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SCE&G®
A SCANA COMPANY

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

ATTN: K. R. Cotton

Ladies and Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
LICENSE AMENDMENT REQUEST - LAR 02-2820
EMERGENCY CORE COOLING SYSTEMS - EXCLUSION OF SAFETY INJECTION PUMPS FROM THE REQUIREMENT TO VENT ECCS PUMPS

Pursuant to 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G), acting for itself and as agent for South Carolina Public Service Authority, hereby requests an amendment to the Virgil C. Summer Nuclear Station (VCSNS) Technical Specifications (TS).

The proposed change will exclude the Charging/Safety Injection (SI) pumps and the Residual Heat Removal pumps from the requirement to vent ECCS Pump casings located in TS section 4.5.2.b.2, eliminate the 31 day venting surveillance for the SI pumps, and add discussion for this exclusion in the Technical Basis of TS Section B 3/4.5.2. Pursuant to 10 CFR 50.91, the enclosed analysis provides a determination that the proposed Technical Specifications change poses no significant hazard as delineated by 10 CFR 50.92.

SCE&G requests approval of the proposed amendment by November 1, 2003, to support the VCSNS plant surveillance program. Once approved, the amendment shall be implemented within 30 days.

If you have any questions or require additional information, please contact Mr. Melvin N. Browne at (803)-345-4141.

I certify under penalty of perjury that the foregoing is true and correct.

1/14/03
Executed on

Stephen A. Byrne

JT/SAB/dr

A001

Enclosures:
Evaluation of the proposed change

Attachment(s): 3

1. Proposed Technical Specification Change - Mark-up
2. Proposed Technical Specification Change - Retyped
3. List of Regulatory Commitments

c: N. O. Lorick
N. S. Carns
T. G. Eppink (w/o Attachments)
R. J. White
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RTS (LAR 02-2820)
File (813.20)
DMS (RC-03-0006)

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1.0 DESCRIPTION

South Carolina Electric & Gas Company (SCE&G) proposes an amendment to revise the Virgil C. Summer Nuclear Station (VCSNS) Technical Specifications (TS) Surveillance Requirements (SR) to revise SR 4.5.2.b.2. The proposed change will:

- exclude the Charging/Safety Injection (SI) pumps from the requirement to vent emergency core cooling system (ECCS) pumps located in TS section 4.5.2.b.2
- remove the reference to venting at the residual heat removal (RHR) pump casing
- add discussion for the venting changes in the Technical Basis of TS Section B 3/4.5.2.

The change to the SI pump venting requirement is supported by system design and operating characteristics that preclude the introduction of non-condensable gas to the pump suction. The pumps are not prone to trapped gas due to a closed circuit pressurized leak off system created by the top mounted suction and discharge nozzles. Venting of the associated piping high points would result in unnecessary exposure without a commensurate increase in safety.

The RHR pump piping will continue to be subject to periodic venting surveillance. The change to the SR will eliminate the reference to venting at the RHR pump casing. The pump casing is adequately vented at local piping high points and the seal water cooler to preclude the buildup of non-condensable gases.

This change is necessary to provide literal compliance with the VCSNS TS.

2.0 PROPOSED CHANGE

Specifically the proposed changes would revise the following:

2.1 TS 4.5.2.b.2

Surveillance Requirement 4.5.2.b is revised to eliminate the SI pump piping from the 31 day periodic surveillance. The SR will specifically state that periodic venting is required for the RHR pump piping. Reference to venting at the RHR casing will also be eliminated.

2.3 BASES 3/4.5.2 and 3/4.5.3

Added discussion on SI and RHR pump piping venting surveillance requirements.

3.0 BACKGROUND

Current SR 4.5.2.b states that each ECCS subsystem shall be demonstrated operable at least every 31 days by verifying that the ECCS piping is full of water by venting the ECCS pump casings and accessible discharge piping high points. The SR is in place to prevent buildup of non-condensable gases that may cause gas binding of the pump or water hammer conditions when ECCS is activated.

The SI pumps are Pacific Model RL-IJ pumps. The SI pumps are actuated by a Safety Injection (SI) signal and provide flow to all three Reactor Coolant System (RCS) cold legs. The SI signal automatically switches the SI pump suction from the Volume Control Tank (VCT) to the Refueling Water Storage Tank (RWST). During normal operation one SI pump is operating, taking suction on the VCT and delivering flow through the normal charging line and to Reactor Coolant Pump (RCP) seals. The VCT is provided with a hydrogen cover pressure as a means of oxygen scavenging in the reactor coolant. Non-condensable gas intrusion from the dissolved hydrogen has occurred at several nuclear facilities. This was covered in NRC Information Notice IN 88-23 (Potential for Gas Binding of High-Pressure Safety Injection Pumps During a Loss-of-Coolant Accident). VCSNS has evaluated the potential for gas intrusion from the VCT. A detailed discussion is provided in the Technical Analysis section of this submittal.

The RHR pumps are Ingersoll Rand Model 8x20WDF vertical pumps. The RHR pumps are actuated by a SI signal and deliver flow to all three RCS cold legs from the RWST. The RHR pump casings are not provided with direct vents. The RHR pumps are able to vent through the seal housing. Venting at piping high points is adequate for ensuring the pipe is full of water.

4.0 TECHNICAL ANALYSIS

During plant operation, emergency core cooling reliability is maintained when the Technical Specification (TS) requirements are met. In Modes 1, 2, and 3, this is accomplished by maintaining ECCS Subsystems operable as described in TS 3.5.2, "Emergency Core Cooling Systems."

The requirements of TS 3.5.2, "ECCS Subsystems - $T_{avg} \geq 350°F$," ensure that sufficient emergency core cooling capability will be available, through two independent ECCS subsystems, in the event of a loss of coolant accident (LOCA) or steam line break (MSLB). The system design provides adequate performance assuming a single active failure. Either subsystem operating in conjunction with the accumulators is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. Limiting Condition for Operation (LCO) 3.5.2 requires that two independent ECCS subsystems are operable. Each subsystem is comprised of one operable SI pump, one operable RHR heat exchanger, one operable RHR pump, and an operable flow path capable of taking suction from the RWST on a SI signal and automatically transferring suction to the RHR sump during the recirculation phase of operation.

The proposed change for the RHR pump piping eliminates the wording that specifies the piping is vented through both piping high point vents and the RHR pump casing vents. The RHR pump casings are not provided with direct vents. This has been the situation since plant startup. Venting at piping high points is adequate for ensuring the pipe is full of water. The TS change is made for clarification and to allow for literal compliance with the ECCS subsystem surveillance requirements.

The proposed change for the SI pump piping eliminates the periodic (31 day) surveillance to vent the piping. The ECCS piping will remain full unless a mechanism is present that allows gas to be introduced into the piping. The mechanisms that could potentially introduce gas into the ECCS piping have been evaluated. The following discussions demonstrate that these mechanisms will not introduce gas into the piping and provide the assurance that the ECCS piping is full of water. Analysis and industry operating experience were used to determine potential mechanisms that could introduce gas into the ECCS piping during Modes 1 through 4. The potential mechanisms that may introduce non-condensable gas into the SI pump piping are addressed in the following sections:

4.1 <u>Gas intrusion from a pump suction source</u>

The potential for gas intrusion into ECCS piping from a SI pump source includes possible intrusion from sources such as the VCT or the RHR System. The gas intrusion mechanism involving hydrogen transport from the VCT and accumulation into the ECCS piping has occurred in the industry before. This issue was addressed via NRC Information Notice IN 88-23 (Potential for Gas Binding of High-Pressure Safety Injection Pumps During a Loss-of-Coolant Accident).

SCE&G evaluated the applicability of this issue to VCSNS. The SI pump(s) suction piping configuration was investigated considering all suction source paths (i.e., via VCT, RWST, RHR system, and boration makeup). In addition to reviewing piping configurations, the evaluation considered dynamic conditions to determine if any low-pressure sites existed which could be susceptible to allowing hydrogen to come out of solution. The evaluation concluded that there is no concern for potential gas binding of the VCSNS SI pumps as a result of hydrogen leaving solution in the SI pump suction piping. Furthermore, the plant's operating experience supports this conclusion as there has been no history of gas accumulation associated with the VCSNS SI pumps.

4.2. <u>Gas intrusion from maintenance</u>

Any maintenance of the ECCS system, which results in a pressure boundary breach of the SI piping, requires draining portions of the affected line. The most common maintenance activities are repairs or replacement of components such as valves, transmitters, gaskets, etc. Planned activities of this type usually occur during Modes 5 and 6 and do not present a problem with regard to non-condensable gas intrusion because the ECCS piping is filled and vented from the

RWST per VCSNS System Operating Procedures (SOPs) during each refueling outage.

Some on-line maintenance activities which breach the ECCS pressure boundary and require draining may also occur in Modes 1, 2, 3, and 4. SI pump seal replacement activities are an example. This is not a problem with regard to gas intrusion because the pump and all the affected portions of piping are filled and vented immediately after the maintenance is completed. Venting is accomplished by opening the pump's suction valve and throttling open an instrument vent valve located on the pump's discharge piping. The instrument valve is located above the pump casing and remains open until a steady stream of water exits. This action ensures the pump suction piping, casing, and discharge piping up to the discharge header check valve is full of water. Furthermore, post-maintenance testing is required to be performed. The testing verifies the pump casing and associated piping is full of water through demonstration of satisfactory pump operation. Satisfactory performance is based on vibration as well as suction and discharge pressure readings observed while on mini-flow.

4.3. Gas intrusion from flow restrictions

It is possible to have local pressures less than VCT pressure at sites characterized by maximum velocities and/or flow restrictions. If the local pressure in the ECCS piping is less than the VCT pressure, any dissolved gas (normally hydrogen) will come out of solution. As stated previously in Section 4.1, the SI pump suction piping was evaluated for this occurrence during dynamic conditions. It was concluded that there is no concern for potential gas binding of the VCSNS SI pump suction piping.

The only other flow restriction where pressure can potentially be low enough such that gas could be stripped out of solution is the SI pump mini-flow orifice piping. This gas intrusion mechanism has occurred before at a plant within the nuclear industry and caused pumps to become gas bound on different occasions. However, the mini-flow recirculation piping at the affected plant is routed back into the suction of their Charging/SI pumps during normal operations. This is not the case at VCSNS. The mini-flow piping at VCSNS is routed into the VCT via a normally open valve (see note 1). The valve that could route miniflow to the SI pump suction is a locked closed valve. Any gas that gets stripped out of solution at the mini-flow orifices will end up at the VCT gas space via the reactor coolant pump (RCP) seal return line. Therefore, this potential gas stripping mechanism is not a concern at VCSNS during normal operations. This is consistent with past operating experience at the plant because there have been no instances of gas binding of the SI pumps.

It is not postulated that gas will come out of solution in the SI pump discharge piping because a running pump pressurizes the majority of the discharge piping. The majority of the discharge piping is pressurized because a SI pump supplies normal charging and RCP seal injection flow during normal operations. The main discharge headers of the two idle SI pumps are connected to the running pump's discharge line via normally locked open valves. Therefore, it is concluded that the pump's discharge piping downstream of the pumps' associated check valves is not susceptible to gas coming out of solution.

It is not postulated that the idle pump's remaining main header discharge piping is susceptible to gas coming out of solution either because the idle pumps' discharge piping up to the associated discharge check valve is pressurized to essentially the same value as the running pump's suction pressure (see note 2). This is true because the suction piping of all three SI pumps is connected to the running pump's suction line via normally locked open valves. Therefore, it is ensured that the piping up to the associated pump's discharge check valve is pressurized. The pressure is sufficient to keep gas in solution for the same reasons the suction piping is not susceptible to gas coming out of solution.

VCSNS System Operating Procedures assure that all of the ECCS piping is filled and vented during each refueling outage. The mechanisms that could potentially introduce gas into the high head portion of the ECCS piping after outages have been evaluated. These mechanisms will not introduce gas into the high head portion of the ECCS piping at VCSNS while the system is required to be operable in Modes 1 through 4. Therefore, it is concluded that the operability intent of TS is satisfied because it is ensured that the high head portion of the ECCS system is full of water while in Modes 1 through 4.

Notes:

1. There is the capability to bypass the VCT and route mini-flow back to the suction of the SI pumps. However, this is only done during surveillance testing while in Mode 6 when the ECCS is not required to be operable. Therefore, the TS sections that require that the ECCS piping be full of water do not apply during the testing conditions. It is also important to note that there has never been any occurrence of a SI pump becoming gas bound during this testing line-up. This is due to the fact that the pump is taking its suction from the RWST during the testing activity. This water supply is not provided with nitrogen or hydrogen gas over-pressure like the VCT, therefore there is less gas available to be stripped out of solution. Another factor which explains why there is not a gas binding problem associated with testing in this flow configuration is the short time duration of flow through the mini-flow path.

2. The elevation difference between the suction nozzles and the discharge header check valves is about 29 inches. This correlates to a reduction in pressure due to the difference in elevation of only about one pound per square inch. Therefore, the pressure in the SI pump discharge lines up to the discharge header check valves is nearly equal to the pump suction pressure.

Based on the analysis performed, SCE&G has determined that the proposed changes are acceptable. The above analyses provide assurance that the proposed changes will not adversely affect the performance of the charging/SI and RHR pumps.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

South Carolina Electric & Gas Company (SCE&G) has evaluated the proposed changes to the VCSNS TS described above against the significant Hazards Criteria of 10CFR50.92 and has determined that the changes do not involve any significant hazard. The following is provided in support of this conclusion.

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

Response: No.

The proposed changes to Technical Specification 4.5.2.b.2 and its associated bases do not contribute to the initiation of any accident previously evaluated. Supporting factors are as follows:

- The safety function of the Charging/SI system, which is related to accident mitigation, has not been altered. Therefore, the probability of an accident is not increased by the exclusion of the Charging/SI system discharge venting requirements.
- The exclusion of the Charging/SI system venting requirements does not affect the integrity of the Charging/SI system such that its function in the control of radiological consequences is affected. In addition, the exclusion of the Charging/SI system venting requirements does not alter any fission product barrier. The exclusion of the Charging/SI system venting requirements does not change, degrade, or prevent the response of the Charging/SI system to accident scenarios, as described in FSAR Chapter 15. In addition, the exclusion of the Charging/SI system venting requirements does not alter any assumptions previously made in the radiological consequence evaluations nor affect the mitigation of the radiological consequences of an accident described in the FSAR. Therefore, the consequences of an accident previously evaluated in the FSAR will not be increased.
- The clarification of the RHR pump piping venting does not affect the integrity of the RHR system such that its function in the control of radiological consequences is affected. In addition, the clarification does not alter any of the fission product barriers. The clarification does not change, degrade, or prevent the response of the RHR system to accident scenarios, as described in FSAR Chapter 15. In addition, the clarification to the RHR pump piping venting does not alter any assumption previously made in the radiological consequences evaluations nor affect the mitigation of the radiological consequences of an accident described in

the FSAR. Therefore, the consequences of an accident previously evaluated in the FSAR will not be increased.

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 Technical Specification 4.5.3.b.2 and its associated bases do not introduce any new accident initiator mechanisms. The clarification of the RHR pump piping venting and the exclusion of the Charging/SI system venting requirements does not cause the initiation of any accident nor create any new credible limiting single failure. The exclusion of the Charging/SI system venting requirements does not result in any event previously deemed incredible being made credible. As such, it does not create the possibility of an accident different than any evaluated in the FSAR.

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

Response: No.

The exclusion of the Charging/SI system venting requirements does not result in a condition where the design, material, and construction standards that were acceptable prior to this change of the Charging/SI or RHR system venting requirements are altered. The proposed changes to Technical Specification 4.5.2.b.2 and its associated bases will have no affect on the availability, operability, or performance of the Charging/SI or RHR systems. Therefore, the clarification of the RHR pump piping venting and the exclusion of the Charging/SI system venting requirements will not reduce the margin of safety, as described in the bases to any technical specification.

Pursuant to 10 CFR 50.91, the preceding analyses provide a determination that the proposed Technical Specifications change poses no significant hazard as delineated by 10 CFR 50.92.

5.2 Applicable Regulatory Requirements/Criteria

10 CFR 50.36 (c) (3), "Surveillance Requirements" stipulates that surveillances be performed to assure the necessary quality of systems and components be maintained, the facility operation will be within safety limits, and that the limiting condition for operation will be met.

The NRC Acceptance Criteria for Emergency Core Cooling Systems (ECCS) for Light-Water Power Reactors was issued in Section 50.46 of 10 CFR 50 on December 28,

1973. It defines the basis and conservative assumptions to be used in the evaluation of the performance of the ECCS.

10 CFR 50 Appendix A, Criterion 35, "Emergency Core Cooling," requires that a ECCS system be in place.

10 CFR 50 Appendix A, Criterion 36, "Inspection of Emergency Core Cooling System," Criterion 37, "Testing of Emergency Core Cooling System," and 10 CFR 50 Appendix B, Criterion XI, "Test Control," all require established programs for assuring that the SSC is demonstrated operable on a periodic basis.

VCSNS complies with requirements of 10 CFR 50.46 and 10 CFR 50 Appendix K regarding ECCS performance.

VCSNS committed to perform periodic testing of ECCS components and support systems while at power.

The proposed change does not violate any requirement or recommended method for assuring the operability of the ECCS system and maintaining the plant design and licensing basis. The change accounts for the design of the Charging/SI pump and provides an exclusion from the prescribed ECCS venting surveillance. This change therefore allows literal compliance of VCSNS TS.

5.2.1 <u>Regulations</u>

The regulatory basis for TS 4.5.2, "Emergency Core Cooling," is to ensure operability of ECCS subsystems is maintained and that the assumptions used in the safety analysis are met. This ensures that the system is able to perform its safety function to transfer heat from the reactor core at a proper rate following a LOCA.

10 CFR Part 50, Appendix A (Reference 2), General Design Criterion (GDC) 35, "Emergency Core Cooling," requires that a system to provide abundant emergency core cooling be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at such a rate that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts.

GDC 37, "Testing of Emergency Core Cooling System," requires appropriate periodic pressure and functional testing to assure (1) the structural and leaktight integrity of its components, (2) the operability and performance of the active components of the system, and (3) the operability of the system as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the system into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of the associated cooling water system.

The parameters of concern and the acceptance criteria applied are based on the requirements of 10 CFR 50.46 with respect to the calculated cooling performance.

5.2.2 Design Bases (FSAR)

FSAR Section 15.3.1 (Small Break LOCA)

A loss of coolant accident is defined as a rupture of the reactor coolant system piping or of any line connected to the system. For the small break LOCA, the Charging/SI pumps provide high pressure injection flows from the RWST. As RCS pressure decreases, the SI accumulators may also inject flow to the RCS cold legs.

Analyses presented for the Small Break LOCA show that the Charging/HHSI pump, together with accumulators, provide sufficient core flooding to keep the calculated peak clad temperatures below the required limits of 10 CFR 50.46.

FSAR Section 15.4.1 Major Reactor Coolant System Pipe Ruptures (LOCA)

For the analyses reported here, a major pipe break (large break) is defined as a rupture with a total cross-sectional area equal to or greater than 1.0 ft^2. This event is considered an ANS Condition IV event, a limiting fault, in that it is not expected to occur during the lifetime of VCSNS, but is postulated as a conservative design basis. For the large break LOCA, the RHR pumps and Charging/SI pumps inject flow to the RCS from the RWST as well as the SI accumulators.

FSAR Section 15.4.2.1 (Major Rupture of a Main Steam Line)

The steam release arising from a rupture of a main steam line would result in an initial increase in steam flow, which decreases during the accident as the steam pressure falls. The energy removal from the RCS causes a reduction of coolant temperature and pressure. In the presence of a negative moderator coefficient, the cool down results in a reduction of core shutdown margin. For the MSLB, the Charging/SI pumps inject flow at high pressure from the RWST to provide negative reactivity insertion for accident mitigation.

5.2.3 Approved Methodologies

10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors," and 10 CFR 50, Appendix K, "ECCS Evaluation Models," describe methods acceptable to the NRC for calculating ECCS performance and developing an evaluation model. Periodic component performance is conducted in accordance with ASME Code, Section XI.

5.2.4 Analysis

The Acceptance Criteria for the LOCA are described in 10CFR50.46 (10CFR50.46 and Appendix K of 10CFR50, 1974).

These criteria were established to provide significant margin in Emergency Core Cooling System (ECCS) performance following a LOCA. WASH-1400 (USNRC 1975) presents a study in regards to the probability of occurrence of RCS pipe ruptures.

Results of the LOCA analysis indicate that the peak clad temperature attained is such that the limits on core behavior as specified in FSAR Section 15.4 are met.

The ECCS analysis presented in FSAR Chapter 15 conforms to the acceptance criteria of 10 CFR 50.46. The analysis demonstrates that the peak clad temperature is less than the 2200°F acceptance criteria.

5.2.5 Conclusion

The technical analysis performed by SCE&G demonstrates that the proposed amendment has no impact on Charging/SI pump performance due to inherent characteristics of the pump and system layout. The change to the RHR pipe venting requirements represents a clarification for literal compliance with the SR. Therefore, the proposed License amendment is in compliance with GDC 35 and 37 as well as 10 CFR 50.46 and 10 CFR 50, Appendix K.

6.0 ENVIRONMENTAL CONSIDERATION

SCE&G has determined that the proposed amendment would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10 CFR 20 (Reference 5), or would change an inspection or surveillance requirement. SCE&G has evaluated the proposed change and has determined that the change does not involve, (i) a significant hazards consideration, (ii) a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. As discussed above, the proposed changes do not involve a significant hazards consideration and the analysis demonstrates that the consequences of a LOCA are well within design boundaries. Accordingly, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51 (Reference 6), specifically 10 CFR 51.22(c)(9). Therefore, pursuant 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

7.0 REFERENCES

1. FSAR Section(s) 1.2.3, 3.1.2, 6.3.1, and 15.4
2. 10 CFR 50, Appendix A, GDC
3. 10 CFR 50.46
4. 10 CFR 50, Appendix K
5. 10 CFR 20
6. 10 CFR 51

ATTACHMENT 1

PROPOSED TECHNICAL SPECIFICATION CHANGES (MARK-UP)

Attachment to License Amendment No. XXX
To Facility Operating License No. NPF-12
Docket No. 50-395

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages	Insert Pages
3/4 5-4	3/4 5-4
3/4 5-6	3/4 5-6
B 3/4 5-2	B 3/4 5-2

SCE&G -- EXPLANATION OF CHANGES

Page	Affected Section	Bar #	Description of Change	Reason for Change
3/4 5-4	4.5.2.b.2	1	Reword to specify that RHR piping high points are subject to the venting requirements.	To facilitate compliance with the ECCS venting requirement.
3/4 5-6	4.5.2	1 2	Change 1) to 1. Change 1) to 1.	Editorial, for consistency Editorial, for consistency
B 3/4 5-2	3/4.5.3	1	Add discussion on charging/safety injection design and operation.	To discuss why periodic venting of charging/safety injection pump piping is not necessary.
		2 3	Indented Paragraph Added period at end of sentence	Editorial, for consistency Editorial, typo

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

a. At least once per 12 hours by verifying that the following valves are in the indicated positions with power to the valve operators removed:

	Valve Number	Valve Function	Valve Position
1.	8884	HHSI Hot Leg Injection	Closed
2.	8886	HHSI Hot Leg Injection	Closed
3.	8888A	LHSI Cold Leg Injection	Open
4.	8888B	LHSI Cold Leg Injection	Open
5.	8889	LHSI Hot Leg Injection	Closed
6	8701A	RHR Inlet	Closed
7.	8701B	RHR Inlet	Closed
8.	8702A	RHR Inlet	Closed
9.	8702B	RHR Inlet	Closed
10.	8133A	Charging/HHSI Cross-Connect	Open
11.	8133B	Charging/HHSI Cross-Connect	Open
12.	8106	Charging Mini-Flow Header Isolation	Open

b. At least once per 31 days by:

1. Verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position, and

2. Verifying that the ECCS piping is full of water by venting the ~~ECCS pump casings and~~ accessible RHR discharge piping high points.

c. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the reactor building which could be transported to the RHR and Spray Recirculation sumps and cause restriction of the pump suctions during LOCA conditions. This visual inspection shall be performed:

1. For all accessible areas of the reactor building prior to establishing CONTAINMENT INTEGRITY, and

2. Of the areas affected within the reactor building at the completion of each reactor building entry when CONTAINMENT INTEGRITY is established

d. At least once per 18 months by:

1. Verifying automatic interlock action of the RHR system from the Reactor Coolant System by ensuring that, with a simulated or actual Reactor Coolant System pressure signal greater than or equal to 425 psig, the interlocks prevent the valves from being opened.

h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying that:

1) For centrifugal charging pump lines, with a single pump running and with recirculation flow:

a) The sum of the injection line flow rates, excluding the highest flow rate, is greater than or equal to 338 gpm, and

b) The total pump flow rate is less than or equal to 688 gpm. 4

i. By performing a flow test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying that:

1) For residual heat removal pump lines, with a single pump running the sum of the injection line flow rates is greater than or equal to 3663 gpm.

ECCS SUBSYSTEMS (Continued)

The limitation for a maximum of one centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE charging pump to be inoperable below 300°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single RHR suction relief valve.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained. Surveillance requirements for throttle valve position stops and flow balance testing provide assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses.

SEE INSERT

3/4.5.4 REFUELING WATER STORAGE TANK

The OPERABILITY of the Refueling Water Storage Tank (RWST) as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of either a LOCA, a steamline break or inadvertent RCS depressurization. The limits of RWST minimum volume and boron concentration ensure 1) that sufficient water is available within containment to permit recirculation cooling flow to the core, 2) that the reactor will remain subcritical in the cold condition (68 to 212 degrees-F) following a small break LOCA assuming complete mixing of the RWST, RCS, Spray Additive Tank (SAT), containment spray system piping and ECCS water volumes with all control rods inserted except the most reactive control rod assembly (ARI-1), 3) that the reactor will remain subcritical in the cold condition following a large break LOCA (break flow area ≥3.0 sq. ft.) assuming complete mixing of the RWST, RCS, ECCS water and other sources of water that may eventually reside in the sump post-LOCA with all control rods assumed to be out (ARO), 4) long term subcriticality following a steamline break assuming ARI-1 and preclude fuel failure.

The maximum allowable value for the RWST boron concentration forms the basis for determining the time (Post-LOCA) at which operator action is required to switch over the ECCS to hot leg recirculation in order to avoid precipitation of the soluble boron.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

"INSERT"

The charging/safety injection system layout and operation have been demonstrated to preclude the buildup of non-condensable gas during normal operations. The charging/safety injection system is therefore not subject to periodic venting requirements.

ATTACHMENT 2

PROPOSED TECHNICAL SPECIFICATION CHANGES (RETYPED)

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

a. At least once per 12 hours by verifying that the following valves are in the indicated positions with power to the valve operators removed:

	Valve Number	Valve Function	Valve Position
1.	8884	HHSI Hot Leg Injection	Closed
2.	8886	HHSI Hot Leg Injection	Closed
3.	8888A	LHSI Cold Leg Injection	Open
4.	8888B	LHSI Cold Leg Injection	Open
5.	8889	LHSI Hot Leg Injection	Closed
6.	8701A	RHR Inlet	Closed
7.	8701B	RHR Inlet	Closed
8.	8702A	RHR Inlet	Closed
9.	8702B	RHR Inlet	Closed
10.	8133A	Charging/HHSI Cross-Connect	Open
11.	8133B	Charging/HHSI Cross-Connect	Open
12.	8106	Charging Mini-Flow Header Isolation	Open

b. At least once per 31 days by:

1. Verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position, and

2. Verifying that the ECCS piping is full of water by venting the accessible RHR discharge piping high points.

c. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the reactor building which could be transported to the RHR and Spray Recirculation sumps and cause restriction of the pump suctions during LOCA conditions. This visual inspection shall be performed:

1. For all accessible areas of the reactor building prior to establishing CONTAINMENT INTEGRITY, and

2. Of the areas affected with the reactor building at the completion of each reactor building entry when CONTAINMENT INTEGRITY is established.

d. At least once per 18 months by:

1. Verifying automatic interlock action of the RHR system from the Reactor Coolant System by ensuring that, with a simulated or actual Reactor Coolant System pressure signal greater than or equal to 425 psig, the interlocks prevent the valves from being opened.

h. By performing a flow balance test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying that:

1. For centrifugal charging pump lines, with a single pump running and with recirculation flow:

a) The sum of the injection line flow rates, excluding the highest flow rate, is greater than or equal to 338 gpm, and

b) The total pump flow rate is less than or equal to 688 gpm.

i. By performing a flow test, during shutdown, following completion of modifications to the ECCS subsystems that alter the subsystem flow characteristics and verifying that:

1. For residual heat removal pump lines, with a single pump running the sum of the injection line flow rates is greater than or equal to 3663 gpm.

ECCS SUBSYSTEMS (Continued)

The limitation for a maximum of one centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE charging pump to be inoperable below 300°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single RHR suction relief valve.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained. Surveillance requirements for throttle valve position stops and flow balance testing provide assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses.

The charging/safety injection system layout and operation have been demonstrated to preclude the buildup of non-condensable gas during normal operations. The charging/safety injection system is therefore not subject to periodic venting requirements.

3/4.5.4 REFUELING WATER STORAGE TANK

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The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

ATTACHMENT 3

LIST OF REGULATORY COMMITMENTS

There are no regulatory commitments created due to this License Amendment Request. The proposed changes provide literal compliance with existing regulatory requirements.