 10 CFR 50.62(c)(4) for plant operation with a core containing GE14 fuel.

In conclusion, based on the considerations discussed above, (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.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed revisions to the SLC system sodium pentaborate solution requirements in the NMP2 TS would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, 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.

ATTACHMENT 2

Proposed Technical Specification Changes (Mark-up)

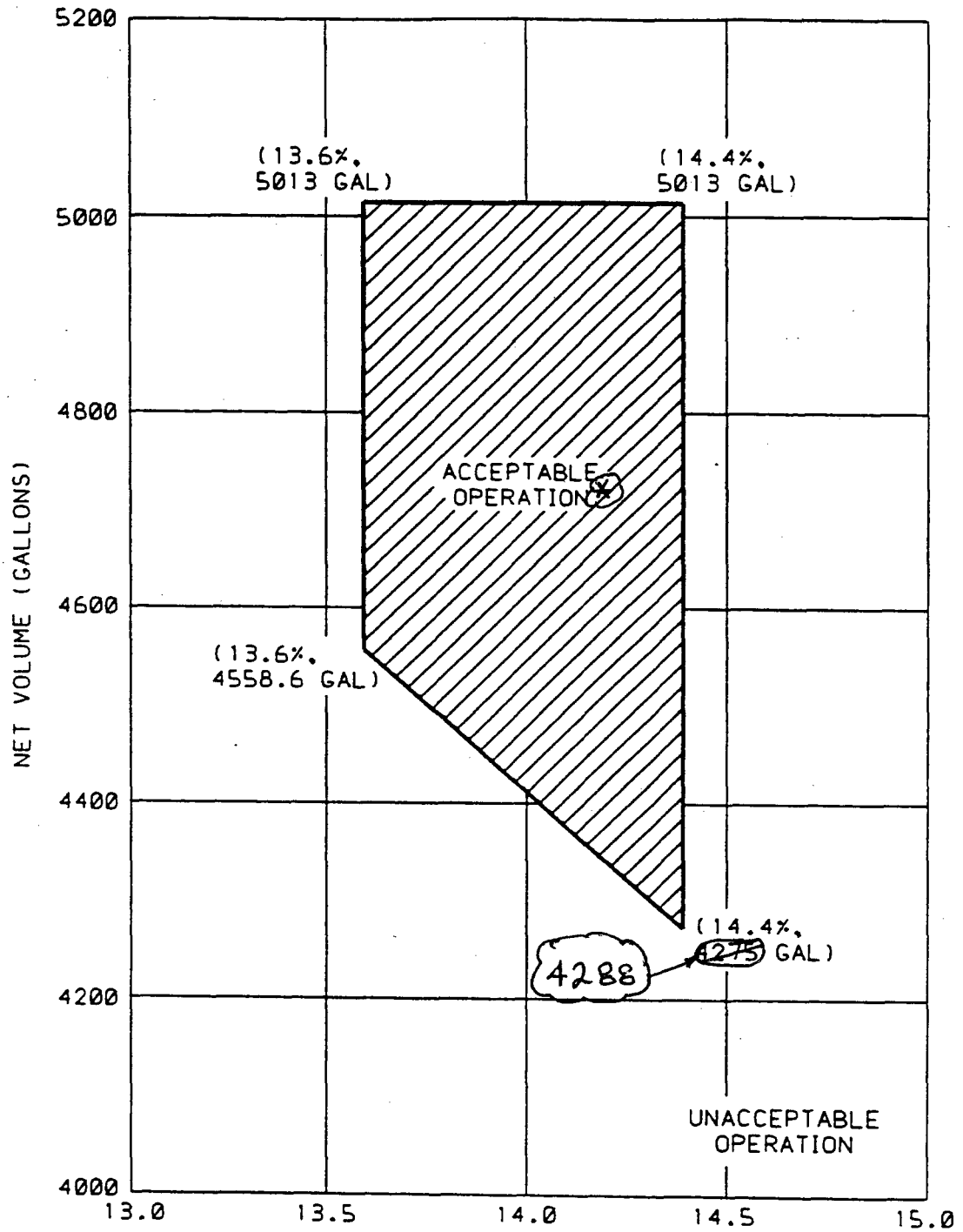
The current versions of Technical Specifications pages 3.1.7-3 and 3.1.7-4 (Figure 3.1.7-1) have been marked-up by hand to reflect the proposed changes.

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.7.7	Verify each pump develops a flow rate ≥ 41.2 gpm at a discharge pressure ≥ 1235 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.	24 months on a STAGGERED TEST BASIS
SR 3.1.7.9	Verify all heat traced piping between storage tank and pump suction valve is unblocked.	24 months AND Once within 24 hours after piping temperature is restored to ≥ 70°F

Add

SR 3.1.7.10	Verify sodium pentaborate enrichment is ≥ 25 atom percent B-10.	Prior to addition to SLC tank



Add

* For Boron-10 Isotope Enrichment ≥ 25 Atom Percent

Figure 3.1.7-1 (Page 1 of 1)
Sodium Pentaborate Solution Volume/Concentration Requirements

ATTACHMENT 3

Changes to Technical Specification Bases Pages

The current versions of Technical Specification Bases pages B 3.1.7-1 and B 3.1.7-6 have been marked-up by hand to reflect the proposed changes. These Bases pages are provided for information only and do not require NRC issuance.

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 can also be automatically initiated as required by Reference 1; however, this is not necessary for SLC System OPERABILITY. 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. 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, using both SLC pumps, a quantity of boron that produces a concentration ~~of 660 ppm~~ equivalent to 780 ppm of natural boron in the reactor core, including recirculation loops, at 68°F and reactor water level at level 8. To allow for potential leakage and imperfect mixing in the reactor system, an additional amount of boron equal to ~~20~~ 25% of the amount cited above is added (Ref. 2). An additional amount is provided to accommodate dilution in the RPV by the residual heat removal shutdown cooling piping. The volume versus concentration limits in Figure 3.1.7-1 are calculated such that the required concentration is achieved. This quantity of borated solution is the amount that is above the pump suction

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.7.8 and SR 3.1.7.9 (continued)

path for injecting the sodium pentaborate solution. An acceptable method for verifying that the suction piping up to the suction valve is unblocked is to pump from the storage tank to the test tank. Upon completion of this verification, the pump suction piping between the pump suction valve and pump suction must be drained and flushed with demineralized water, since this piping is not heat traced. The 24 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 within the limits of SR 3.1.7.3.

REFERENCES

1. 10 CFR 50.62.

2. USAR, Section 9.3.5.3.

3. 10 CFR 50.36(c)(2)(ii).

Add

SR 3.1.7.10

Enriched sodium pentaborate solution is made by mixing granular, enriched sodium pentaborate with water. Isotopic tests on the granular sodium pentaborate to verify the actual B-10 enrichment must be performed prior to addition to the SLC tank in order to ensure that the proper B-10 atom percentage is being used.

ATTACHMENT 4

List of Regulatory Commitments

The following table identifies those actions committed to by Nine Mile Point Nuclear Station, LLC (NMPNS) in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

REGULATORY COMMITMENT	DUE DATE
None	N/A