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AUG 2 8 2007

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

**SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED LICENSE AMENDMENT NO. 285
FOR UNIT 1 OPERATING LICENSE NO. NPF-14
AND PROPOSED LICENSE AMENDMENT NO. 253
FOR UNIT 2 OPERATING LICENSE NO. NPF-22
EXTENDED POWER UPRATE APPLICATION
REGARDING CHANGE TO
TECHNICAL SPECIFICATION SR 3.7.1 –
RESIDUAL HEAT REMOVAL SERVICE WATER
(RHRSW) SYSTEM
AND THE ULTIMATE HEAT SINK (UHS)
PLA-6266**

**Docket Nos. 50-387
and 50-388**

*Reference: 1. PPL Letter PLA-6076, B. T. McKinney (PPL) to USNRC, "Proposed License Amendment Numbers 285 for Unit 1 Operating License No. NPF-14 and 253 for Unit 2 Operating License No. NPF-22 Constant Pressure Power Uprate," dated October 11, 2006.*

Pursuant to 10 CFR 50.90, PPL Susquehanna LLC (PPL) requested in the above Reference 1 approval of amendments to the Susquehanna Steam Electric Station (SSES) Unit 1 and Unit 2 Operating Licenses and Technical Specifications (TS) to increase the maximum power level authorized from 3489 megawatts thermal (MWt) to 3952 MWt, an approximate 13% increase in thermal power. The proposed Constant Pressure Power Uprate (CPPU) represents an increase of approximately 20% above the Original Licensed Thermal Power (OLTP).

The purpose of this letter is to revise the proposed change to Technical Specification (TS) 3.7.1 contained in Reference 1 based on discussions held with the NRC staff on August 23, 2007.

A001

NRR

Enclosure 1 contains the basis for the revision to TS 3.7.1. Enclosure 2 contains the marked-up Technical Specification pages for Section 3.7.1 for Units 1 & 2, which supersede those pages that were transmitted in Reference 1. Enclosure 3 contains the revised marked-up Technical Specification Bases pages for Section B3.7.1 for Units 1 & 2 that are provided for information.

There are no new regulatory commitments associated with this submittal.

PPL has reviewed the "No Significant Hazards Consideration" and the "Environmental Consideration" submitted with Reference 1 relative to the Attachments. We have determined that there are no changes required to the "Environmental Consideration" of the "No Significant Hazards Consideration".

If you have any questions or require additional information, please contact Mr. Michael H. Crowthers at (610) 774-7766.

I declare under perjury that the foregoing is true and correct.

Executed on: 8-28-07

Richard D Pagodin
for B. T. McKinney

Enclosure 1 - TS 3.7.1 Revision Basis
Enclosure 2 - Revised Technical Specification Pages for Section 3.3.1.1 Units 1 & 2 (Mark-ups)
Enclosure 3 - Revised Technical Specification Bases Pages for Section B3.3.1.1 Units 1 & 2 (Mark-ups – For Information Only)

Attachment 1 - TS 3.7.1 Implementation Table

Copy: NRC Region I
Mr. R. V. Guzman, NRC Sr. Project Manager
Mr. R. R. Janati, DEP/BRP
Mr. F. W. Jaxheimer, NRC Sr. Resident Inspector

# Enclosure 1 to PLA-6266

# TS 3.7.1 Revision Basis

**Proposed Revision Description:**

Based on discussions with NRC staff on August 23, 2007, it was agreed that the proposed changes to TS 3.7.1 provided in Reference 1 would be revised. The TS 3.7.1 proposed changes with the revision is provided in Enclosure 2.

The revision adds the following new Required Action (RA).

"Establish an open flow path to the UHS."

The proposed Completion Time (CT) is 8 hours (from entry into Condition "A").

A double bubble on the markup pages provided in Enclosure 2 surrounds the added RA and CT.

Attachment 1 to this Enclosure demonstrates sufficient spray capacity is provided when in the applicable LCO 3.7.1 Condition "A" configurations.

**Proposed Revision Basis:**

The proposed changes to TS 3.7.1 impact three systems. These systems are:

1. Residual Heat Removal Service Water
2. Ultimate Heat Sink
3. Emergency Service Water

The Emergency Service Water (ESW) system cools safety related equipment. The pumps automatically start when the associated diesel generator receives a start signal. The Residual Heat Removal Service Water (RHRSW) system is manually placed in service to support heat removal from the associated RHR heat exchanger. The ESW and RHRSW systems share the Ultimate Heat Sink (UHS) as a water source and the return piping that includes the large spray array, small spray array, and the spray array bypass header. The normal lineup has all pumps shutdown with the return path aligned through the spray array bypass header. The motor operated spray array bypass valve is normally open. It receives an open signal on any pump start and when the last pump is shut down. The large and small spray array valves are manually opened and receive a close signal when the last pump is shut down. Operation of the large spray array, small spray array, and bypass valves are directed by plant operating procedures to maintain the UHS temperature based on meteorological and plant conditions.

These systems are considered OPERABLE when they are determined to be capable of performing their specified safety functions. For a given TS condition, completion times (CT) are specified in the TS to limit the time that the Condition exists. A 72-hour completion time is applicable when the remaining OPERABLE equipment is capable of performing its specified safety function. A 72-hour completion time is assigned to the proposed Condition "A" changes because the RHRSW and UHS, when in that condition, are capable of performing their specified safety function. The revision proposed herein to add the new RA provides assurance that the plant will be in a configuration that supports the 72-hour completion time.

Addition of the proposed RA provides a TS action to establish a flow path for the ESW system and establish a flow path for RHRSW that otherwise would not be required by the TS's as proposed in Reference 1. This action maintains the plant configuration such that it is in a configuration that is capable of mitigating the consequences of an accident consistent with the design basis analysis presented in Reference 1. Once this RA is taken, ESW can be considered OPERABLE since it requires a flow path capable of returning flow to the UHS, and the UHS can be considered OPERABLE since it has sufficient spray capacity.

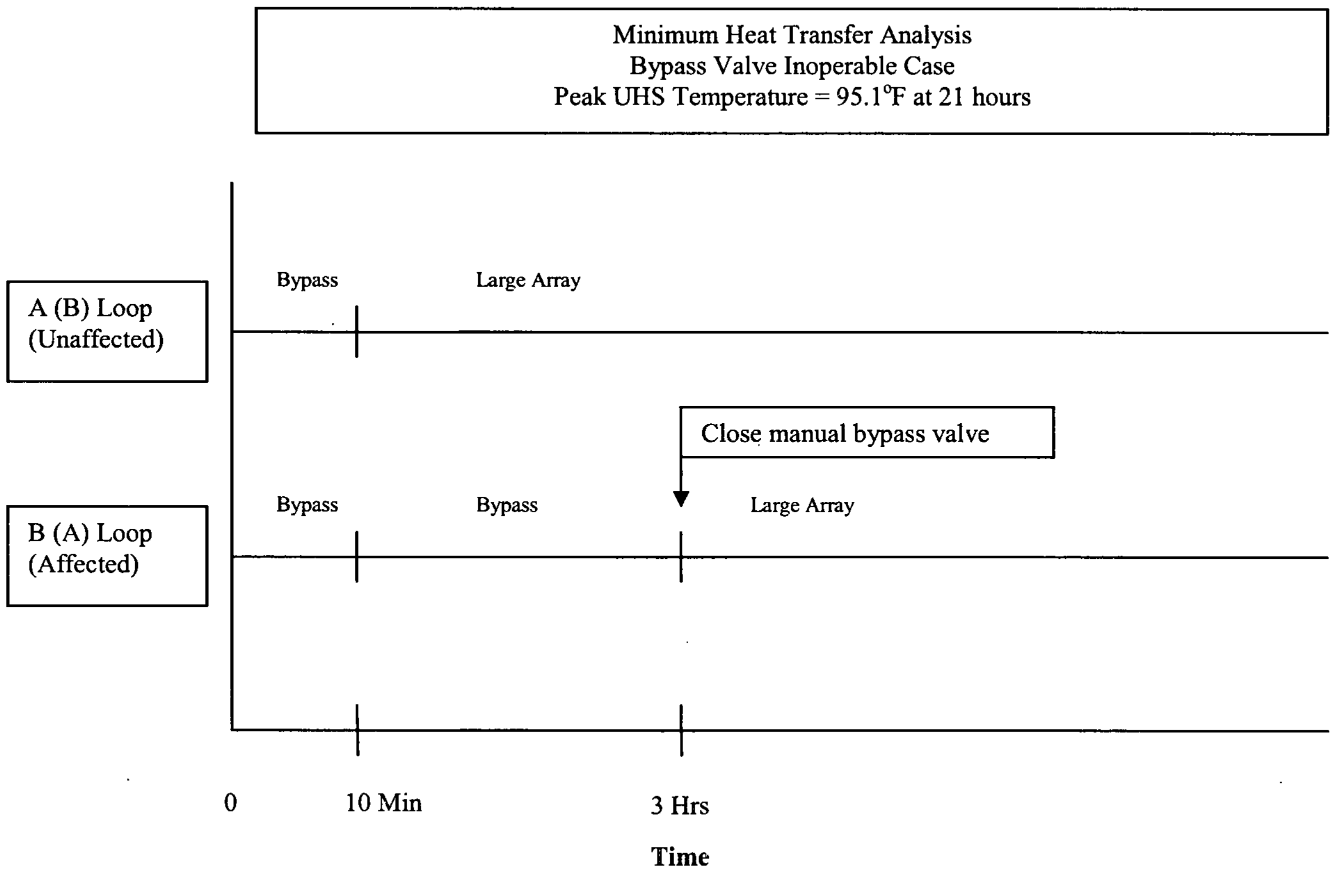
The design basis analysis for the UHS demonstrating existing spray capacity is summarized in Reference 1, Attachment 4, Section 4.5.1. The figures that follow the below discussion of the analysis depict the flow paths that are assumed for the UHS design base analysis. These analyses demonstrate the UHS has sufficient spray capacity.

The Minimum Heat Transfer Cases assume meteorological conditions that maximize peak pond temperature. The Maximum Water Loss Case assumes meteorological data that maximizes water loss.

For all cases, a LOCA and simultaneous shutdown of the other unit is assumed. A loss of offsite power to both units is also assumed. UHS temperature is maintained below the 97°F UHS design maximum temperature for the entire 30-day transient for all cases. In addition, all cases demonstrate that adequate UHS inventory exists to provide cooling for 30 days without makeup.

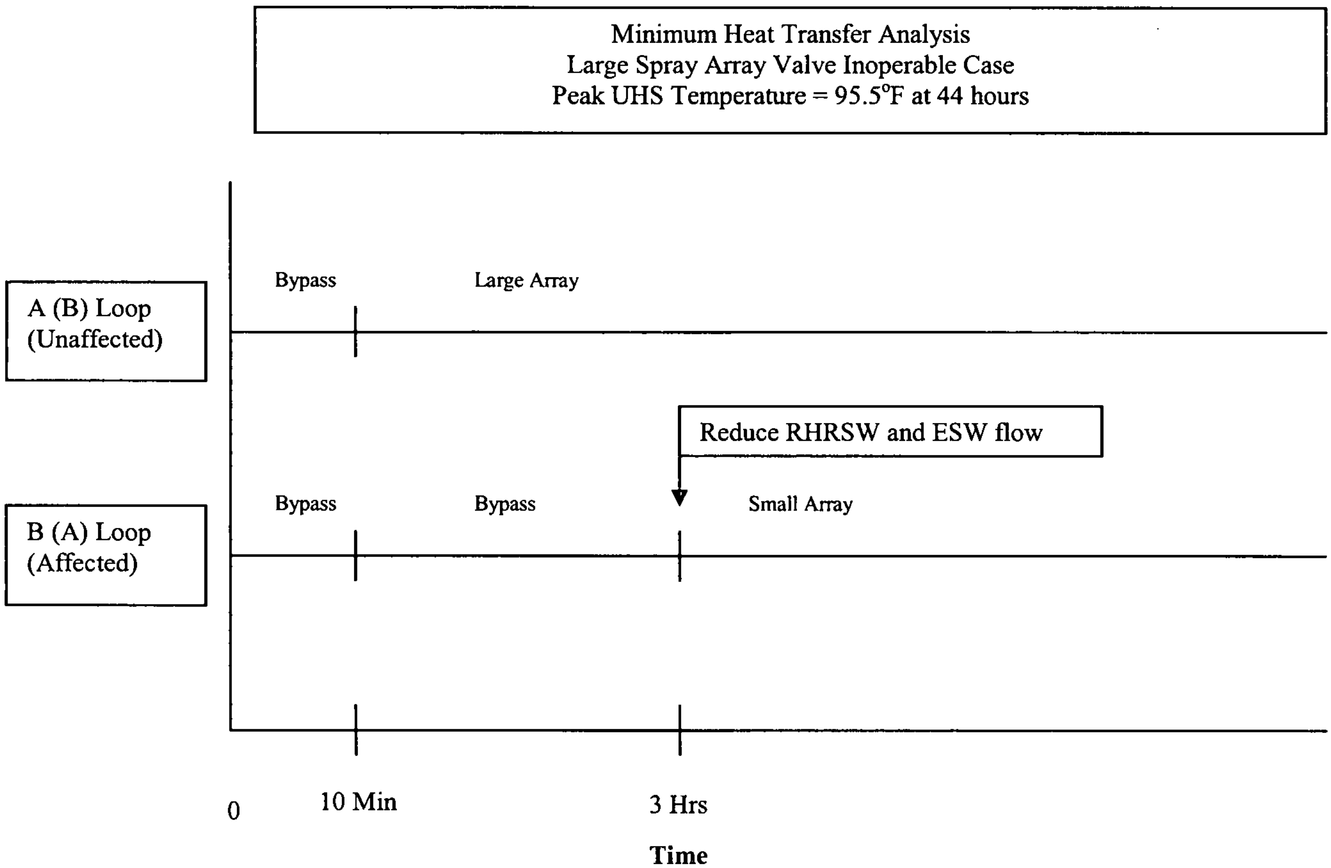
Minimum Heat Transfer Analysis
Motor Operated Bypass Valve Inoperable Case

For this case, a motor operated bypass valve is assumed to be inoperable in the open position in one UHS return loop ("affected" loop). Heat is rejected to the UHS through both bypass lines at the beginning of the transient. On the unaffected loop, from the control room, the large spray array valve is opened and the motor operated bypass valve is closed at 10 minutes to establish spray cooling. On the affected loop, flow continues through the bypass line for three hours. At three hours, the large spray array valve on the affected loop is opened and the manual bypass valve is closed to establish spray cooling. Spray cooling using the two large spray arrays continues for the balance of the transient.



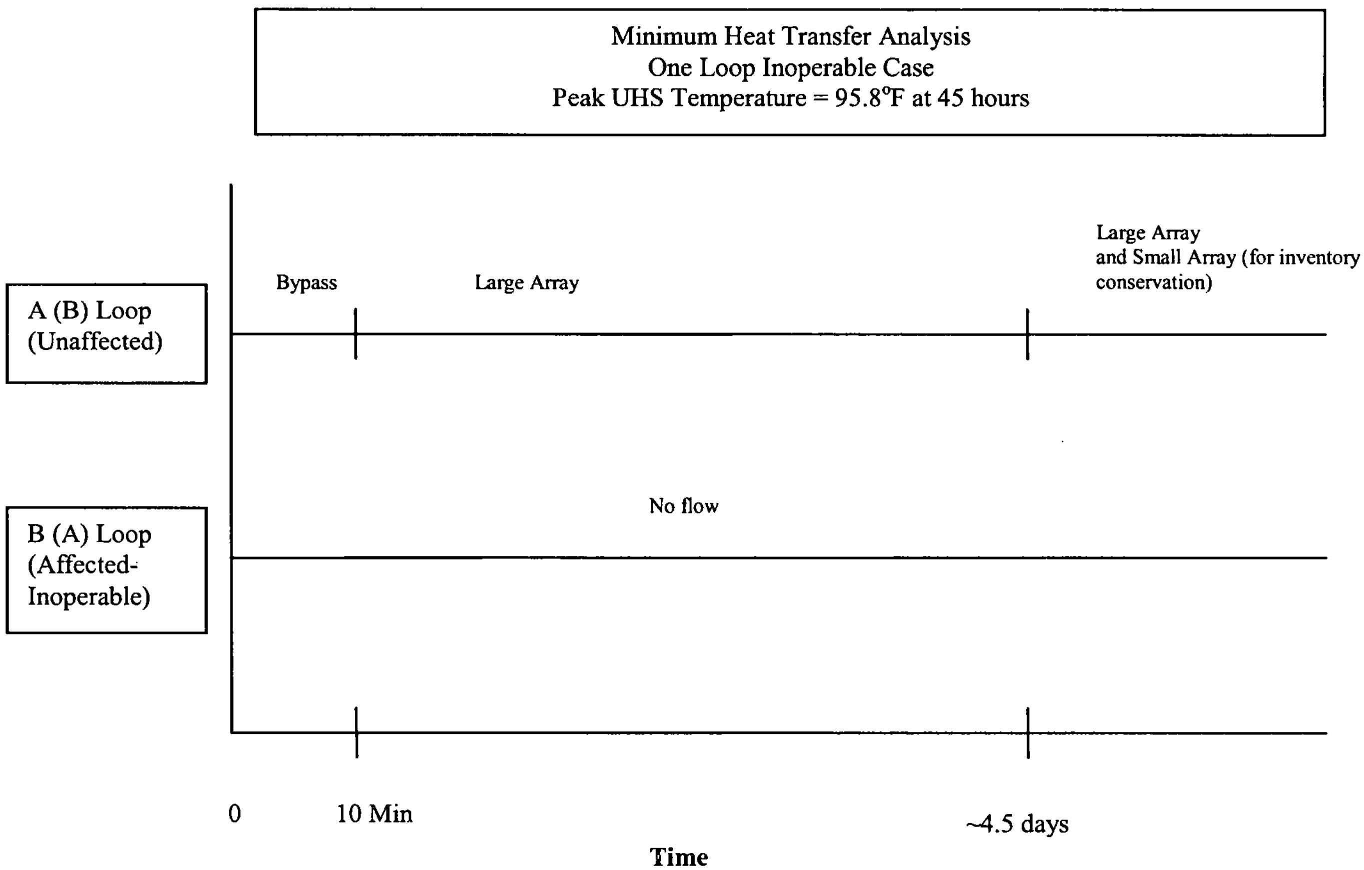
Minimum Heat Transfer Analysis
Large Spray Array Valve Inoperable Case

For this case, a large spray array valve is assumed to be inoperable in the closed position ("affected" loop). Heat is rejected to the UHS through both bypass lines at the beginning of the transient. On the unaffected loop, the large spray array valve is opened and the motor operated bypass valve is closed at 10 minutes to establish spray cooling. On the affected loop, flow continues through the bypass line for three hours. At three hours, RHRSW and ESW flow are reduced on the affected loop, the small spray array valve is opened and the motor operated bypass valve is closed to establish spray cooling. Spray cooling using a large spray array on one loop and a small spray array on the other loop continues for the balance of the transient.



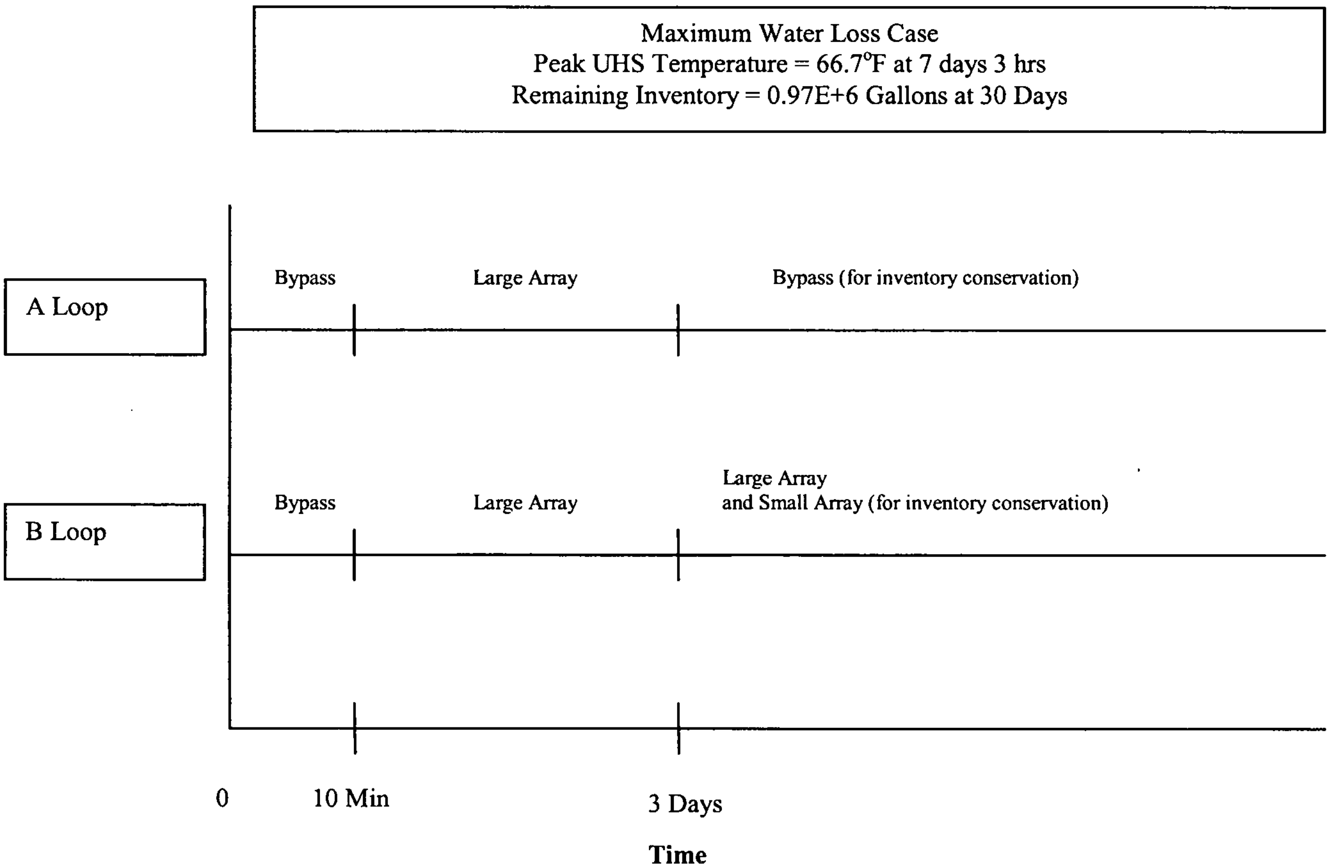
Minimum Heat Transfer Analysis
One Loop Inoperable Case

For this case, an entire loop of RHRSW and ESW is assumed to be inoperable ("affected" loop). No flow is assumed to exist in the affected loop for the entire transient. On the unaffected loop, heat is rejected to the UHS through the bypass line at the beginning of the transient. At 10 minutes, the large spray array valve is opened and the motor operated bypass valve is closed to establish spray cooling. Spray cooling using the large spray array continues until the small spray array valve is opened in order to conserve water inventory. Spray operation continues using both spray arrays in the same loop for the balance of the transient.



Maximum Water Loss Case

All equipment is assumed to be OPERABLE for this case. Heat is rejected to the UHS through both bypass lines at the beginning of the transient. At 10 minutes, the large spray array valves are opened and the motor operated bypass valves are closed to establish spray cooling on both loops. Spray operation continues on both loops using the large spray arrays until actions are taken to reduce spray evaporation and drift losses. These actions involve the use of the small spray array on one loop (in addition to the large spray array) and the use of the bypass line on the other loop (no sprays). Under worst case conditions, these actions will take place in approximately 3 days. Operation will continue in this configuration for the balance of the transient.




Operating Procedures:

All operator actions assumed in the analysis discussed above are defined in operating procedures. The new action to close the manual bypass header valve has no impact on existing action times. The ESW system is automatically started and the RHRSW system is manually initiated from the control room.

The ESW System operating procedure has a precaution to ensure a return flow path to the UHS through the bypass header, large spray array and/or small spray array when an ESW pump is started.

Specific procedural direction is provided in the RHRSW operating procedures to address the possible UHS return path configurations since a return path established through a large spray array can accommodate the maximum loop flow from ESW and RHRSW system operation, but the small spray array can only accommodate the flow from the ESW loop and one RHRSW subsystem (1 pump) at maximum flow.

The RHRSW System operating procedure ensures a return path is open to the UHS through the bypass header, large spray array and/or small spray array when the pumps are being started. The procedure has a table that identifies the applicable flow rates as a function of the available UHS return path.

The emergency plan provides direction to monitor UHS conditions and utilize UHS spray capacity to maintain water level and water temperature within limits accounting for actual meteorological and system configurations.

**Conclusion:**

This analysis for the UHS described above demonstrates that sufficient spray capacity is provided when in LCO 3.7.1 Condition "A" with a UHS return loop that has an inoperable or a combination of inoperable flow path valves. Attachment 1 provides in a tabular format an evaluation of the various plant configurations of the proposed TS 3.7.1 Condition "A" demonstrating acceptability and consistency with the design basis analysis. As a result, the proposed TS changes delineated in Enclosure 2 are acceptable.

# Attachment 1 to PLA-6266
# TS 3.7.1 Implementation Table

X = Inoperable
Not all possible actions for all possible configurations are discussed in the last column.

| Case No. | A LG Array Valve | A Sm Array Valve | A Bypass | A Manual Bypass | B LG Array Valve | B Sm Array Valve | B Bypass | B Manual Bypass | Applicable Condition and CT | Possible actions to establish open flow path in affected loop. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | X | X | | | | | | | Condition A -<br>- Declare the U1 and U2 A RHRSW subsystems inoperable.<br>- Completion Time is 72 hours, since adequate cooling capability exists via spray arrays in the unaffected loop. | Assuming the large and small spray array valves are failed in the closed position, the bypass valve, which is normally open, would need to be de-energized in the open position within 8 hours. With the large or small spray array valves failed in the open position, the large or small spray array valves could be de-energized in the open position to meet this required action. |
| 1.1 | X | X | | | X | | | | LCO 3.0.3 in both units would be entered since no condition in the TS to address this configuration. | Not relevant. |
| 2 | X | | X | | | | | | Same as 1. | Assuming the large spray array and bypass valves are failed in the closed position, the small spray array valve would be opened and de-energized within 8 hours. With the large spray array or bypass valve failed in the open position, the large spray array or bypass valve could be de-energized in the open position to meet this required action. |

| Case No. | A LG Array Valve | A Sm Array Valve | A Bypass | A Manual Bypass | B LG Array Valve | B Sm Array Valve | B Bypass | B Manual Bypass | Applicable Condition and CT | Possible actions to establish open flow path in affected loop. |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | X | | | X | | | | | Same as 1 | Assuming the large spray array and manual bypass valves are failed in the closed position, the small spray array valve would be opened and de-energized within 8 hours. With the large spray array valve failed in the open position, the large spray array valve could be de-energized in the open position. |
| 4 | | X | X | | | | | | Same as 1. | Assuming the small spray array and bypass valves are failed in the closed position; the large spray array valve would be opened and de-energized within 8 hours. With the small array valve and bypass valve failed open, the small spray array or bypass valves could be de-energized in the open position to meet this required action. |
| 5 | | X | | X | | | | | Same as 1. | Assuming the small spray array and bypass valves are failed in the closed position, the large spray array valve would need to be opened and de-energized within 8 hours. With the small array valve failed in the open position, the small spray array valve could be de-energized in the open position to meet this required action. |

| Case No. | A LG Array Valve | A Sm Array Valve | A Bypass | A Manual Bypass | B LG Array Valve | B Sm Array Valve | B Bypass | B Manual Bypass | Applicable Condition and CT | Possible actions to establish open flow path in affected loop. |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | | X | X | | | | | Same as 1 | Assuming the bypass valves are failed in the closed position, the large and/or small array valves would be opened and de-energized within 8 hours. With the valves failed in the open position, the motor operated bypass valve could be de-energized to meet this required action. |
| 6.1 | | | X | X | | | X | | LCO 3.0.3 in both units would be entered since no condition in the TS to address this configuration. | Not relevant. |
| 7 | X | X | X | | | | | | Same as 1. | Assuming the valves are failed closed, one of the affected valves would need to be opened and de-energized to meet the required action. |
| 7.1 | X | X | X | | X | | | | LCO 3.0.3 in both units would be entered since no condition in the TS to address this configuration. | Not relevant. |
| 8 | X | X | | X | | | | | Same as 1. | Assuming the valves are failed closed, one of the affected valves would need to be opened and de-energized to meet the required action. |
| 9 | X | | X | X | | | | | Same as 1. | Assuming the large spray array and bypass valves are failed in the closed position, the small array valve would need to be opened and de-energized within 8 hours. |

| Case No. | A LG Array Valve | A Sm Array Valve | A Bypass | A Manual Bypass | B LG Array Valve | B Sm Array Valve | B Bypass | B Manual Bypass | Applicable Condition and CT | Possible actions to establish open flow path in affected loop. |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | X | X | X | | | | | Same as 1. | Assuming the small spray array valve and bypass valves are failed in the closed position, the large array valve would need to be opened and de-energized within 8 hours. |
| 11 | | X | | | | X | | | LCO 3.0.3 in both units would be entered since no condition in the TS to address this configuration. | Not relevant. |
| 12 | X | | | | | | | | Same as 1. | Assuming the large array valve is failed in the closed position, the bypass line which is normally open, would need to be de-energized in the open position within 8 hours. |
| 13 | | X | | | | | | | Same as 1. | Assuming the small spray array valve is failed in the closed position, the bypass line which is normally open, would need to be de-energized in the open position within 8 hours. |
| 14 | | | X | | | | | | Same as 1. | Assuming the bypass valve is failed in the closed position, the large and/or small spray array valves would need to be opened and de-energized within 8 hours. |

| Case No. | A LG Array Valve | A Sm Array Valve | A Bypass | A Manual Bypass | B LG Array Valve | B Sm Array Valve | B Bypass | B Manual Bypass | Applicable Condition and CT | Possible actions to establish open flow path in affected loop. |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | | | | X | | | | | Same as 1. | Assuming the bypass valve is failed in the closed position, the large and/or small spray array valves would need to be opened and de-energized in the open position within 8 hours. |

# Enclosure 2 to PLA-6266

# Revised Technical Specification Pages for Section 3.7.1 Units 1 & 2 (Mark-ups)

3.7 PLANT SYSTEMS

3.7.1 Residual Heat Removal Service Water (RHRSW) System and the Ultimate Heat Sink (UHS)

LCO 3.7.1 Two RHRSW subsystems and the UHS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

---NOTE---
Enter applicable Conditions and Required Actions of LCO 3.4.8, "Residual Heat Removal (RHR) Shutdown Cooling System-Hot Shutdown," for RHR shutdown cooling made inoperable by RHRSW System.

---

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. ---NOTE--- Separate Condition entry is allowed for each valve. --- One valve in Table 3.7.1-1 inoperable. <br>OR<br> One valve in Table 3.7.1-2 inoperable. <br>OR<br> ~~One valve in Table 3.7.1-2 and the same return loop valve in Table 3.7.1-1 inoperable.~~ <br> Any combination of valves in Table 3.7.1-1, Table 3.7.1-2, or Table 3.7.1-3 in the same return loop inoperable. <br>OR<br> One valve in Table 3.7.1-3 inoperable. | A.1 Declare the associated RHRSW subsystems inoperable <br>AND<br> A.2 Establish an open flow path to the UHS. <br>AND<br> A.~~2~~ 3 Restore the inoperable valve(s) to OPERABLE status. | Immediately <br><br> 8 hours from the discovery of an inoperable RHRSW subsystem in the opposite loop from the inoperable valve(s) <br>AND<br> ~~72 hours~~ 8 hours |

(continued)

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.7.1.1 | Verify the water level is greater than or equal to 678 feet 1 inch above Mean Sea Level. | 12 hours |
| SR 3.7.1.2 | Verify the average water temperature of the UHS is:<br>a. ------NOTE------<br>Only applicable with both units in MODE 1 or 2, or with either unit in MODE 3 for less than twelve (12) hours.<br>------<br>≤ 85°F; or<br>b. ------NOTE------<br>Only applicable when either unit has been in MODE 3 for at least twelve (12) hours but not more than twenty-four (24) hours.<br>------<br>≤ 87°F; or<br>c. ------NOTE------<br>Only applicable when either unit has been in MODE 3 for at least twenty-four (24) hours.<br>------<br>≤ 88°F | 24 hours |
| SR 3.7.1.3 | Verify each RHRSW manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position or can be aligned to the correct position. | 31 days |
| SR 3.7.1.4 | Verify that valves HV-01222A and B (the spray loop bypass valves) close upon receipt of a closing signal. | 92 days |
| SR 3.7.1.5 | Verify that valves HV-01224A1 and B1 (the large loop spray array valves) open on receipt of an opening signal. | 92 days |

Insert 3.7-3A

**Insert 3.7-3A**

| | | |
|---|---|---|
| SR 3.7.1.4 | Verify that valves HV-01222A and B (the spray array bypass valves) close upon receipt of a closing signal and open upon receipt of an opening signal. | 92 days |
| SR 3.7.1.5 | Verify that valves HV-01224A1 and B1 (the large spray array valves) close upon receipt of a closing signal and open upon receipt of an opening signal. | 92 days |
| SR 3.7.1.6 | Verify that valves HV-01224A2 and B2 (the small spray array valves) close upon receipt of a closing signal and open upon receipt of an opening signal. | 92 days |
| SR 3.7.1.7 | Verify that valves 012287A and 012287B (the spray array bypass manual valves) are capable of being opened and closed. | 92 days |

TABLE 3.7.1-1 (PAGE 1 OF 1)

Ultimate Heat Sink Spray Cooling Large Array Valves

| VALVE NUMBER | VALVE DESCRIPTION |
|---|---|
| HV-01224A1 | Loop A large spray array valve |
| HV-01224B1 | Loop B large spray array valve |
| HV-01224A2 | Loop A small spray array valve |
| HV-01224B2 | Loop B small spray array valve |

TABLE 3.7.1-2 Array

Ultimate Heat Sink Spray Bypass Valves

| VALVE NUMBER | VALVE DESCRIPTION |
|---|---|
| HV-01222A | Loop A spray array bypass valve |
| HV-01222B | Loop B spray array bypass valve |

Insert 3.7-3bA

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TABLE 3.7.1-2

Ultimate Heat Sink Spray Bypass Valves

Array

| VALVE NUMBER | VALVE DESCRIPTION |
|---|---|
| HV-01222A | Loop A spray array bypass valve |
| HV-01222B | Loop B spray array bypass valve |

Insert 3.7-36A

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**Insert 3.7-3bA**

| TABLE 3.7.1-3<br><br>Ultimate Heat Sink Spray Array Bypass Manual Valves | |
|---|---|
| VALVE NUMBER | VALVE DESCRIPTION |
| 012287A | Loop A spray array bypass manual valve |
| 012287B | Loop B spray array bypass manual valve |

3.7 PLANT SYSTEMS

3.7.1 Residual Heat Removal Service Water (RHRSW) System and the Ultimate Heat Sink (UHS)

LCO 3.7.1 Two RHRSW subsystems and the UHS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

-----NOTE-----
Enter applicable Conditions and Required Actions of LCO 3.4.8, "Residual Heat Removal (RHR) Shutdown Cooling System-Hot Shutdown," for RHR shutdown cooling made inoperable by RHRSW System.

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. -----NOTE----- Separate Condition entry is allowed for each valve. | A.1 Declare the associated RHRSW subsystems inoperable. | Immediately |
| One valve in Table 3.7.1-1 inoperable.<br>OR<br>One valve in Table 3.7.1-2 inoperable.<br>OR<br>~~One valve in Table 3.7.1-2 and the same return loop valve in Table 3.7.1-1 inoperable.~~<br>Any combination of valves in Table 3.7.1-1, Table 3.7.1-2, or Table 3.7.1-3 in the same return loop inoperable.<br>OR<br>One valve in Table 3.7.1-3 inoperable. | AND<br>A.~~2~~3 Restore the inoperable valve(s) to OPERABLE status.<br>AND<br>A.2 Establish an open flow-path to the UHS. | 8 hours from the discovery of an inoperable RHRSW subsystem in the opposite loop from the inoperable valve(s)<br>AND<br>~~72 hours~~ 8 hours |

(continued)

SURVEILLANCE REQUIREMENTS

| | SURVEILLANCE | FREQUENCY |
|---|---|---|
| SR 3.7.1.1 | Verify the water level is greater than or equal to 678 feet 1 inch above Mean Sea Level. | 12 hours |
| SR 3.7.1.2 | Verify the average water temperature of the UHS is:<br>a. ------------NOTE------------<br>Only applicable with both units in MODE 1 or 2, or with either unit in MODE 3 for less than twelve (12) hours.<br>------------------------<br>≤ 85°F; or<br>b. ------------NOTE------------<br>Only applicable when either unit has been in MODE 3 for at least twelve (12) hours but not more than twenty-four (24) hours.<br>------------------------<br>≤ 87°F; or<br>c. ------------NOTE------------<br>Only applicable when either unit has been in MODE 3 for at least twenty-four (24) hours.<br>------------------------<br>≤ 88°F. | 24 hours |
| SR 3.7.1.3 | Verify each RHRSW manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position or can be aligned to the correct position. | 31 days |
| SR 3.7.1.4 | Verify that valves HV-01222A and B (the spray loop bypass valves) close upon receipt of a closing signal. | 92 days |
| SR 3.7.1.5 | Verify that valves HV-01224A1 and B1 (the large loop spray array valves) open upon receipt of an opening signal. | 92 days |

Insert 3.7-3A

## Insert 3.7-3A

| | | |
|---|---|---|
| SR 3.7.1.4 | Verify that valves HV-01222A and B (the spray array bypass valves) close upon receipt of a closing signal and open upon receipt of an opening signal. | 92 days |
| SR 3.7.1.5 | Verify that valves HV-01224A1 and B1 (the large spray array valves) close upon receipt of a closing signal and open upon receipt of an opening signal. | 92 days |
| SR 3.7.1.6 | Verify that valves HV-01224A2 and B2 (the small spray array valves) close upon receipt of a closing signal and open upon receipt of an opening signal. | 92 days |
| SR 3.7.1.7 | Verify that valves 012287A and 012287B (the spray array bypass manual valves) are capable of being opened and closed. | 92 days |

TABLE 3.7.1-1 (PAGE 1 OF 1)

Ultimate Heat Sink Spray Cooling Large Array Valves

| VALVE NUMBER | VALVE DESCRIPTION |
|---|---|
| HV-01224A1 | Loop A large spray array valve |
| HV-01224B1 | Loop B large spray array valve |
| HV-01224A2 | Loop A Small spray array valve |
| HV-01224B2 | Loop B Small spray array valve |

TABLE 3.7.1-2 (PAGE 1 OF 1)

Ultimate Heat Sink Spray Array Bypass Valves

| VALVE NUMBER | VALVE DESCRIPTION |
|---|---|
| HV-01222A | Loop A spray array bypass valve |
| HV-01222B | Loop B spray array bypass valve |

Insert 3.7-3bA

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## Insert 3.7-3bA

| TABLE 3.7.1-3<br><br>Ultimate Heat Sink Spray Array Bypass Manual Valves | |
|---|---|
| VALVE NUMBER | VALVE DESCRIPTION |
| 012287A | Loop A spray array bypass manual valve |
| 012287B | Loop B spray array bypass manual valve |

# Enclosure 3 to PLA-6266

# Revised Technical Specification Bases Pages for Section B3.7.1 Units 1 & 2 (Mark-ups – For Information Only)

# B 3.7 PLANT SYSTEMS

## B 3.7.1 Residual Heat Removal Service Water (RHRSW) System and the Ultimate Heat Sink (UHS)

BASES

BACKGROUND

The RHRSW System is designed to provide cooling water for the Residual Heat Removal (RHR) System heat exchangers, required for a safe reactor shutdown following a Design Basis Accident (DBA) or transient. The RHRSW System is operated whenever the RHR heat exchangers are required to operate in the shutdown cooling mode or in the suppression pool cooling or spray mode of the RHR System.

The RHRSW System consists of two independent and redundant subsystems. Each subsystem is made up of a header, one pump, a suction source, valves, piping, heat exchanger, and associated instrumentation. Either of the two subsystems is capable of providing the required cooling capacity to maintain safe shutdown conditions. The two subsystems are separated so that failure of one subsystem will not affect the OPERABILITY of the other subsystem. One Unit 1 RHRSW subsystem and the associated (same division) Unit 2 RHRSW subsystem constitute a single RHRSW loop. The two RHRSW pumps in a loop can each, independently, be aligned to either Unit's heat exchanger. The RHRSW System is designed with sufficient redundancy so that no single active component failure can prevent it from achieving its design function. The RHRSW System is described in the FSAR, Section 9.2.6, Reference 1.

Cooling water is pumped by the RHRSW pumps from the UHS through the tube side of the RHR heat exchangers. After removing heat from the RHRSW heat exchanger, the water is discharged to the spray pond (UHS) by way of the UHS return loops. The UHS return loops direct the return flow to a network of sprays that dissipate the heat to the atmosphere or directly to the UHS via a bypass ~~valve~~ header.

The system is initiated manually from the control room, except for the spray array bypass manual valves that are operated locally in the event of a failure of the spray array bypass valves. The system can be started any time the LOCA signal is manually overridden or clears.

(continued)

BASES

BACKGROUND (continued)

The ultimate heat sink (UHS) system is composed of a 350,000 cubic foot spray pond and associated piping and spray risers. Each UHS return loop contains a bypass line, a large spray array and a small spray array. The purpose of the UHS is to provide both a suction source of water and a return path for the RHRSW and ESW systems. The function of the UHS is to provide water to the RHRSW and ESW systems at a temperature less than the 97°F design temperature of the RHRSW and ESW systems. UHS temperature is maintained less than the design temperature by introducing the hot return fluid from the RHRSW and ESW systems into the spray loops and relying on spray cooling to maintain temperature. The UHS is designed to supply the RHRSW and ESW systems with all the cooling capacity required during a combination LOCA/LOOP for thirty days without fluid addition. The UHS is described in the FSAR, Section 9.2.7 (Reference 1).

APPLICABLE SAFETY ANALYSES

The RHRSW System removes heat from the suppression pool to limit the suppression pool temperature and primary containment pressure following a LOCA. This ensures that the primary containment can perform its function of limiting the release of radioactive materials to the environment following a LOCA. The ability of the RHRSW System to support long term cooling of the reactor or primary containment is discussed in the FSAR, Chapters 6 and 15 (Refs. 2 and 3, respectively). These analyses explicitly assume that the RHRSW System will provide adequate cooling support to the equipment required for safe shutdown. These analyses include the evaluation of the long term primary containment response after a design basis LOCA.

RHRSW and UHS Configurations.

The safety analyses for long term cooling were performed for various combinations of RHR System failures. The worst case single failure that would affect the performance of the RHRSW System is any failure that would disable one UHS return loop. The failure of the spray array bypass valve to close results in the inability of one UHS return loop to perform its design function because failure of this valve to close results in inadequate spray nozzle pressures on the affected loop. As discussed in the FSAR, Section 6.2.2 (Ref. 2) for these analyses, manual initiation of the OPERABLE RHRSW subsystem and the associated RHR System is required. ~~assumed to occur 30 minutes after a DBA. In this case,~~ The maximum suppression chamber water temperature and pressure are analyzed to be below the design temperature of 220°F and maximum allowable pressure of 53 psig.

(continued)

Insert 3.7-3A

BASES

APPLICABLE SAFETY ANALYSES (continued)

The failure of the large spray array valve to open on demand is of less consequence than the failure of the spray array bypass valve because the small spray array is still available. Two small spray arrays have the same capacity and can perform the same function as a single large spray array. Each small array can effectively discharge the output of one RHRSW subsystem and one ESW loop to the UHS. The small spray arrays do not meet the 10CFR50.36 criteria for inclusion into the Technical Specifications and are not included. As a result, no credit is taken for the existence of the small spray arrays.

The RHRSW System, together with the UHS, satisfy Criterion 3 of the NRC Policy Statement. (Ref. 4)

LCO

Two RHRSW subsystems are required to be OPERABLE to provide the required redundancy to ensure that the system functions to remove post accident heat loads, assuming the worst case single active failure occurs coincident with the loss of offsite power.

An RHRSW subsystem is considered OPERABLE when:

a. One pump is OPERABLE; and

b. An OPERABLE flow path is capable of taking suction from the UHS and transferring the water to the RHR heat exchanger and returning it to the UHS at the assumed flow rate, and

c. An OPERABLE UHS.

The OPERABILITY of the UHS is based on having a minimum water level at the overflow weir of 678 feet 1 inch above mean sea level and a maximum water temperature of 85°F; unless either unit is in MODE 3. If a unit enters MODE 3, the time of entrance into this condition determines the appropriate maximum ultimate heat sink fluid temperature. If the earliest unit to enter MODE 3 has been in that condition for less than twelve (12) hours, the peak temperature to maintain OPERABILITY of the ultimate heat sink remains at 85°F. If either unit has been in MODE 3 for more than twelve (12) hours but less than twenty-four (24) hours, the OPERABILITY temperature of the ultimate heat sink becomes 87°F. If either unit has been in MODE 3 for twenty-four (24) hours or more, the OPERABILITY temperature of the ultimate heat sink becomes 88°F.

(continued)

**Insert B 3.7-3A**

The UHS design takes into account the cooling efficiency of the spray arrays and the evaporation losses during design basis environmental conditions. The spray array bypass header provides the flow path for the ESW and RHRSW system to keep the spray array headers from freezing. The small and/or large spray arrays are placed in service to dissipate heat returning from the plant. The UHS return header is comprised of the spray array bypass header, the large spray array, and the small spray array.

The spray array bypass header is capable of passing full flow from the RHRSW and ESW systems in each loop. The large spray array is capable of passing full flow from the RHRSW and ESW systems in each loop. The small spray array supports heat dissipation when low system flows are required.

For Information Only



in one loop

BASES

LCO (continued)

In addition, the OPERABILITY of the UHS is based on having sufficient spray capacity in the UHS return loops to effectively dissipate the heat picked up by the RHRSW and ESW systems. Sufficient spray capacity is defined as one large spray array available for heat dissipation.

and one small

This OPERABILITY definition is supported by analysis and evaluations performed in accordance with the guidance given in Regulatory Guide 1.27.

APPLICABILITY

In MODES 1, 2, and 3, the RHRSW System and the UHS are required to be OPERABLE to support the OPERABILITY of the RHR System for primary containment cooling (LCO 3.6.2.3, "Residual Heat Removal (RHR) Suppression Pool Cooling," and LCO 3.6.2.4, "Residual Heat Removal (RHR) Suppression Pool Spray") and decay heat removal (LCO 3.4.8, "Residual Heat Removal (RHR) Shutdown Cooling System—Hot Shutdown"). The Applicability is therefore consistent with the requirements of these systems.

In MODES 4 and 5, the OPERABILITY requirements of the RHRSW System are determined by the RHR shutdown cooling subsystem(s) it supports (LCO 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown"; LCO 3.9.7, "Residual Heat Removal (RHR) - High Water Level"; and LCO 3.9.8, "Residual Heat Removal (RHR) - Low Water Level").

In MODES 4 and 5, the OPERABILITY requirements of the UHS is determined by the systems it supports.

ACTIONS

The ACTIONS are modified by a Note indicating that the applicable Conditions of LCO 3.4.8, be entered and Required Actions taken if the inoperable RHRSW subsystem results in inoperable RHR shutdown cooling (SDC) (i.e., both the Unit 1 and Unit 2 RHRSW pumps in a loop are inoperable resulting in the associated RHR SDC system being inoperable). This is an exception to LCO 3.0.6 because the Required Actions of LCO 3.7.1 do not adequately compensate for the loss of RHR SDC Function (LCO 3.4.8).

Condition A is modified by a separate note to allow separate Condition entry for each valve. This is acceptable since the Required Action for this Condition provides appropriate compensatory actions.

(continued)

Insert B 3.7-5A

BASES

ACTIONS (continued)

A.1, A.2 and A.3

With one spray array bypass valve inoperable (that is, not capable of being closed on demand), or with one large spray array valve not capable of being opened, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the spray cooling function of the affected UHS return loop. As a result, the associated RHRSW subsystems must be declared inoperable.

A.2

Insert B 3.7-5B

With one spray array bypass valve or one large spray array valve inoperable, only one large spray array is available for effective spray cooling. Failure of either the spray bypass valve or the large spray array valve in the unaffected loop would result in insufficient spray cooling capacity. The 72-hour completion time is based on the fact that, although adequate UHS spray loop capability exists during this time period, both units are affected and an additional single failure results in a system configuration that will not meet design basis accident requirements.

Insert B 3.7-5C

If an additional RHRSW subsystem on either Unit is inoperable, cooling capacity less than the minimum required for response to a design basis event would exist. Therefore, an 8-hour Completion Time is appropriate. The 8-hour Completion Time provides sufficient time to restore inoperable equipment and there is a low probability that a design basis event would occur during this period.

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if one Unit 1 RHRSW subsystem is inoperable. Although designated and operated as a unitized system, the associated Unit 2 subsystem is directly connected to a common header, which can supply the associated RHR heat exchanger in either unit. The Unit 2 subsystems are considered capable of supporting Unit 1 RHRSW subsystem when the Unit 2 subsystem is OPERABLE and can provide the assumed flow to the Unit 1 heat exchanger. A Completion time of 72 hours, when one Unit 2 RHRSW subsystem is not capable of supporting the Unit 1 RHRSW subsystems, is allowed to restore the Unit 1 RHRSW subsystem to OPERABLE status. In this configuration, the remaining OPERABLE Unit 1 RHRSW subsystem is adequate to perform the RHRSW heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE RHRSW subsystem

(continued)

## Insert B 3.7-5A

With one spray array loop bypass valve not capable of being closed on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the spray cooling function of the affected UHS return loop. As a result, the associated RHRSW subsystem must be declared inoperable.

With one spray array loop bypass valve not capable of being opened on demand, the associated Unit 1 and Unit 2 RHRSW subsystems and ESW subsystem are not provided a return path to the UHS. a return flow path is not available. As a result, the associated RHRSW subsystems and ESW subsystem must be declared inoperable.

With one spray array bypass manual valve not capable of being closed, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the spray cooling function of the affected UHS return path if the spray array bypass valve fails to close. As a result, the associated RHRSW subsystems must be declared inoperable.

With one spray array bypass manual valve not open, the associated Unit 1 and Unit 2 RHRSW subsystems and ESW subsystem are not provided a return path to the UHS. a return flow path is not available. As a result, the associated RHRSW subsystems and ESW subsystem must be declared inoperable.

With one large spray array valve not capable of being opened on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the full required spray cooling capability of the affected UHS return path. With one large spray array valve not capable of being closed on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the small spray array when loop flows are low as the required spray nozzle pressure is not achievable for the small spray array. As a result, the associated RHRSW subsystems must be declared inoperable.

With one small spray array valve not capable of being opened on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the spray cooling function of the affected UHS return path for low loop flow rates. For a single failure of the large spray array valve in the closed position, design bases LOCA/LOOP calculations assume that flow is reduced on the affected loop within 3 hours after the event to allow use of the small spray array. With one small spray array valve not capable of being closed on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the large spray array for a flow path as the required nozzle pressure is not achievable for the large spray array. As a result, the associated RHRSW subsystems must be declared inoperable.

## Insert B 3.7-5B

With any UHS return path valve listed in Tables 3.7.1-1, 3.7.1-2, or 3.7.1-3 inoperable, the UHS return path is no longer single failure proof.

**Insert B 3.7-5C**

For combinations of inoperable valves in the same loop, the UHS spray capacity needed to support the OPERABILITY of the associated Unit 1 and Unit 2 RHRSW subsystems is affected. As a result, the associated RHRSW subsystems must be declared inoperable.

The 8 hour completion time to establish the flow path provides sufficient time to open a path and de-energize the appropriate valve in the open position.

For Information Only



BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.1.3

Verifying the correct alignment for each manual, power operated, and automatic valve in each RHRSW subsystem flow path provides assurance that the proper flow paths will exist for RHRSW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. A valve is also allowed to be in the nonaccident position, and yet considered in the correct position, provided it can be realigned to its accident position. This is acceptable because the RHRSW System is a manually initiated system.

This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

The 31-day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

SR 3.7.1.4

The UHS spray array bypass valves are required to actuate to the closed position for the UHS to perform its design function. These valves receive an automatic signal to open upon emergency service water (ESW) or residual heat removal service water (RHRSW) system pump start and are required to be operated from the control room or the remote shutdown panel. A spray bypass valve is considered to be inoperable when it cannot be closed on demand. Failure of the spray bypass valve to close on demand puts the UHS at risk to exceed its design temperature. The failure of the spray bypass valve to open on demand ~~is not limiting and~~, ~~therefore, would not cause the loop to be inoperable.~~ This SR demonstrates that the valves will move to their required positions when required. The 92-day Test Frequency is based upon engineering judgment and operating/testing history that indicates this frequency gives adequate assurance that the valves will move to their required positions when required.

makes one return path unavailable, and therefore the associated RHRSW subsystems must be declared inoperable.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.1.5 — UHS return header

The ~~return loop~~ large spray array valves are required to open in order for the UHS to perform its design function. These valves are manually actuated from either the control room or the remote shutdown panel, under station operating procedure, when the RHRSW system is required to remove energy from the reactor vessel or suppression pool. ~~A large spray array valve is considered inoperable if it cannot be opened on demand, because the valve must be opened to allow spray cooling to occur.~~ This SR demonstrates that the valves will move to their required positions when required. The 92-day Test Frequency is based upon engineering judgment and operating/testing history that indicates this frequency gives adequate assurance that the valves will move to their required positions when required.

Insert B 3.7-6cA

REFERENCES

1. FSAR, Section 9.2.6.
2. FSAR, Chapter 6.
3. FSAR, Chapter 15.
4. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).

**Insert B 3.7-6cA**

SR 3.7.1.6

operate The small spray array valves HV-012224A2 and B2 are required to be closed in order for the UHS to perform its design function. These valves are manually actuated from the control room or the remote shutdown panel, under station operating procedure, when the RHRSW system is required to remove energy from the reactor vessel or suppression pool. A small spray array valve is considered inoperable if it cannot be closed when required to support design bases analyses lineups. The small spray array valve has to be closed for the large spray array to be capable of design bases cooling capacity. This SR demonstrates that the valves will move to their required positions when required. The 92-day Test Frequency is based upon engineering judgment and operating/testing history that indicates this frequency gives adequate assurance that the valves will move to their required positions when required.

SR 3.7.1.7

operate The spray array bypass manual valves 012287A and B are required to be closed in the event of a failure of the spray array bypass valves to close in order for the UHS to perform its design function. A spray array bypass manual valve is considered inoperable if it is not capable of being closed in a timely manner as described in the design bases analyses (3 hours from the time the spray array bypass valve fails to close and the UHS temperature exceeds the requirements in SR 3.7.1.2.)

B 3.7 PLANT SYSTEMS

B 3.7.1 Residual Heat Removal Service Water (RHRSW) System and the Ultimate Heat Sink (UHS)

## BASES

BACKGROUND

The RHRSW System is designed to provide cooling water for the Residual Heat Removal (RHR) System heat exchangers, required for a safe reactor shutdown following a Design Basis Accident (DBA) or transient. The RHRSW System is operated whenever the RHR heat exchangers are required to operate in the shutdown cooling mode or in the suppression pool cooling or spray mode of the RHR System.

The RHRSW System consists of two independent and redundant subsystems. Each subsystem is made up of a header, one pump, a suction source, valves, piping, heat exchanger, and associated instrumentation. Either of the two subsystems is capable of providing the required cooling capacity to maintain safe shutdown conditions. The two subsystems are separated so that failure of one subsystem will not affect the OPERABILITY of the other subsystem. One Unit 1 RHRSW subsystem and the associated (same division) Unit 2 RHRSW subsystem constitute a single RHRSW loop. The two RHRSW pumps in a loop can each, independently, be aligned to either Unit's heat exchanger. The RHRSW System is designed with sufficient redundancy so that no single active component failure can prevent it from achieving its design function. The RHRSW System is described in the FSAR, Section 9.2.6, Reference 1.

Cooling water is pumped by the RHRSW pumps from the UHS through the tube side of the RHR heat exchangers. After removing heat from the RHRSW heat exchanger, the water is discharged to the spray pond (UHS) by way of the UHS return loops. The UHS return loops direct the return flow to a network of sprays that dissipate the heat to the atmosphere or directly to the UHS via a bypass ~~valve.~~ header.

The system is initiated manually from the control room. The system can be started any time the LOCA signal is manually overridden or clears.

except for the spray array bypass manual valves that are operated locally in the event of a failure of the spray array bypass valves.

(continued)

BASES (continued)

BACKGROUND (continued)

The ultimate heat sink (UHS) system is composed of a 350,000 cubic foot spray pond and associated piping and spray risers. Each UHS return loop contains a bypass line, a large spray array and a small spray array. The purpose of the UHS is to provide both a suction source of water and a return path for the RHRSW and ESW systems. The function of the UHS is to provide water to the RHRSW and ESW systems at a temperature less than the 97°F design temperature of the RHRSW and ESW systems. UHS temperature is maintained less than the design temperature by introducing the hot return fluid from the RHRSW and ESW systems into the spray loops and relying on spray cooling to maintain temperature. The UHS is designed to supply the RHRSW and ESW systems with all the cooling capacity required during a combination LOCA/LOOP for thirty days without fluid addition. The UHS is described in the FSAR, Section 9.2.7 (Reference 1).

APPLICABLE SAFETY ANALYSES

The RHRSW System removes heat from the suppression pool to limit the suppression pool temperature and primary containment pressure following a LOCA. This ensures that the primary containment can perform its function of limiting the release of radioactive materials to the environment following a LOCA. The ability of the RHRSW System to support long term cooling of the reactor or primary containment is discussed in the FSAR, Chapters 6 and 15 (Refs. 2 and 3, respectively). These analyses explicitly assume that the RHRSW System will provide adequate cooling support to the equipment required for safe shutdown. These analyses include the evaluation of the long term primary containment response after a design basis LOCA.

RHRSW and UHS configurations

The safety analyses for long term cooling were performed for various combinations of RHR System failures. ~~The worst case single failure that would affect the performance of the RHRSW System is any failure that would disable one UHS return loop. The failure of the spray array bypass valve to close results in the inability of one UHS return loop to perform its design function because failure of this valve to close results in inadequate spray nozzle pressures on the affected loop.~~ As discussed in the FSAR, ~~Section 6.2.2 (Ref. 2) for these analyses,~~ manual initiation of the OPERABLE RHRSW subsystem and the associated RHR System is required. ~~assumed to occur 30 minutes after a DBA. In this case,~~ The maximum suppression chamber water temperature and pressure are analyzed to be below the design temperature of 220°F and maximum allowable pressure of 53 psig.

(continued)

Insert B 3.7-3A

BASES (continued)

APPLICABLE SAFETY ANALYSES (continued)

The failure of the large spray array valve to open on demand is of less consequence than the failure of the spray array bypass valve because the small spray array is still available. Two small spray arrays have the same capacity and can perform the same function as a single large spray array. Each small array can effectively discharge the output of one RHRSW subsystem and one ESW loop to the UHS. The small spray arrays do not meet the 10CFR50.36 criteria for inclusion into the Technical Specifications and are not included. As a result, no credit is taken for the existence of the small spray arrays.

The RHRSW System, together with the UHS, satisfy Criterion 3 of the NRC Policy Statement. (Ref. 4)

LCO

Two RHRSW subsystems are required to be OPERABLE to provide the required redundancy to ensure that the system functions to remove post accident heat loads, assuming the worst case single active failure occurs coincident with the loss of offsite power.

An RHRSW subsystem is considered OPERABLE when:

a. One pump is OPERABLE; and

b. An OPERABLE flow path is capable of taking suction from the UHS and transferring the water to the RHR heat exchanger and returning it to the UHS at the assumed flow rate, and

c. An OPERABLE UHS.

The OPERABILITY of the UHS is based on having a minimum water level at the overflow weir of 678 feet 1 inch above mean sea level and a maximum water temperature of 85°F; unless either unit is in MODE 3. If a unit enters MODE 3, the time of entrance into this condition determines the appropriate maximum ultimate heat sink fluid temperature. If the earliest unit to enter MODE 3 has been in that condition for less than twelve (12) hours, the peak temperature to maintain OPERABILITY of the ultimate heat sink remains at 85°F. If either unit has been in MODE 3 for more than twelve (12) hours but less than twenty-four (24) hours, the OPERABILITY temperature of the ultimate heat sink becomes 87°F. If either unit has been in MODE 3 for twenty-four (24) hours or more, the OPERABILITY temperature of the ultimate heat sink becomes 88°F.

(continued)

**Insert B 3.7-3A**

The UHS design takes into account the cooling efficiency of the spray arrays and the evaporation losses during design basis environmental conditions. The spray array bypass header provides the flow path for the ESW and RHRSW system to keep the spray array headers from freezing. The small and/or large spray arrays are placed in service to dissipate heat returning from the plant. The UHS return header is comprised of the spray array bypass header, the large spray array, and the small spray array.

The spray array bypass header is capable of passing full flow from the RHRSW and ESW systems in each loop. The large spray array is capable of passing full flow from the RHRSW and ESW systems in each loop. The small spray array supports heat dissipation when low system flows are required.

For Information Only



BASES (continued)

in one loop

and one small

LCO (continued)

In addition, the OPERABILITY of the UHS is based on having sufficient spray capacity in the UHS return loops ~~to effectively dissipate the heat picked up by the RHRSW and ESW systems~~. Sufficient spray capacity is defined as one large spray array ~~available for heat dissipation~~.

This OPERABILITY definition is supported by analysis and evaluations performed in accordance with the guidance given in Regulatory Guide 1.27.

APPLICABILITY

In MODES 1, 2, and 3, the RHRSW System and the UHS are required to be OPERABLE to support the OPERABILITY of the RHR System for primary containment cooling (LCO 3.6.2.3, "Residual Heat Removal (RHR) Suppression Pool Cooling," and LCO 3.6.2.4, "Residual Heat Removal (RHR) Suppression Pool Spray") and decay heat removal (LCO 3.4.8, "Residual Heat Removal (RHR) Shutdown Cooling System—Hot Shutdown"). The Applicability is therefore consistent with the requirements of these systems.

In MODES 4 and 5, the OPERABILITY requirements of the RHRSW System are determined by the RHR shutdown cooling subsystem(s) it supports (LCO 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown"; LCO 3.9.7, "Residual Heat Removal (RHR) - High Water Level"; and LCO 3.9.8, "Residual Heat Removal (RHR) - Low Water Level").

In MODES 4 and 5, the OPERABILITY requirements of the UHS is determined by the systems it supports.

ACTIONS

The ACTIONS are modified by a Note indicating that the applicable Conditions of LCO 3.4.8, be entered and Required Actions taken if the inoperable RHRSW subsystem results in inoperable RHR shutdown cooling (SDC) (i.e., both the Unit 1 and Unit 2 RHRSW pumps in a loop are inoperable resulting in the associated RHR SDC system being inoperable). This is an exception to LCO 3.0.6 because the Required Actions of LCO 3.7.1 do not adequately compensate for the loss of RHR SDC Function (LCO 3.4.8).

Condition A is modified by a separate note to allow separate Condition entry for each valve. This is acceptable since the Required Action for this Condition provide appropriate compensatory actions.

(continued)

BASES (continued) Insert B 3.7-5A

ACTIONS (continued)

A.1 A.2 and A.3

With one spray array bypass valve inoperable (that is, not capable of being closed on demand), or with one large spray array valve not capable of being opened, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the spray cooling function of the affected UHS return loop. As a result, the associated RHRSW subsystems must be declared inoperable.

A.2

Insert B3.7-5B

With one spray array bypass valve or one large spray array valve inoperable, only one large spray array is available for effective spray cooling. Failure of either the spray bypass valve or the large spray array valve in the unaffected loop would result in insufficient spray cooling capacity. The 72-hour completion time is based on the fact that, although adequate UHS spray loop capability exists during this time period, both units are affected and an additional single failure results in a system configuration that will not meet design basis accident requirements.

Insert B3.7-5C

If an additional RHRSW subsystem on either Unit is inoperable, cooling capacity less than the minimum required for response to a design basis event would exist. Therefore, an 8-hour Completion Time is appropriate. The 8-hour Completion Time provides sufficient time to restore inoperable equipment and there is a low probability that a design basis event would occur during this period.

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if one Unit 2 RHRSW subsystem is inoperable. Although designated and operated as a unitized system, the associated Unit 1 subsystem is directly connected to a common header which can supply the associated RHR heat exchanger in either unit. The Unit 1 subsystems are considered capable of supporting Unit 2 RHRSW subsystem when the Unit 1 subsystem is OPERABLE and can provide the assumed flow to the Unit 2 heat exchanger. A Completion time of 72 hours, when one Unit 1 RHRSW subsystem is not capable of supporting the Unit 2 RHRSW subsystems, is allowed to restore the Unit 2 RHRSW subsystem to OPERABLE status. In this configuration, the remaining OPERABLE Unit 2 RHRSW subsystem is adequate to perform the RHRSW heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE RHRSW subsystem

(continued)

## Insert B 3.7-5A

With one spray array loop bypass valve not capable of being closed on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the spray cooling function of the affected UHS return loop. As a result, the associated RHRSW subsystem must be declared inoperable.

a return flow path is not available

With one spray array loop bypass valve not capable of being opened on demand, ~~the associated Unit 1 and Unit 2 RHRSW subsystems and ESW subsystem are not provided a return path to the UHS~~. As a result, the associated RHRSW subsystems ~~and ESW subsystem~~ must be declared inoperable.

With one spray array bypass manual valve not capable of being closed, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the spray cooling function of the affected UHS return path if the spray array bypass valve fails to close. As a result, the associated RHRSW subsystems must be declared inoperable.

With one spray array bypass manual valve not open, ~~the associated Unit 1 and Unit 2 RHRSW subsystems and ESW subsystem are not provided a return path to the UHS~~. As a result, the associated RHRSW subsystems ~~and ESW subsystem~~ must be declared inoperable.

With one large spray array valve not capable of being opened on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the full required spray cooling capability of the affected UHS return path. With one large spray array valve not capable of being closed on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the small spray array when loop flows are low as the required spray nozzle pressure is not achievable for the small spray array. As a result, the associated RHRSW subsystems must be declared inoperable.

With one small spray array valve not capable of being opened on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the spray cooling function of the affected UHS return path for low loop flow rates. For a single failure of the large spray array valve in the closed position, design bases LOCA/LOOP calculations assume that flow is reduced on the affected loop within 3 hours after the event to allow use of the small spray array. With one small spray array valve not capable of being closed on demand, the associated Unit 1 and Unit 2 RHRSW subsystems cannot use the large spray array for a flow path as the required nozzle pressure is not achievable for the large spray array. As a result, the associated RHRSW subsystems must be declared inoperable.

## Insert B 3.7-5B

With any UHS return path valve listed in Tables 3.7.1-1, 3.7.1-2, or 3.7.1-3 inoperable, the UHS return path is no longer single failure proof.

**Insert B 3.7-5C**

For combinations of inoperable valves in the same loop, the UHS spray capacity needed to support the OPERABILITY of the associated Unit 1 and Unit 2 RHRSW subsystems is affected. As a result, the associated RHRSW subsystems must be declared inoperable.

The 8 hour completion time to establish the flow path provides sufficient time to open a path and de-energize the appropriate valve in the open position.

For Information Only



BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.1.3

Verifying the correct alignment for each manual, power operated, and automatic valve in each RHRSW subsystem flow path provides assurance that the proper flow paths will exist for RHRSW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. A valve is also allowed to be in the nonaccident position, and yet considered in the correct position, provided it can be realigned to its accident position. This is acceptable because the RHRSW System is a manually initiated system.

This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

The 31-day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

SR 3.7.1.4

The UHS spray array bypass valves are required to actuate to the closed position for the UHS to perform its design function. These valves receive an automatic signal to open upon emergency service water (ESW) or residual heat removal service water (RHRSW) system pump start and are required to be operated from the control room or the remote shutdown panel. A spray bypass valve is considered to be inoperable when it cannot be closed on demand. Failure of the spray bypass valve to close on demand puts the UHS at risk to exceed its design temperature. The failure of the spray bypass valve to open on demand ~~is not limiting and, therefore, would not cause the loop to be inoperable~~. This SR demonstrates that the valves will move to their required positions when required. The 92-day Test Frequency is based upon engineering judgement and operating/testing history that indicates this frequency gives adequate assurance that the valves will move to their required positions when required.

makes one return path unavailable, and therefore the associated RHRSW subsystems must be declared inoperable.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.1.5

UHS return header

The return loop large spray array valves are required to open in order for the UHS to perform its design function. These valves are manually actuated from either the control room or the remote shutdown panel, under station operating procedure, when the RHRSW system is required to remove energy from the reactor vessel or suppression pool. A large spray array valve is considered inoperable if it cannot be opened on demand, because the valve must be opened to allow spray cooling to occur. This SR demonstrates that the valves will move to their required positions when required. The 92-day Test Frequency is based upon engineering judgement and operating/testing history that indicates this frequency gives adequate assurance that the valves will move to their required positions when required.

Insert B 3.7-6cA

REFERENCES

1. FSAR, Section 9.2.6.
2. FSAR, Chapter 6.
3. FSAR, Chapter 15.
4. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).

## Insert B 3.7-6cA

SR 3.7.1.6

operate

The small spray array valves HV-012224A2 and B2 are required to ~~be closed~~ in order for the UHS to perform its design function. These valves are manually actuated from the control room or the remote shutdown panel, under station operating procedure, when the RHRSW system is required to remove energy from the reactor vessel or suppression pool. ~~A small spray array valve is considered inoperable if it cannot be closed when required to support design bases analyses lineups. The small spray array valve has to be closed for the large spray array to be capable of design bases cooling capacity.~~ This SR demonstrates that the valves will move to their required positions when required. The 92-day Test Frequency is based upon engineering judgment and operating/testing history that indicates this frequency gives adequate assurance that the valves will move to their required positions when required.

SR 3.7.1.7

operate

The spray array bypass manual valves 012287A and B are required to ~~be closed~~ in the event of a failure of the spray array bypass valves to close in order for the UHS to perform its design function. ~~A spray array bypass manual valve is considered inoperable if it is not capable of being closed in a timely manner as described in the design bases analyses (3 hours from the time the spray array bypass valve fails to close and the UHS temperature exceeds the requirements in SR 3.7.1.2.)~~