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Docket Nos.: 50-424
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NL-15-0422

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Vogtle Electric Generating Plant – Units 1 and 2
License Amendment Request to Revise Technical Specifications Regarding
Generic Letter 2008-01, Managing Gas Accumulation in accordance with TSTF-523,
Revision 2, Using the Consolidated Line Item Improvement Process (CLIIP)

Ladies and Gentlemen:

In accordance with the provisions of 10 CFR 50.90 Southern Nuclear Operating Company (SNC) is submitting a request for an amendment to the Technical Specifications (TS) for Vogtle Electric Generating Plant (VEGP), Units 1 and 2.

The proposed amendment would modify TS requirements related to Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray systems," as described in TSTF-523, Revision 2, "Generic Letter 2008-01, Managing Gas Accumulation." SNC committed to submit this proposed change in Vogtle Electric Generating Plant Response to NRC Generic Letter 2008-1, "Response to Request for Additional Information," ML102140115.

Enclosure 1 provides a description of the proposed changes, the requested confirmation of applicability, and plant-specific verifications. Enclosure 2 provides the existing TS pages marked up to show the proposed changes. Enclosure 3 provides revised (clean) TS pages. Enclosure 4 provides existing TS Bases pages marked up to show the proposed changes.

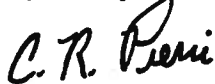
SNC requests approval of the proposed license amendments by May 30, 2016. The proposed changes would be implemented within 120 days of issuance of the amendment.

In accordance with 10 CFR 50.91(b)(1), "State Consultation," a copy of this application and its reasoned analysis about no significant hazards considerations is being provided to the designated Georgia officials.

This letter contains no NRC commitments. If you have any questions, please contact Ken McElroy at (205) 992-7369.

Mr. C. R. Pierce states he is Regulatory Affairs Director of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and, to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,



C. R. Pierce
Regulatory Affairs Director

CRP/GLS/lac

Sworn to and subscribed before me this 12 day of May, 2015.


Notary Public

My commission expires: 10-8-2017

- Enclosures:
1. Basis for Proposed Change
 2. VEGP Technical Specification Marked Up Pages
 3. VEGP Technical Specification Clean Typed Pages
 4. VEGP Technical Specification Bases Marked Up Pages (for information only)

cc: Southern Nuclear Operating Company
Mr. S. E. Kuczynski, Chairman, President & CEO
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Mr. V. M. McCree, Regional Administrator
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State of Georgia
Mr. J. H. Turner, Director – Environmental Protection Division

**Vogtle Electric Generating Plant
License Amendment Request to Revise Technical Specifications Regarding
GL 2008-01, Managing Gas Accumulation, TSTF-523 Revision 2, Using the
Consolidated Line Item Improvement Process (CLIIP)**

Enclosure 1

Basis for Proposed Change

Enclosure 1 to NL-15-0422
Basis for Proposed Change

Table of Contents

- 1.0 Description
- 2.0 Assessment
- 3.0 Regulatory Analysis
- 4.0 Environmental Evaluation

1.0 DESCRIPTION

The proposed change revises or adds Surveillance Requirements to verify that the system locations susceptible to gas accumulation are sufficiently filled with water and to provide allowances which permit performance of the verification. The changes are being made to address the concerns discussed in Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems."

The proposed amendment is consistent with TSTF-523, Revision 2, "Generic Letter 2008-01, Managing Gas Accumulation." The availability of this Technical Specification (TS) improvement was published in the *Federal Register* on January 15, 2014 as part of the consolidated line item improvement process (CLIP).

2.0 ASSESSMENT

2.1 Applicability of Published Safety Evaluation

Southern Nuclear Operating Company (SNC) has reviewed the safety evaluation dated December 23, 2013 as part of the CLIP. This review included a review of the NRC staff's evaluation, as well as the supporting information provided to support TSTF-523. As described in the subsequent paragraphs, SNC has concluded that the justifications presented in the TSTF proposal and the safety evaluation prepared by the Nuclear Regulatory Commission (NRC) staff are applicable to Vogtle Electric Generating Plant (VEGP), Units 1 and 2, and justify this amendment for the incorporation of the changes to the VEGP Units 1 and 2 TS.

2.2 Optional Changes and Variations

SNC is proposing the following variations from the TS changes described in the TSTF-523, Revision 2, or the applicable parts of the NRC staff's model safety evaluation dated December 23, 2013.

VEGP Units 1 and 2 TS utilize different numbering than the Standard Technical Specifications on which TSTF-523 was based. Specifically, SR 3.4.8.4 was added to reflect addition of the new SR 3.4.8.3 reflected in the TSTF-523 in the RCS Loops – Mode 5, Loops Not Filled. SR 3.6.6.9 was added to reflect addition of the new SR 3.6.6.4 reflected in the TSTF-523 in the Containment Spray and Cooling Systems. By numbering this addition to the end of this section it precluded having to make administrative changes to VEGP Unit 1 and 2 existing SRs. Also, in the RHR and Coolant Circulation – Low Water Level section 3.9.6 at VEGP Units 1 and 2, the next available SR number to use is SR 3.9.6.2 instead of SR 3.9.6.3, as reflected in TSTF-523. These differences are administrative and do not affect the applicability of TSTF-523 to the VEGP Units 1 and 2 TS.

The Technical Specification Bases for the note added for SR 3.5.2.2 and SR 3.6.6.1 explaining the site process for administratively controlling opening vent flow paths is clarified. This administrative variance does not affect the applicability of TSTF-523 to the VEGP Units 1 and 2 TS.

The Technical Specification Bases for RHR per SR 3.4.6.4, SR 3.4.7.4, SR 3.4.8.4, SR 3.9.5.2, and SR 3.9.6.2 clarifies that the RHR Loop is adequately filled and vented by virtue of performing the operating procedure and when the RHR Loop is in service in accordance with operating procedures. Also, the RHR system is assumed to remain sufficiently filled with water and may be restarted following short term duration RHR shutdowns, if no evolutions were performed that can introduce voids into the RHR loop.

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Consideration Determination

SNC requests adoption of TSTF-523, Rev. 2, "Generic Letter 2008-01, Managing Gas Accumulation," which is an approved change to the standard technical specifications (STS), into the Vogtle Electric Generating Plants Unit 1 and 2 technical specifications (TS). The proposed change revises or adds Surveillance Requirements to verify that the system locations susceptible to gas accumulation are sufficiently filled with water and to provide allowances which permit performance of the verification.

SNC 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 proposed change revises or adds Surveillance Requirements (SRs) that require verification that the Emergency Core Cooling System (ECCS), the Residual Heat Removal (RHR) System, and the Containment Spray (CS) System are not rendered inoperable due to accumulated gas and to provide allowances which permit performance of the revised verification. Gas accumulation in the subject systems is not an initiator of any accident previously evaluated. As a result, the probability of any accident previously evaluated is not significantly increased. The proposed SRs ensure that the subject systems continue to be capable to perform their assumed safety function and are not rendered inoperable due to gas accumulation. Thus, the consequences of any accident previously evaluated are not significantly increased.

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.

The proposed change revises or adds SRs that require verification that the ECCS, the RHR System, and the CS System are not rendered inoperable due to accumulated gas and to provide allowances which permit performance of the revised verification. The proposed change does not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. In addition, the proposed change does not impose any new or different requirements that could initiate an accident. The proposed change does not alter assumptions made in the safety analysis and is consistent with the safety analysis assumptions.

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

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

Response: No.

The proposed change revises or adds SRs that require verification that the ECCS, the RHR System, and the CS System are not rendered inoperable due to accumulated gas and to provide allowances which permit performance of the revised verification. The proposed change adds new requirements to manage gas accumulation in order to ensure the subject systems are capable of performing their assumed safety functions. The proposed SRs are more comprehensive than the current SRs and will ensure that the assumptions of the safety analysis are protected. The proposed change does not adversely affect any current plant safety margins or the reliability of the equipment assumed in the safety analysis. Therefore, there are no changes being made to any safety analysis assumptions, safety limits or limiting safety system settings that would adversely affect plant safety as a result of the proposed change.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, SNC concludes that the proposed change presents 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.

4.0 ENVIRONMENTAL EVALUATION

The proposed change 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 change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a 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 change 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 change.

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Enclosure 2

VEGP Technical Specification Marked Up Pages

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|--------------|--|---|
| SR 3.4.6.3 | Verify correct pump breaker alignment and indicated power are available to the required pump that is not in operation. | In accordance with the Surveillance Frequency Control Program |

SR 3.4.6.4

-----NOTE-----

Not required to be performed until 12 hours after entering MODE 4.

Verify required RHR loop locations susceptible to gas accumulation are sufficiently filled with water.

In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.4.7.3 Verify correct breaker alignment and indicated power are available to the required RHR pump that is not in operation. | In accordance with the Surveillance Frequency Control Program |

| | |
|--|---|
| SR 3.4.7.4 Verify required RHR loop locations susceptible to gas accumulation are sufficiently filled with water. | In accordance with the Surveillance Frequency Control Program |
|--|---|

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|--|------------------------------------|
| A. One RHR loop inoperable. | A.1 Initiate action to restore RHR loop to OPERABLE status. | Immediately |
| B. Required RHR loops inoperable. <u>OR</u> No RHR loop in operation. | B.1 Suspend all operations involving reduction in RCS boron concentration. <u>AND</u> B.2 Initiate action to restore one RHR loop to OPERABLE status and to operation. | Immediately Immediately |
| C. One or more valves used to isolate unborated water sources not secured in closed position. | C.1 Initiate action to secure valve(s) in closed position. | Immediately |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|--|---|
| SR 3.4.8.1 Verify one RHR loop is in operation. | In accordance with the Surveillance Frequency Control Program |
| SR 3.4.8.2 Verify correct breaker alignment and indicated power are available to the required RHR pump that is not in operation. | In accordance with the Surveillance Frequency Control Program |
| SR 3.4.8.3 Verify each valve that isolates unborated water sources is secured in the closed position. | In accordance with the Surveillance Frequency Control Program |

Insert SR 3.4.8.4 located on next page

Insert as SR 3.4.8.4

SR 3.4.8.4

Verify required RHR loop locations susceptible to gas accumulation are sufficiently filled with water.

In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---------------------|---|---|
| SR 3.5.2.1 | Verify the following valves are in the listed position with the power lockout switches in the lockout position. | In accordance with the Surveillance Frequency Control Program |
| <u>Valve Number</u> | <u>Valve Function</u> | |
| | <u>Valve Position</u> | |
| HV-8835 | SI Pump Cold Leg Inj. | |
| HV-8840 | RHR Pump Hot Leg Inj. | |
| HV-8813 | SI Pump Mini Flow Isol. | |
| HV-8806 | SI Pump Suction from RWST | |
| HV-8802A, B | SI Pump Hot Leg Inj. | In accordance with the Surveillance Frequency Control Program |
| HV-8809A, B | RHR Pump Cold Leg Inj. | |
| SR 3.5.2.2 | Verify each ECCS 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. | In accordance with the Surveillance Frequency Control Program |
| SR 3.5.2.3 | <p>Verify ECCS piping is full of water.</p> <p>Verify ECCS locations susceptible to gas accumulation are sufficiently filled with water.</p> | In accordance with the Surveillance Frequency Control Program |
| SR 3.5.2.4 | Verify each ECCS pump's developed head at the test flow point is greater than or equal to the required developed head. | In accordance with the Inservice Testing Program |
| SR 3.5.2.5 | Verify each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position actuates to the correct position on an actual or simulated actuation signal. | In accordance with the Surveillance Frequency Control Program |

(continued)

-----NOTE-----
Not required to be met for system vent flow paths opened under administrative control

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|--------------|--|---|
| SR 3.6.6.1 | Verify each containment spray 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. | In accordance with the Surveillance Frequency Control Program |
| SR 3.6.6.2 | Operate each containment cooling train fan unit for ≥ 15 minutes. | In accordance with the Surveillance Frequency Control Program |
| SR 3.6.6.3 | Verify each pair of containment fan coolers cooling water flow rate is ≥ 1359 gpm. | In accordance with the Surveillance Frequency Control Program |
| SR 3.6.6.4 | Verify each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head. | In accordance with the Inservice Testing Program |
| SR 3.6.6.5 | Verify each automatic containment spray valve in the flow path that is not locked, sealed, or otherwise secured in position actuates to the correct position on an actual or simulated actuation signal. | In accordance with the Surveillance Frequency Control Program |
| SR 3.6.6.6 | Verify each containment spray pump starts automatically on an actual or simulated actuation signal. | In accordance with the Surveillance Frequency Control Program |

(continued)

-----NOTE-----
Not required to be met for system vent flow paths
opened under administrative control.

Containment Spray and Cooling Systems
3.6.6

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|--------------|--|---|
| SR 3.6.6.7 | Verify each containment cooling train starts automatically on an actual or simulated actuation signal. | In accordance with the Surveillance Frequency Control Program |
| SR 3.6.6.8 | Verify each spray nozzle is unobstructed. | In accordance with the Surveillance Frequency Control Program |



| | | |
|------------|--|---|
| SR 3.6.6.9 | Verify containment spray locations susceptible to gas accumulation are sufficiently filled with water. | In accordance with the Surveillance Frequency Control Program |
|------------|--|---|

RHR and Coolant Circulation – High Water Level
3.9.5

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|----------------|---|-----------------|
| A. (continued) | A.4 Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere. | 4 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.9.5.1 Verify one RHR loop is in operation and circulating reactor coolant at a flow rate of ≥ 3000 gpm. | In accordance with the Surveillance Frequency Control Program |

| | | |
|------------|--|---|
| SR 3.9.5.2 | Verify required RHR loop locations susceptible to gas accumulation are sufficiently filled with water. | In accordance with the Surveillance Frequency Control Program |
|------------|--|---|

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|----------------|---|-----------------|
| B. (continued) | B.2 Initiate action to restore one RHR loop to operation. | Immediately |
| | <u>AND</u> B.3 Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere. | 4 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.9.6.1 Verify one RHR loop is in operation and circulating reactor coolant at a flow rate of ≥ 3000 gpm. | In accordance with the Surveillance Frequency Control Program |

SR 3.9.6.2 Verify required RHR loop locations susceptible to gas accumulation are sufficiently filled with water. In accordance with the Surveillance Frequency Control Program

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Enclosure 3

VEGP Technical Specification Clean Typed Pages

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|--------------|--|---|
| SR 3.4.6.3 | Verify correct pump breaker alignment and indicated power are available to the required pump that is not in operation. | In accordance with the Surveillance Frequency Control Program |
| SR 3.4.6.4 | <p>-----NOTE-----</p> <p>Not required to be performed until 12 hours after entering MODE 4.</p> <p>-----</p> <p>Verify required RHR loop locations susceptible to gas accumulation are sufficiently filled with water.</p> | In accordance with the Surveillance Frequency Control Program |

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|--------------|---|---|
| SR 3.4.7.3 | Verify correct breaker alignment and indicated power are available to the required RHR pump that is not in operation. | In accordance with the Surveillance Frequency Control Program |
| SR 3.4.7.4 | Verify required RHR loop locations susceptible to gas accumulation are sufficiently filled with water. | In accordance with the Surveillance Frequency Control Program |

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|--------------|--|---|
| SR 3.4.8.4 | Verify required RHR loop locations susceptible to gas accumulation are sufficiently filled with water. | In accordance with the Surveillance Frequency Control Program |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | | FREQUENCY |
|---------------------|---|-----------------------|---|
| SR 3.5.2.1 | Verify the following valves are in the listed position with the power lockout switches in the lockout position. | | In accordance with the Surveillance Frequency Control Program |
| <u>Valve Number</u> | <u>Valve Function</u> | <u>Valve Position</u> | |
| HV-8835 | SI Pump Cold Leg Inj. | OPEN | |
| HV-8840 | RHR Pump Hot Leg Inj. | CLOSED | |
| HV-8813 | SI Pump Mini Flow Isol. | OPEN | |
| HV-8806 | SI Pump Suction from RWST | OPEN | |
| HV-8802A, B | SI Pump Hot Leg Inj. | CLOSED | |
| HV-8809A, B | RHR Pump Cold Leg Inj. | OPEN | |
| SR 3.5.2.2 | <p>-----NOTE-----</p> <p>Not required to be met for system vent flow paths opened under administrative control</p> <p>-----</p> <p>Verify each ECCS 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.</p> | | In accordance with the Surveillance Frequency Control Program |
| SR 3.5.2.3 | Verify ECCS locations susceptible to gas accumulation are sufficiently filled with water. | | In accordance with the Surveillance Frequency Control Program |
| SR 3.5.2.4 | Verify each ECCS pump's developed head at the test flow point is greater than or equal to the required developed head. | | In accordance with the Inservice Testing Program |
| SR 3.5.2.5 | Verify each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position actuates to the correct position on an actual or simulated actuation signal. | | In accordance with the Surveillance Frequency Control Program |

(continued)

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|--------------|---|---|
| SR 3.6.6.1 | <p>-----NOTE-----</p> <p>Not required to be met for system vent flow paths opened under administrative control.</p> <p>-----</p> <p>Verify each containment spray 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.</p> | In accordance with the Surveillance Frequency Control Program |
| SR 3.6.6.2 | Operate each containment cooling train fan unit for ≥ 15 minutes. | In accordance with the Surveillance Frequency Control Program |
| SR 3.6.6.3 | Verify each pair of containment fan coolers cooling water flow rate is ≥ 1359 gpm. | In accordance with the Surveillance Frequency Control Program |
| SR 3.6.6.4 | Verify each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head. | In accordance with the Inservice Testing Program |
| SR 3.6.6.5 | Verify each automatic containment spray valve in the flow path that is not locked, sealed, or otherwise secured in position actuates to the correct position on an actual or simulated actuation signal. | In accordance with the Surveillance Frequency Control Program |
| SR 3.6.6.6 | Verify each containment spray pump starts automatically on an actual or simulated actuation signal. | In accordance with the Surveillance Frequency Control Program |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|--------------|--|---|
| SR 3.6.6.7 | Verify each containment cooling train starts automatically on an actual or simulated actuation signal. | In accordance with the Surveillance Frequency Control Program |
| SR 3.6.6.8 | Verify each spray nozzle is unobstructed. | In accordance with the Surveillance Frequency Control Program |
| SR 3.6.6.9 | Verify containment spray locations susceptible to gas accumulation are sufficiently filled with water. | In accordance with the Surveillance Frequency Control Program |

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|----------------|---|-----------------|
| A. (continued) | A.4 Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere. | 4 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.9.5.1 Verify one RHR loop is in operation and circulating reactor coolant at a flow rate of ≥ 3000 gpm. | In accordance with the Surveillance Frequency Control Program |
| SR 3.9.5.2 Verify required RHR loop locations susceptible to gas accumulation are sufficiently filled with water. | In accordance with the Surveillance Frequency Control Program |

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|----------------|---|-----------------|
| B. (continued) | B.2 Initiate action to restore one RHR loop to operation. | Immediately |
| | <u>AND</u> B.3 Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere. | 4 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|--------------|--|---|
| SR 3.9.6.1 | Verify one RHR loop is in operation and circulating reactor coolant at a flow rate of ≥ 3000 gpm. | In accordance with the Surveillance Frequency Control Program |
| SR 3.9.6.2 | Verify required RHR loop locations susceptible to gas accumulation are sufficiently filled with water. | In accordance with the Surveillance Frequency Control Program |

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Enclosure 4

VEGP Technical Specification Bases Marked Up Pages (for information only)

BASES

LCO (continued)

An OPERABLE RCS loop is comprised of an OPERABLE RCP and an OPERABLE SG which has the minimum water level specified in SR 3.4.6.2, and the necessary aspects of the Auxiliary Feedwater and Condensate Storage Tank Systems available to provide feedwater. Additionally, the OPERABILITY of an SG must include a means by which the decay heat may be removed (i.e., the capability of the atmospheric relief valve to stroke or the condenser is available).

Similarly for the RHR System, an OPERABLE RHR loop comprises an OPERABLE RHR pump capable of providing forced flow to an OPERABLE RHR heat exchanger. RCPs and RHR pumps are OPERABLE if they are capable of being powered and are able to provide forced flow if required. Management of gas voids is important to RHR System OPERABILITY.

APPLICABILITY

In MODE 4, this LCO ensures forced circulation of the reactor coolant to remove decay heat from the core and to provide proper boron mixing. One loop of either RCS or RHR provides sufficient circulation for these purposes. However, two loops consisting of any combination of RCS and RHR loops are required to be OPERABLE to meet single failure considerations.

Operation in other MODES is covered by:

LCO 3.4.4, "RCS Loops — MODES 1 and 2";
LCO 3.4.5, "RCS Loops — MODE 3";
LCO 3.4.7, "RCS Loops — MODE 5, Loops Filled"; LCO
3.4.8, "RCS Loops — MODE 5, Loops Not Filled"; LCO
3.9.5, "Residual Heat Removal (RHR) and Coolant
Circulation — High Water Level" (MODE 6); and
LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant
Circulation — Low Water Level" (MODE 6).

ACTIONS

A.1

If one required RCS loop is inoperable and two RHR loops are inoperable, redundancy for heat removal is lost. Action must be initiated to restore a second RCS or RHR loop to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.6.2

SR 3.4.6.2 requires verification of SG OPERABILITY. SG OPERABILITY is verified by ensuring that the secondary side water level (LI-0501, LI-0502, LI-0503, LI-0504) for the required RCS loops is above the highest point of the steam generator U-tubes for each required loop. To assure that the steam generator is capable of functioning as a heat sink for the removal of decay heat, the U-tubes must be completely submerged. Plant procedures provide the minimum indicated levels for the range of the steam generator operating conditions required to satisfy this SR. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.4.6.3

Verification that the required pump is OPERABLE ensures that an additional RCS or RHR pump can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper pump breaker alignment and power available to the required pump. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.4.6.4

RHR System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the required RHR loop(s) and may also prevent water hammer, pump cavitation, and pumping of noncondensable gas into the reactor vessel.

Selection of RHR System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.6.4

The RHR System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If it is determined by subsequent evaluation that the RHR System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits. When the RHR System is restored to service, the surveillance is met by virtue of the performance of operating procedures that ensure the RHR Loop is adequately filled and vented. The performance of these manual actions ensures that the surveillance is met.

RHR System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

The SR may be met for a RHR Loop by virtue of having a loop in service in accordance with operating procedures.

The RHR system is assumed to remain sufficiently filled with water and may be restarted following short term duration RHR shutdowns, if no evolutions were performed that can introduce voids into the RHR loop.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

(continued)

SR 3.4.6.4

This SR is modified by a Note that states the SR is not required to be performed until 12 hours after entering MODE 4. In a rapid shutdown, there may be insufficient time to verify all susceptible locations prior to entering MODE 4.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

REFERENCES

None.

BASES

LCO (continued)

Utilization of Note 1 is permitted provided the following conditions are met, along with any other conditions imposed by initial startup test procedures:

- a. No operations are permitted that would dilute the RCS boron concentration, therefore maintaining the margin to criticality. Boron reduction is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation; and
- b. Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

Note 2 allows one RHR loop to be inoperable for a period of up to 2 hours, provided that the other RHR loop is OPERABLE and in operation. This permits periodic surveillance tests to be performed on the inoperable loop during the only time when such testing is safe and possible.

Note 3 requires that the secondary side water temperature of each SG be < 50°F above each of the RCS cold leg temperatures before the start of a reactor coolant pump (RCP) during MODE 5 with the RCS loops filled. This restriction is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started.

Note 4 provides for an orderly transition from MODE 5 to MODE 4 during a planned heatup by permitting removal of RHR loops from operation when at least one RCS loop is in operation. This Note provides for the transition to MODE 4 where an RCS loop is permitted to be in operation and replaces the RCS circulation function provided by the RHR loops.

RHR pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. A SG can perform as a heat sink when it has an adequate water level and is OPERABLE. Management of gas voids is important to RHR System OPERABILITY. Additional requirements for an SG to be available as a heat sink are:

- a. RCS loops and reactor pressure vessel filling and venting complete; and

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.7.3 (continued)

Verification is performed by verifying proper breaker alignment and power available to the RHR pump. If secondary side water level is above the highest point of the SG U-tubes in at least two SGs, this Surveillance is not needed. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.4.7.4

RHR System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the required RHR loop(s) and may also prevent water hammer, pump cavitation, and pumping of noncondensable gas into the reactor vessel.

Selection of RHR System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

The RHR System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If it is determined by subsequent evaluation that the RHR System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits. When the RHR System is restored to service, the surveillance is met by virtue of the performance of operating procedures that ensure the RHR Loop is adequately filled and vented. The performance of these manual actions ensures that the surveillance is met.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.7.4 (continued)

RHR System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative subset of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

The SR may be met for a RHR Loop by virtue of having a loop in service in accordance with operating procedures.

The RHR system is assumed to remain sufficiently filled with water and may be restarted following short term duration RHR shutdowns, if no evolutions were performed that can introduce voids into the RHR loop.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

REFERENCES

None.

BASES

LCO (continued)

Note 3 allows valves in the flowpath from the RMW ST, through the chemical mixing tank, to the suction of the charging pumps to be open under administrative control provided the SDM requirements of LCO 3.1.1 are met and the high flux at shutdown alarm is OPERABLE. (OPERABILITY of the high flux at shutdown alarm is defined by LCO 3.3.8.) This permits the addition of chemicals to the RCS as necessary in this MODE of operation while minimizing the risk of an uncontrolled boron dilution transient.

An OPERABLE RHR loop is comprised of an OPERABLE RHR pump capable of providing forced flow to an OPERABLE RHR heat exchanger. RHR pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. Management of gas voids is important to RHR System OPERABILITY.

APPLICABILITY

In MODE 5 with loops not filled, this LCO requires core heat removal and coolant circulation by the RHR System.

Operation in other MODES is covered by:

LCO 3.4.4, "RCS Loops — MODES 1 and 2";
LCO 3.4.5, "RCS Loops — MODE 3";
LCO 3.4.6, "RCS Loops — MODE 4";
LCO 3.4.7, "RCS Loops — MODE 5, Loops Filled";
LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation — HighWater Level" (MODE 6); and
LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation — LowWater Level" (MODE 6).

ACTIONS

A.1

If only one RHR loop is OPERABLE and in operation, redundancy for RHR is lost. Action must be initiated to restore a second loop to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for heat removal.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.8.3

Verification that the required valve(s) are closed (except as provided in Note 3 to the LCO) will preclude an uncontrolled boron dilution event in MODE 5 with the RCS loops not filled. Since these valves are required to be secured in position, a frequency of 31 days is sufficient to ensure that they remain closed as required.

SR 3.4.8.4

RHR System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the RHR loops and may also prevent water hammer, pump cavitation, and pumping of noncondensable gas into the reactor vessel.

Selection of RHR System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

The RHR System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If it is determined by subsequent evaluation that the RHR System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits. When the RHR System is restored to service, the surveillance is met by virtue of the performance of operating procedures that ensure the RHR Loop is adequately filled and vented. The performance of these manual actions ensures that the surveillance is met.

continued

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.8.4

RHR System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

The SR may be met for a RHR Loop by virtue of having a loop in service in accordance with operating procedures.

The RHR system is assumed to remain sufficiently filled with water and may be restarted following short term duration RHR shutdowns, if no evolutions were performed that can introduce voids into the RHR loop.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

REFERENCES

1. FSAR, Subsection 15.4.6.
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BASES

APPLICABLE SAFETY ANALYSES (continued)

The effects on containment mass and energy releases are accounted for in appropriate analyses (Refs. 3 and 4). The LCO ensures that an ECCS train will deliver sufficient water to match boil off rates soon enough to minimize the consequences of the core being uncovered following a large LOCA. It also ensures that the centrifugal charging and SI pumps will deliver sufficient water and boron during a small LOCA to maintain core subcriticality. For smaller LOCAs, the centrifugal charging pump delivers sufficient fluid to maintain RCS inventory. For a small break LOCA, the steam generators continue to serve as the heat sink, providing part of the required core cooling.

The ECCS trains satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

LCO

In MODES 1, 2, and 3, two independent (and redundant) ECCS trains are required to ensure that sufficient ECCS flow is available, assuming a single failure affecting either train. Additionally, individual components within the ECCS trains may be called upon to mitigate the consequences of other transients and accidents.

In MODES 1, 2, and 3, an ECCS train consists of a centrifugal charging subsystem, an SI subsystem, and an RHR subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RW ST upon an SI signal and automatically transferring suction to the containment sump.

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the ECCS pumps and their respective supply headers to each of the four cold leg injection nozzles. In the long term, this flow path may be switched to take its supply from the containment sump and to supply its flow to the RCS hot and cold legs. Management of gas voids is important to ECCS OPERABILITY.

The flow path for each train must maintain its designed independence to ensure that no single failure can disable both ECCS trains.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.2.2 (continued)

The Surveillance is modified by a Note which exempts system vent flow paths opened under administrative control. The administrative control should be proceduralized and include stationing an individual who can rapidly close the system vent flow path if directed.

SR 3.5.2.3

ECCS piping and components have the ~~With the exception of the operating centrifugal charging pump, the ECCS pumps are normally in a standby, nonoperating mode. As such, flow path piping has the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for~~ Maintaining the piping from the ECCS pumps to the RCS full of water proper operation of the ECCS and may also ensures that the system will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent water hammer, pump cavitation, and pumping of noncondensable gas (e.g., air, nitrogen, or hydrogen) into the reactor vessel following an SI signal or during shutdown cooling.

Selection of ECCS locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

The ECCS is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If it is determined by subsequent evaluation that the ECCS is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.2.3 (continued)

ECCS locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g. operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge the system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

SR 3.5.2.4

Periodic surveillance testing of ECCS pumps to detect gross degradation caused by impeller structural damage or other hydraulic component problems is required by Section XI of the ASME Code. This type of testing may be accomplished by measuring the pump developed head at only one point of the pump characteristic curve. This verifies that the measured performance is within an acceptable tolerance of the original pump baseline performance. SRs are specified in the Inservice Testing Program, which encompasses Section XI of the ASME Code. Section XI of the ASME Code provides the activities and Frequencies necessary to satisfy the requirements.

In addition to the acceptance criteria of the Inservice Testing Program, performance of this SR also verifies that pump performance is greater than or equal to the performance assumed in the safety analysis.

SR 3.5.2.5 and SR 3.5.2.6

These Surveillances demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SI and FW ST level low-low (for RHR semiautomatic switchover to the

(continued)

BASES

LCO (continued)

In MODE 4, an ECCS train consists of a centrifugal charging subsystem and an RHR subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RW ST and transferring suction to the containment sump.

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the ECCS pumps and their respective supply headers to each of the four cold leg injection nozzles. In the long term, this flow path may be switched to take its supply from the containment sump and to deliver its flow to the RCS hot and cold legs. Management of gas voids is important to ECCS OPERABILITY.

APPLICABILITY

In MODES 1, 2, and 3, the OPERABILITY requirements for ECCS are covered by LCO 3.5.2.

In MODE 4 with RCS temperature below 350°F, one OPERABLE ECCS train is acceptable without single failure consideration, on the basis of the stable reactivity of the reactor and the limited core cooling requirements.

In MODES 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops—MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops—MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation — HighWater Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation — LowWater Level."

ACTIONS

A Note prohibits the application of LCO 3.0.4b to an inoperable ECCS centrifugal charging pump subsystem when entering MODE 4. There is an increased risk associated with entering MODE 4 from MODE 5 with an inoperable ECCS centrifugal charging pump subsystem, and the provisions of LCO 3.0.4b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The modeled Containment Cooling System actuation from the containment analysis is based upon a response time associated with exceeding the containment High-1 pressure setpoint to achieving full Containment Cooling System air and safety grade cooling water flow. The Containment Cooling System fan response time of 48 seconds includes signal delay and DG startup (for loss of offsite power) (Ref. 3).

The Containment Spray System and the Containment Cooling System satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

LCO

During a DBA, a minimum of one containment cooling train and one containment spray train are required to maintain the containment peak pressure and temperature below the design limits (Ref. 4). Additionally, one containment spray train is also required to remove iodine from the containment atmosphere and maintain concentrations below those assumed in the safety analysis. To ensure that these requirements are met, two containment spray trains and two containment cooling trains must be OPERABLE. Therefore, in the event of an accident, at least one train in each system operates, assuming the worst case single active failure occurs.

Each Containment Spray System typically includes a spray pump, spray headers, nozzles, valves, piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RW ST upon an ESF actuation signal and manually transferring suction to the containment sump. Management of gas voids is important to Containment Spray System OPERABILITY.

Each Containment Cooling System typically includes demisters, cooling coils, dampers, fans, instruments, and controls to ensure an OPERABLE flow path.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment and an increase in containment pressure and temperature requiring the operation of the containment spray trains and containment cooling trains.

(continued)

BASES

ACTIONS (continued)

C.1 and C.2

If the inoperable containment spray or cooling train cannot be restored to OPERABLE status within the required Completion Time, 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 at least MODE 3 within 6 hours and to MODE 5 within 84 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems. The extended interval to reach MODE 5 allows additional time for attempting restoration of the containment spray or cooling train and is reasonable when considering the driving force for a release of radioactive material from the Reactor Coolant System is reduced in MODE 3.

SURVEILLANCE REQUIREMENTS

SR 3.6.6.1

Verifying the correct alignment for manual, power operated, and automatic valves in the containment spray flow path provides assurance that the proper flow paths will exist for Containment Spray System operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these were verified to be in the correct position prior to locking, sealing, or securing. This SR does not require any testing or valve manipulation. Rather, it involves verification that those valves outside containment (only check valves are inside containment) and capable of potentially being mispositioned are in the correct position.

The Surveillance is modified by a Note which exempts system vent flow paths opened under administrative control. The administrative control should be proceduralized and include stationing an individual who can rapidly close the system vent flow path if directed.

SR 3.6.6.2

Operating each pair of containment cooling fan units for ≥ 15 minutes ensures that all fan units are OPERABLE and that all associated controls are functioning properly. It also ensures that blockage or fan

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.6.5 and SR 3.6.6.6 (continued)

Program. Any change in the scope or frequency of SR 3.6.6.6 requires reevaluation of STI Evaluation number 417332, in accordance with the Surveillance Frequency Control Program. The surveillance of containment sump isolation valves is also required by SR 3.5.2.5. A single surveillance may be used to satisfy both requirements.

SR 3.6.6.7

This SR requires verification that each containment cooling train actuates upon receipt of an actual or simulated safety injection signal and operates at low speed. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.6.6.8

With the containment spray inlet valves closed and the spray header drained of any solution, low pressure air or smoke can be blown through test connections. This SR ensures that each spray nozzle is unobstructed and provides assurance that spray coverage of the containment during an accident is not degraded. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.6.6.9

Containment Spray System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the containment spray trains and may also prevent water hammer and pump cavitation.

Selection of Containment Spray System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.6.9 (continued)

The Containment Spray System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If it is determined by subsequent evaluation that the Containment Spray System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits.

Containment Spray System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 38, GDC 39, GDC 40, GDC 41, GDC 42, and GDC 43.
2. 10 CFR 50, Appendix K.
3. FSAR, Chapter 7.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

RHR and Coolant Circulation - HighWater Level satisfies Criterion 4 of 10 CFR 50.36 (c)(2)(ii).

LCO

Only one RHR loop is required for decay heat removal in MODE 6, with the water level ≥ 23 ft above the top of the reactor vessel flange. Only one RHR loop is required to be OPERABLE, because the volume of water above the reactor vessel flange provides backup decay heat removal capability. At least one RHR loop must be OPERABLE and in operation to provide:

- a. Removal of decay heat;
- b. Mixing of borated coolant to minimize the possibility of criticality; and
- c. Indication of reactor coolant temperature.

An OPERABLE RHR loop includes an RHR pump, a heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path and to determine the low end temperature. The flow path starts in one of the RCS hot legs and is returned to the RCS cold legs.

Management of gas voids is important to RHR System OPERABILITY.

The LCO is modified by a Note that allows the required operating RHR loop to be removed from service for up to 1 hour per 8 hour period provided no operations are permitted that would cause a reduction of the RCS boron concentration. Boron concentration reduction is prohibited because uniform concentration distribution cannot be ensured without forced circulation. This permits operations such as core mapping or alterations in the vicinity of the reactor vessel hot leg nozzles and RCS to RHR isolation valve testing. During this 1 hour period, decay heat is removed by natural convection to the large mass of water in the refueling cavity.

APPLICABILITY

One RHR loop must be OPERABLE and in operation in MODE 6, with the water level ≥ 23 ft above the top of the reactor vessel flange, to provide decay heat removal and mixing of the borated coolant. The 23 ft water level was selected

(continued)

BASES

ACTIONS

A.3 (continued)

water level \geq 23 ft above the top of the reactor vessel flange, corrective actions shall be initiated immediately.

A.4

If RHR loop requirements are not met, all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere must be closed within 4 hours. With the RHR loop requirements not met, the potential exists for the coolant to boil and release radioactive gas to the containment atmosphere. Closing containment penetrations that are open to the outside atmosphere ensures dose limits are not exceeded.

The Completion Time of 4 hours is reasonable, based on the low probability of the coolant boiling in that time.

SURVEILLANCE REQUIREMENTS

SR 3.9.5.1

This Surveillance demonstrates that the RHR loop is in operation and circulating reactor coolant. The flow rate (FIC-0618A and FIC-0619A) is determined by the flow rate necessary to provide sufficient decay heat removal capability and to provide mixing of the borated coolant to prevent thermal and boron stratification in the core. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.9.5.2

RHR System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the RHR loops and may also prevent water hammer, pump cavitation, and pumping of noncondensable gas into the reactor vessel.

Selection of RHR System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.9.5.2 (continued)

to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

The RHR System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If it is determined by subsequent evaluation that the RHR System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits. When the RHR System is restored to service, the surveillance is met by virtue of the performance of operating procedures that ensure the RHR Loop is adequately filled and vented. The performance of these manual actions ensures that the surveillance is met.

RHR System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

The SR may be met for a RHR Loop by virtue of having a loop in service in accordance with operating procedures.

The RHR system is assumed to remain sufficiently filled with water and may be restarted following short term duration RHR shutdowns, if no evolutions were performed that can introduce voids into the RHR loop.

(continued)

BASES

**SURVEILLANCE
REQUIREMENTS**

SR 3.9.5.2 (continued)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

REFERENCES

NONE

BASES

LCO (continued)

Additionally, one loop of RHR must be in operation in order to provide:

- a. Removal of decay heat;
- b. Mixing of borated coolant to minimize the possibility of criticality; and
- c. Indication of reactor coolant temperature.

This LCO is modified by a Note that allows one RHR loop to be inoperable for a period of 2 hours provided the other loop is OPERABLE and in operation. Prior to declaring the loop inoperable, consideration should be given to the existing plant configuration. This consideration should include that the core time to boil is short, there is no draining operation to further reduce RCS water level and that the capability exists to inject borated water into the reactor vessel. This permits surveillance tests to be performed on the inoperable loop during a time when these tests are safe and possible.

An OPERABLE RHR loop consists of an RHR pump, a heat exchanger, valves, piping, instruments and controls to ensure an OPERABLE flow path and to determine the low end temperature. The flow path starts in one of the RCS hot legs and is returned to the RCS cold legs. Management of gas voids is important to RHR System OPERABILITY.

APPLICABILITY

Two RHR loops are required to be OPERABLE, and one RHR loop must be in operation in MODE 6, with the water level < 23 ft above the top of the reactor vessel flange, to provide decay heat removal and mixing of the borated coolant. Requirements for the RHR System in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS), and Section 3.5, Emergency Core Cooling Systems (ECCS). RHR loop requirements in MODE 6 with the water level ≥ 23 ft are located in LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation — HighWater Level."

ACTIONS

A.1 and A.2

If less than the required number of RHR loops are OPERABLE, action shall be immediately initiated and continued until the RHR loop is

(continued)

BASES (continued)

SURVEILLANCE
REQUIREMENTS

SR 3.9.6.1

This Surveillance demonstrates that one RHR loop is in operation and circulating reactor coolant. The flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability and to provide mixing of the borated coolant to prevent thermal and boron stratification in the core. In addition, during operation of the RHR loop with the water level in the vicinity of the reactor vessel nozzles, the RHR pump suction requirements must be met. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.9.6.2

RHR System piping and components have the potential to develop voids and pockets of entrained gases. Preventing and managing gas intrusion and accumulation is necessary for proper operation of the RHR loops and may also prevent water hammer, pump cavitation, and pumping of noncondensable gas into the reactor vessel.

Selection of RHR System locations susceptible to gas accumulation is based on a review of system design information, including piping and instrumentation drawings, isometric drawings, plan and elevation drawings, and calculations. The design review is supplemented by system walk downs to validate the system high points and to confirm the location and orientation of important components that can become sources of gas or could otherwise cause gas to be trapped or difficult to remove during system maintenance or restoration. Susceptible locations depend on plant and system configuration, such as stand-by versus operating conditions.

The RHR System is OPERABLE when it is sufficiently filled with water. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criteria for gas volume at the suction or discharge of a pump), the Surveillance is not met. If it is determined by subsequent evaluation that the RHR System is not rendered inoperable by the accumulated gas (i.e., the system is sufficiently filled with water), the Surveillance may be declared met. Accumulated gas should be eliminated or brought within the acceptance criteria limits. When the RHR System is restored to service, the surveillance is met by virtue of the performance of operating procedures that ensure the RHR Loop is adequately filled and vented. The performance of these manual actions ensures that the surveillance is met.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.9.6.2 (continued)

RHR System locations susceptible to gas accumulation are monitored and, if gas is found, the gas volume is compared to the acceptance criteria for the location. Susceptible locations in the same system flow path which are subject to the same gas intrusion mechanisms may be verified by monitoring a representative sub-set of susceptible locations. Monitoring may not be practical for locations that are inaccessible due to radiological or environmental conditions, the plant configuration, or personnel safety. For these locations alternative methods (e.g., operating parameters, remote monitoring) may be used to monitor the susceptible location. Monitoring is not required for susceptible locations where the maximum potential accumulated gas void volume has been evaluated and determined to not challenge system OPERABILITY. The accuracy of the method used for monitoring the susceptible locations and trending of the results should be sufficient to assure system OPERABILITY during the Surveillance interval.

The SR may be met for a RHR Loop by virtue of having a loop in service in accordance with operating procedures.

The RHR system is assumed to remain sufficiently filled with water and may be restarted following short term duration RHR shutdowns, if no evolutions were performed that can introduce voids into the RHR loop.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. The Surveillance Frequency may vary by location susceptible to gas accumulation.

REFERENCES

NONE