Nebraska Public Power District
"Always there when you need us"

50.90

NLS2021018
May 11, 2021

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

Subject: Application to Revise Technical Specifications to Adopt TSTF-582, "Reactor Pressure Vessel Water Inventory Control (RPV WIC) Enhancements"
Cooper Nuclear Station, Docket No. 50-298, License No. DPR-46

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Nebraska Public Power District (NPPD) is submitting a request for an amendment to the Technical Specifications (TS) for Cooper Nuclear Station.

NPPD requests adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-582, "Reactor Pressure Vessel Water Inventory Control (RPV WIC) Enhancements." The TS related to RPV WIC are revised to incorporate operating experience and to correct errors and omissions in TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control."

Attachment 1 provides a description and assessment of the proposed changes. Attachment 2 provides the existing TS pages marked to show the proposed changes. Attachment 3 provides revised (clean) TS pages. Attachment 4 provides the existing TS Bases pages marked to show revised text associated with the proposed TS changes and is provided for information only.

NPPD requests that the amendment be reviewed under the Consolidated Line Item Improvement Process. Approval of the proposed amendment is requested by May 11, 2022. Once approved, the amendment shall be implemented within 60 days.

The proposed TS changes have been reviewed by the necessary safety review committees (Station Operations Review Committee and Safety Review and Audit Board). In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," a copy of this application, with attachments, is being provided to the designated State of Nebraska Official.

No regulatory commitments are made in this submittal.

If you should have any questions regarding this submittal please contact Linda Dewhirst, Regulatory Affairs and Compliance Manager, at (402) 825-5416.

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

Executed On: 5/11/2021
Date

Sincerely,

John Dent, Jr.
Vice President and
Chief Nuclear Officer

/dv

Attachments:
1. Description and Assessment
2. Proposed Technical Specifications Changes (Mark-up)
3. Revised Technical Specifications Pages
4. Proposed Technical Specifications Bases Changes (Mark-up)

cc: Regional Administrator w/ attachments
USNRC - Region IV

Cooper Project Manager w/ attachments
USNRC - NRR Plant Licensing Branch IV

Senior Resident Inspector w/ attachments
USNRC - CNS

Nebraska Health and Human Services w/ attachments
Department of Regulation and Licensure

NPG Distribution w/ attachments

CNS Records w/ attachments

Attachment 1

Description and Assessment

Cooper Nuclear Station, Docket No. 50-298, License No. DPR-46

1.0 DESCRIPTION

Nebraska Public Power District (NPPD) requests adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-582, "Reactor Pressure Vessel Water Inventory Control (RPV WIC) Enhancements." The Technical Specifications (TS) related to RPV WIC are revised to incorporate operating experience and to correct errors and omissions in TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control."

2.0 ASSESSMENT

2.1 Applicability of Safety Evaluation

NPPD has reviewed the safety evaluation for TSTF-582 provided to the TSTF in a letter dated August 13, 2020. (ADAMS Accession No. ML20223A000). This review included the Nuclear Regulatory Commission (NRC) staff's evaluation, as well as the information provided in TSTF-582. NPPD has concluded that the justifications presented in the TSTF-582 and the safety evaluation prepared by the NRC staff are applicable to Cooper Nuclear Station (CNS) and justify this amendment for the incorporation of the changes to the CNS TS.

NPPD verifies that the required Emergency Core Cooling System (ECCS) injection/spray subsystem can be aligned and the pump started using relatively simple evolutions involving the manipulation of a small number of components. These actions can be performed in a short time (less than the minimum Drain Time of 1 hour) from the control room following plant procedures.

2.2 Optional Changes and Variations

NPPD is proposing the following variations from the TS changes described in TSTF-582 or the applicable parts of the NRC staff's safety evaluation:

2.2.1 The CNS TS utilize different numbering than the Standard Technical Specifications (STS) on which TSTF-582 was based. These differences are administrative and do not affect the applicability of TSTF-582 to the CNS TS.

TSTF-582 STS	CNS TS
TS 3.3.5.2	TS 3.3.5.3
Table 3.3.5.2-1	Table 3.3.5.3-1
Surveillance Requirement (SR) 3.5.2.5	SR 3.5.2.4
SR 3.5.2.6	SR 3.5.2.5
Limiting Condition for Operation (LCO) 3.6.1.3, Condition F	LCO 3.6.1.3, Condition E
SR 3.8.1.14	SR 3.8.1.9
SR 3.8.1.18	SR 3.8.1.10
SR 3.8.1.19	SR 3.8.1.11

2.2.2 TSTF-582 deletes instrumentation functions, surveillance requirements and notes, and renumbers/reletters subsequent functions, SRs, and notes. CNS has instead marked the deleted steps/rows as "[DELETED]" to maintain the current numbering and lettering. These differences are administrative and do not affect the applicability of TSTF-582 to the CNS TS.

2.2.3 The CNS TS contain requirements that differ from the Standard Technical Specifications on which TSTF-582 was based but are encompassed in the TSTF-582 justification. These variations are acceptable and do not affect the applicability of TSTF-582 to the CNS TS.

- STS SR 3.6.1.3.1, SR 3.6.1.3.2, SR 3.6.1.3.7, SR 3.6.1.3.12, SR 3.6.1.3.14 and SR 3.6.1.3.15 contain a note stating that the SR is only required to be met in Modes 1, 2, and 3. TSTF-582 deletes this note. The note does not exist in the CNS TS for TS 3.6.1.3 SRs, therefore, the change is not required.

- The CNS TS 3.8.1 do not include SRs equivalent to STS SR 3.8.1.9, SR 3.8.1.10, SR 3.8.1.11, SR 3.8.1.12, SR 3.8.1.13, SR 3.8.1.15, SR 3.8.1.16, SR 3.8.1.17, and 3.8.1.20. CNS SR 3.8.2.1 is updated to reflect CNS SRs contained in TS 3.8.1.

2.2.4 Some changes in TSTF-582 were incorporated in the CNS TS as variations during adoption of TSTF-542. Therefore, those TSTF-582 changes are not needed.

- STS Table 3.3.5.2-1, Functions 1.c and 2.c, "Manual Initiation," and STS SR 3.3.5.2.3, "Perform LOGIC SYSTEM FUNCTIONAL TEST," are not applicable to the CNS design, therefore, these functions and SR were not added during the adoption of TSTF-542. Also, the existing CNS SR 3.5.2.7 is currently worded as proposed in TSTF-582, "Verify the required ECCS injection/spray subsystem can be manually operated."

- CNS TS 3.6.1.3, Condition F, was the equivalent to STS 3.6.1.3, Condition G and H. Condition F was deleted when adopting TSTF-542.

- TSTF-582 eliminates a redundant definition of Low Pressure Coolant Injection (LPCI) in SR 3.5.2.2. The CNS TS SR 3.5.2.2 uses "ECCS" instead of "LPCI."

2.2.5 Proposed Variation to Adopt TSTF-583-T, "TSTF-582 Diesel Generator Variation"

TSTF-582, "RPV WIC Enhancements, "states:

> The ECCS injection/spray subsystem required to be operable by LCO 3.5.2 must be capable of being manually started as defense-in-depth against an unexpected draining event. ... However, LCO 3.5.2 does not assume that the onsite electrical power source will start automatically on an ECCS or loss of power signal.
>
> LCO 3.8.2, "AC Sources - Shutdown," requires one offsite circuit and one diesel generator to be operable in Modes 4 and 5. SR 3.8.2.1 lists the TS 3.8.1, "AC

> Sources - Operating," SRs that are applicable in Modes 4 and 5. In an oversight in TSTF-542 ["Reactor Pressure Vessel Water Inventory Control"], the TS 3.8.1 SRs that test automatic start and loading of a diesel generator on an ECCS or loss of offsite power signal were not excluded from SR 3.8.2.1.

TSTF-582 revised TS 3.8.2, "AC Sources - Shutdown," SR 3.8.2.1, to exclude additional SRs that verify the ability of the diesel generators to automatically start and load on an ECCS initiation signal or loss of offsite power signal.

The NRC Safety Evaluation for TSTF-582 (ADAMS Accession No. ML20223A000, dated, August 13, 2020), Section 3.6, "Alternating Current Sources - Shutdown, STS 3.8.2," states:

> STS 3.5.2, "Reactor Pressure Vessel Water Inventory Control (RPV WIC)," does not require automatic ECCS initiation to mitigate a draining event in Modes 4 and 5, and the ECCS initiation signal related to the automatic ECCS initiation is removed from the STS. Because the automatic ECCS initiation and related ECCS initial signal in Modes 4 and 5 are eliminated, the automatic start of the DG on an ECCS initiation signal is not required in Modes 4 and 5. ... [T]he NRC staff finds that STS 3.5.2 provides enough time from the onset of the [loss of offsite power] LOOP event for the operator to manually start the DG required to supply power to the water injection equipment to mitigate the draining event in Modes 4 and 5. In addition, STS 3.5.2 does not require the automatic initiation of the ECCS injection/spray subsystem or the additional method of water injection. Therefore, since STS 3.5.2 allows enough time to manually start the DG and the equipment for water injection, the NRC staff finds that the automatic start and loading of the DG are not necessary on a LOOP signal or LOOP concurrent with an ECCS initiation signal to mitigate a draining event in Modes 4 and 5.
>
> Furthermore, the NRC staff notes that other events postulated in Modes 4 and 5 (e.g., [Fuel Handling Accident] FHA, waste gas tank rupture) and during movement of [recently] irradiated fuel assemblies in the [primary and secondary containment] do not assume a LOOP event or an automatic ECCS initiation.

TSTF-582 did not include all of the TS changes needed to reflect that TS 3.8.2 does not require automatic start and loading of a diesel generator within 14 seconds on an ECCS initiation signal or a loss of offsite power signal.

- TS 3.3.8.1, "Loss of Power (LOP) Instrumentation," is applicable in Modes 1, 2, and 3, and when the associated diesel generator is required to be operable by TS 3.8.2. TSTF-582 revised TS 3.8.2 to no longer require automatic start and loading of a diesel generator on a loss of offsite power signal. Consequently, the LOP instrumentation that generates the loss of offsite power signal should not be required to be operable when the diesel generator is required to be operable by TS 3.8.2. The Applicability of LCO 3.3.8.1 is revised to not include the specified condition "When the associated

diesel generator is required to be OPERABLE by LCO 3.8.2, 'AC Sources – Shutdown'."

- SR 3.8.2.1 requires TS SR 3.8.1.7 to be met. SR 3.8.1.7 requires that the DG starts from standby condition and achieves required voltage and frequency within 14 seconds. The 14 second start requirement supports the assumptions in the design basis loss of coolant accident analysis. This capability is not required during a manual diesel generator start to respond to a draining event, which has a minimum Drain Time of one hour. Therefore, SR 3.8.2.1 is revised to add SR 3.8.1.7 to the list of TS 3.8.1 SRs that are not applicable.

- SR 3.8.2.1 requires SR 3.8.1.10 to be met but not performed. SR 3.8.1.10 states, "Verify interval between each sequenced load is within $\pm$ 10% of nominal timer setpoint." The sequencing logic is only used for the automatic start and loading of the diesel generator and is not used during a manual diesel generator start. Therefore, SR is revised to add SR 3.8.1.10 to the list of TS 3.8.1 SRs that are not applicable.

- As an editorial improvement, SR 3.8.2.1 is revised to list the TS 3.8.1 SRs that are applicable instead of the TS 3.8.1 SRs that are not applicable. This has no effect on the requirements. The SR 3.8.2.1 Bases continue to explain why certain TS 3.8.1 SRs are omitted from the list.

The TS Bases are revised to reflect the proposed change. The TS 3.3.8.1 Bases are revised to reflect the change in the TS Applicability. The TS 3.8.2 LCO and SR 3.8.2.1 Bases are revised to reflect the proposed change and to state that TS 3.8.2 assumes that a required diesel generator is manually started.

The proposed variation is consistent with TSTF-583-T, "TSTF-582 Diesel Generator Variation" and provides consistency within the TS after incorporating the TSTF-582 changes to SR 3.8.2.1.

2.2.6 Proposed Variation to Adopt TSTF-587-T, "Delete LCO 3.5.2 Note"

Limiting Condition for Operation (LCO) 3.5.2 is modified by a Note that states:

> A Low Pressure Coolant Injection (LPCI) subsystem may be considered Operable during alignment and operation for decay heat removal if capable of being manually realigned and not otherwise inoperable.

TSTF-582 deletes CNS SR 3.5.2.4, which required verification that each manual, power operated, and automatic valve in the required ECCS injection/spray subsystem flow path that is not locked, sealed, or otherwise secured in position is in the correct position. Section 3.4.2.1 to the NRC Safety Evaluation for TSTF-582 (ADAMS Accession No. ML20223A000, dated August 13, 2020) states:

> There is no longer a specified "correct position" for the subsystem valves to support initiation from the ECCS instrumentation. The changes to STS 3.5.2 no longer credit the use of automatic valves that respond to an ECCS signal. The STS 3.5.2 permits the use of operator action to align power operated valves. Licensee control of manual valves will be as needed to support manual alignment and initiation of the ECCS subsystem from the control room.

Therefore, the required ECCS subsystem is operable while being used for decay heat removal if it can be realigned and started in injection mode from the control room. This renders the LCO Note unnecessary.

CNS SR 3.5.2.5 requires operating the ECCS subsystem periodically to verify its operability. TSTF-582 added a Note to CNS SR 3.5.2.5 that permits the ECCS subsystem to be credited for operating in normal mode as demonstrating operation of the required ECCS subsystem. As stated in the TSTF-582 justification, "This Note permits crediting the normal operation of a RHR [Residual Heat Removal Shutdown] Cooling subsystem to satisfy the SR. The revised SR continues to ensure the ECCS injection/spray subsystem can inject water into the RPV if needed for defense-in-depth, while eliminating unnecessary testing."

The removal of CNS SR 3.5.2.4 and the addition of the Note to SR 3.5.2.5 by TSTF-582 eliminates the need for the LCO 3.5.2 Note and it is deleted. The TS 3.5.2 Bases is revised accordingly.

The proposed variation is consistent with TSTF-587-T, "Delete LCO 3.5.2 Note."

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Consideration Analysis

Nebraska Public Power District (NPPD) requests adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-582, "Reactor Pressure Vessel Water Inventory Control (RPV WIC) Enhancements." The Technical Specifications (TS) related to RPV WIC are revised to incorporate operating experiences and to correct errors and omissions that were incorporated into the plant TS when adopting TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control." The Cooper Nuclear Station adoption of TSTF-582, with the variations described in the assessment, includes the following changes to the TS:

1. The TS are revised to eliminate TS 3.3.5.3 functions, Surveillance Requirements and Actions, that only support manual initiation using an Emergency Core Cooling System (ECCS) signal.

2. The Drain Time definition is revised to move the examples of common mode failure mechanisms to the Bases and seismic events are no longer considered a common mode failure mechanism.

3. The Drain Time definition exception from considering the Drain Time for penetration flow path isolated with manual or automatic valves that are "locked, sealed, or otherwise secured" is revised to apply the exception for manual or automatic valves that are "closed and administratively controlled."

4. The TS are revised to permit placing an inoperable isolation channel in trip as an alternative to declaring the associated penetration flow path incapable of automatic isolation.

5. A Surveillance Requirement (SR) that requires operating the required ECCS injection/spray subsystem for at least 10 minutes through the recirculation line, is modified to permit crediting normal operation of the system to satisfy the SR and to permit operation through the test return line.

6. TS 3.8.2, "AC Sources - Shutdown," SR 3.8.2.1, is revised to not require SRs that test the ability of the automatic diesel generator to start, or SRs that test load shedding and sequential loading capability, in Modes 4 and 5. Automatic ECCS initiation in Modes 4 and 5 was eliminated in TSTF-542. This was an oversight in TSTF-542.

7. The applicability of Limiting Condition for Operation (LCO) 3.3.8.1, "Loss of Power (LOP) Instrumentation," is revised to not include the specified condition "When the associated diesel generator is required to be OPERABLE by LCO 3.8.2, 'AC Sources - Shutdown'."

8. The applicability of TS 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)," is revised to delete the phrase, "When associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, 'Primary Containment Isolation Instrumentation'." This makes TS 3.6.1.3 only applicable in Modes 1, 2, and 3. Following adoption of TSTF-542, no functions in LCO 3.3.6.1 are applicable outside of Modes 1, 2, or 3.

9. The TS are revised to use wording and to define acronyms in a manner consistent with the remainder of the TS. These changes are made for consistency and have no effect on the application of the TS.

10. Delete LCO 3.5.2 Note that is no longer required because an ECCS injection/spray subsystem is operable if it can be manually aligned or started from the control room, even when it is being used as a residual heat removal subsystem.

NPPD has evaluated if 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 amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

The proposed change incorporates operating experience and corrects errors and omissions that were incorporated into the plant TS when adopting TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control." Draining of RPV water inventory in Mode 4 (i.e., cold shutdown) and Mode 5 (i.e., refueling) is not an accident previously evaluated and, therefore, revising the existing TS controls to prevent or mitigate such an event has no effect on any accident previously evaluated. RPV water inventory control in Mode 4 or Mode 5 is not an initiator of any accident previously evaluated. The existing and revised TS controls are not mitigating actions assumed in any accident previously evaluated.

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

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

Response: No.

The proposed change incorporates operating experience and corrects errors and omissions that were incorporated into the plant TS when adopting TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control." The event of concern under the current requirements and the proposed change is an unexpected draining event. The TS have contained requirements related to an unexpected draining event during shutdown for over 40 years and this event does not appear as an analyzed event in the Updated Safety Analysis Report (USAR) for any plant or in the NRC's Standard Review Plant (NUREG-0800). Therefore, an unexpected draining event is not a new or different kind of accident not considered in the design and licensing bases that would have been considered a design basis accident in the USAR had it been previously identified.

None of the equipment affected by the proposed change has a design function described in the USAR to mitigate an unexpected draining event in Modes 4 or 5, although the equipment may be used for that purpose. Therefore, the proposed amendment will not change the design function of the affected equipment. The proposed change will affect the operation of certain equipment, such as the manual initiation related instrumentation, to permit initiation of the required ECCS injection/spray subsystem, and the control of valves credited for preventing a draining event. However, these changes provide adequate protection to prevent or mitigate an unexpected draining event and do not create the possibility of a new or different kind of accident due to credible new failure mechanisms, malfunctions, or accident initiators not considered in the design and licensing bases.

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 amendment involve a significant reduction in a margin of safety?

Response: No.
The proposed change incorporates operating experience and corrects errors and omissions that were incorporated into the plant TS when adopting TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control."

The safety basis for the RPV WIC requirements is to protect Safety Limit 2.1.1.3. The proposed change does not affect any specific values that define a safety margin as established in the licensing basis. The proposed change does not affect a design basis or safety limit, or any controlling value for a parameter established in the USAR or the license. Therefore, the proposed change does not significantly reduce the margin of safety.

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

Based on the above, NPPD 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.

3.2 Conclusion

In conclusion, based on the consideration discussed above, (1) there is a reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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 Part 20, or would change an inspection or surveillance requirement. The proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. 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.

Attachment 2

Proposed Technical Specifications Changes (Mark-up)

Cooper Nuclear Station, Docket No. 50-298, License No. DPR-46

Revised Pages

1.1-3
3.3-47
3.3-48
3.3-49
3.3-67
3.5-7
3.5-8
3.5-9
3.5-10
3.6-8
3.6-11
3.8-12

1.1 Definitions

DOSE EQUIVALENT I-131 (continued)

I-133, I-134, and I-135 actually present. The DOSE EQUIVALENT I-131 concentration is calculated as follows: DOSE EQUIVALENT I-131 = (I-131) + 0.0060 (I-132) + 0.17 (I-133) + 0.0010 (I-134) + 0.029 (I-135). The dose conversion factors used for this calculation are those listed in Federal Guidance Report (FGR) 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," 1989.

DRAIN TIME

The DRAIN TIME is the time it would take for the water inventory in and above the Reactor Pressure Vessel (RPV) to drain to the top of the active fuel (TAF) seated in the RPV assuming:

a. The water inventory above the TAF is divided by the limiting drain rate;

b. The limiting drain rate is the larger of the drain rate through a single penetration flow path with the highest flow rate, or the sum of the drain rates through multiple penetration flow paths susceptible to a common mode failure ~~(e.g., seismic event, loss of normal power, single human error)~~, for all penetration flow paths below the TAF except:

1. Penetration flow paths connected to an intact closed system, or isolated by manual or automatic valves that are ~~locked, sealed, or otherwise secured~~closed and administratively controlled in the closed position, blank flanges, or other devices that prevent flow of reactor coolant through the penetration flow paths;

2. Penetration flow paths capable of being isolated by valves that will close automatically without offsite power prior to the RPV water level being equal to the TAF when actuated by RPV water level isolation instrumentation; or

3. Penetration flow paths with isolation devices that can be closed prior to the RPV water level being equal to the TAF by a dedicated operator trained in the task, who in continuous communication with the control room, is stationed at the controls, and is capable of closing the penetration flow path isolation device without offsite power.

(continued)

3.3 INSTRUMENTATION

3.3.5.3 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation

LCO 3.3.5.3 The RPV Water Inventory Control Instrumentation for each Function in Table 3.3.5.3-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5.3-1.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A. One or more channels inoperable.~~	~~A.1 Enter the Condition referenced in Table 3.3.5.3-1 for the channel.~~	~~Immediately~~
~~B. As required by Required Action A.1 and referenced in Table 3.3.5.3-1.~~ A. One or more channels inoperable.	A.1 Initiate action to place channel in trip. OR ~~B.1~~A.2.1 Declare associated penetration flow path(s) incapable of automatic isolation. AND ~~B.2~~A.2.2 Initiate action to ~~C~~calculate DRAIN TIME.	Immediately Immediately Immediately
~~C. As required by Required Action A.1 and referenced in Table 3.3.5.3-1.~~	~~C.1 Place channel in trip.~~	~~1 hour~~

(~~continued~~)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. As required by Required Action A.1 and referenced in Table 3.3.5.3-1.	D.1 Restore channel to OPERABLE status.	24 hours
E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Declare associated low pressure ECCS injection/spray subsystem inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------

Refer to Table 3.3.5.3-1 to determine which SRs apply for each ECCS Function. These SRs apply to each Function in Table 3.3.5.3-1.

SURVEILLANCE		FREQUENCY
SR 3.3.5.3.1	Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.2	Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program

Table 3.3.5.3-1 (page 1 of 1)
RPV Water Inventory Control Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	~~CONDITIONS REFERENCED FROM REQUIRED ACTION A.1~~	~~SURVEILLANCE REQUIREMENTS~~	ALLOWABLE VALUE
1. ~~Core Spray System~~[DELETED]					
~~a. Reactor Pressure - Low (Injection Permissive)~~	~~4,5~~	~~4[a]~~	~~C~~	~~SR 3.3.5.3.2~~	~~≤ 436 psig~~
~~b. Core Spray Pump Discharge Flow - Low (Bypass)~~	~~4,5~~	~~1 per pump[a]~~	~~D~~	~~SR 3.3.5.3.2~~	~~≥ 1370 gpm~~
2. ~~Low Pressure Coolant Injection (LPCI) System~~[DELETED]					
~~a. Reactor Pressure - Low (Injection Permissive)~~	~~4,5~~	~~4[a]~~	~~C~~	~~SR 3.3.5.3.2~~	~~≤ 436 psig~~
~~b. Low Pressure Coolant Injection Pump Discharge Flow - Low (Bypass)~~	~~4,5~~	~~1 per subsystem[a]~~	~~D~~	~~SR 3.3.5.3.2~~	~~≥ 2107 gpm~~
3. RHR System Isolation					
a. Reactor Vessel Water Level - Low, Level 3	[b]	2 in one trip system	B	SR 3.3.5.3.1 SR 3.3.5.3.2	≥ 3 inches
4. Reactor Water Cleanup (RWCU) System Isolation					
a. Reactor Vessel Water Level - Low Low, Level 2	[b]	2 in one trip system	B	SR 3.3.5.3.1 SR 3.3.5.3.2	≥ -42 inches

(a) ~~Associated with an ECCS subsystem required to be OPERABLE by LCO 3.5.2, "Reactor Pressure Vessel Water Inventory Control."~~[DELETED]

(b) When automatic isolation of the associated penetration flow path(s) is credited in calculating DRAIN TIME.

3.3 INSTRUMENTATION

3.3.8.1 Loss of Power (LOP) Instrumentation

LCO 3.3.8.1 The LOP instrumentation for each Function in Table 3.3.8.1-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3~~,~~
~~When the associated diesel generator is required to be OPERABLE by LCO 3.8.2, "AC Sources - Shutdown."~~

ACTIONS

---NOTE---
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channels inoperable.	A.1 Restore channel to OPERABLE status.	1 hour
B. Required Action and associated Completion Time not met.	B.1 Declare associated diesel generator (DG) inoperable.	Immediately

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), RPV WATER INVENTORY CONTROL, AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control

LCO 3.5.2 DRAIN TIME of RPV water inventory to the top of active fuel (TAF) shall be ≥ 36 hours.

AND

One low pressure ECCS injection/spray subsystem shall be OPERABLE.

~~NOTE~~
~~A Low Pressure Coolant Injection (LPCI) subsystem may be considered OPERABLE during alignment and operation for decay heat removal if capable of being manually realigned and not otherwise inoperable.~~

APPLICABILITY: MODES 4 and 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required ECCS injection/spray subsystem inoperable.	A.1 Restore required ECCS injection/spray subsystem to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to establish a method of water injection capable of operating without offsite electrical power.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. DRAIN TIME < 36 hours and ≥ 8 hours.	C.1	Verify secondary containment boundary is capable of being established in less than the DRAIN TIME.	4 hours
	AND		
	C.2	Verify each secondary containment penetration flow path is capable of being isolated in less than the DRAIN TIME.	4 hours
	AND		
	C.3	Verify one standby gas treatment (SGT) subsystem is capable of being placed in operation in less than the DRAIN TIME.	4 hours
D. DRAIN TIME < 8 hours.	D.1	----------NOTE---------- Required ECCS injection/spray subsystem or additional method of water injection shall be capable of operating without offsite electrical power. ----------	
		Initiate action to establish an additional method of water injection with water sources capable of maintaining RPV water level > TAF for ≥ 36 hours.	Immediately
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. (continued)	D.2	Initiate action to establish secondary containment boundary.	Immediately
	AND		
	D.3	Initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room.	Immediately
	AND		
	D.4	Initiate action to verify one ~~standby gas treatment~~SGT subsystem is capable of being placed in operation.	Immediately
E. Required Action and associated Completion Time of Condition C or D not met. OR DRAIN TIME < 1 hour.	E.1	Initiate action to restore DRAIN TIME to ≥ 36 hours.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify DRAIN TIME ≥ 36 hours.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.2	Verify, for a required ECCS injection/spray subsystem, the suppression pool water level is ≥ 12 ft 7 inches.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.3	Verify, for the required ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.4	~~Verify, for the required ECCS injection/spray subsystem, each 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.~~[DELETED]	~~In accordance with the Surveillance Frequency Control Program~~ [DELETED]
SR 3.5.2.5	----------NOTES---------- 1. Operation may be through the test return line. 2. Credit may be taken for normal system operation to satisfy this SR. ---------- Operate the required ECCS injection/spray subsystem ~~through the recirculation line~~ for ≥ 10 minutes.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.6	Verify each valve credited for automatically isolating a penetration flow path actuates to the isolation position on an actual or simulated isolation signal.	In accordance with the Surveillance Frequency Control Program

(continued)

3.6 CONTAINMENT SYSTEMS

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

LCO 3.6.1.3 Each PCIV, except reactor building-to-suppression chamber vacuum breakers, shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3~~,~~
~~When associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment Isolation Instrumentation."~~

ACTIONS

----------NOTES----------

1. Penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for systems made inoperable by PCIVs.
4. Enter applicable Conditions and Required Actions of LCO 3.6.1.1, "Primary Containment," when PCIV leakage results in exceeding overall containment leakage rate acceptance criteria.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Only applicable to penetration flow paths with two PCIVs. ---------- One or more penetration flow paths with one PCIV inoperable except for MSIV leakage not within limit.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. AND	4 hours except for main steam line AND 8 hours for main steam line

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more penetration flowpaths with one or more MSIVs not within leakage rate limit.	D.1 Restore leakage rate to within limit.	8 hours
E. Required Action and associated Completion Time of Condition A, B, C, or D not met ~~in MODE 1, 2, or 3~~.	E.1 Be in MODE 3. AND E.2 Be in MODE 4.	12 hours 36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One required DG inoperable.	B.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	B.2	Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	AND		
	B.3	Initiate action to restore required DG to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.2.1	----------NOTES---------- ~~1.~~ The following SRs are not required to be performed: SR 3.8.1.3~~,~~ and SR 3.8.1.9 ~~through SR 3.8.1.11~~. ~~2. SR 3.8.1.11 is considered to be met without the ECCS initiation signals OPERABLE when the ECCS initiation signals are not required to be OPERABLE per Table 3.3.5.1-1.~~ ---------- The following SRs are applicable ~~F~~for AC sources required to be OPERABLE~~:~~ ~~the SRs of Specification 3.8.1, except SR 3.8.1.8, are applicable.~~ SR 3.8.1.1 SR 3.8.1.2 SR 3.8.1.3 SR 3.8.1.4 SR 3.8.1.5 SR 3.8.1.6 SR 3.8.1.9	In accordance with applicable SRs

Attachment 3

Revised Technical Specifications Pages

Cooper Nuclear Station, Docket No. 50-298, License No. DPR-46

Revised Pages

1.1-3
3.3-47
3.3-48
3.3-49
3.3-67
3.5-7
3.5-8
3.5-9
3.5-10
3.6-8
3.6-11
3.8-12

1.1 Definitions

DOSE EQUIVALENT I-131 (continued)

I-133, I-134, and I-135 actually present. The DOSE EQUIVALENT I-131 concentration is calculated as follows: DOSE EQUIVALENT I-131 = (I-131) + 0.0060 (I-132) + 0.17 (I-133) + 0.0010 (I-134) + 0.029 (I-135). The dose conversion factors used for this calculation are those listed in Federal Guidance Report (FGR) 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," 1989.

DRAIN TIME

The DRAIN TIME is the time it would take for the water inventory in and above the Reactor Pressure Vessel (RPV) to drain to the top of the active fuel (TAF) seated in the RPV assuming:

a. The water inventory above the TAF is divided by the limiting drain rate;

b. The limiting drain rate is the larger of the drain rate through a single penetration flow path with the highest flow rate, or the sum of the drain rates through multiple penetration flow paths susceptible to a common mode failure, for all penetration flow paths below the TAF except:

1. Penetration flow paths connected to an intact closed system, or isolated by manual or automatic valves that are closed and administratively controlled in the closed position, blank flanges, or other devices that prevent flow of reactor coolant through the penetration flow paths;

2. Penetration flow paths capable of being isolated by valves that will close automatically without offsite power prior to the RPV water level being equal to the TAF when actuated by RPV water level isolation instrumentation; or

3. Penetration flow paths with isolation devices that can be closed prior to the RPV water level being equal to the TAF by a dedicated operator trained in the task, who in continuous communication with the control room, is stationed at the controls, and is capable of closing the penetration flow path isolation device without offsite power.

(continued)

3.3 INSTRUMENTATION

3.3.5.3 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation

LCO 3.3.5.3 The RPV Water Inventory Control Instrumentation for each Function in Table 3.3.5.3-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5.3-1.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more channels inoperable.	A.1	Initiate action to place channel in trip.	Immediately
	OR		
	A.2.1	Declare associated penetration flow path(s) incapable of automatic isolation.	Immediately
	AND		
	A.2.2	Initiate action to calculate DRAIN TIME.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------
These SRs apply to each Function in Table 3.3.5.3-1.

SURVEILLANCE		FREQUENCY
SR 3.3.5.3.1	Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.2	Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program

Table 3.3.5.3-1 (page 1 of 1)
RPV Water Inventory Control Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	ALLOWABLE VALUE
1. [DELETED]			
2. [DELETED]			
3. RHR System Isolation			
a. Reactor Vessel Water Level - Low, Level 3	(b)	2 in one trip system	≥ 3 inches
4. Reactor Water Cleanup (RWCU) System Isolation			
a. Reactor Vessel Water Level - Low Low, Level 2	(b)	2 in one trip system	≥ -42 inches

(a) [DELETED]

(b) When automatic isolation of the associated penetration flow path(s) is credited in calculating DRAIN TIME.

3.3 INSTRUMENTATION

3.3.8.1 Loss of Power (LOP) Instrumentation

LCO 3.3.8.1 The LOP instrumentation for each Function in Table 3.3.8.1-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more channels inoperable.	A.1	Restore channel to OPERABLE status.	1 hour
B. Required Action and associated Completion Time not met.	B.1	Declare associated diesel generator (DG) inoperable.	Immediately

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), RPV WATER INVENTORY CONTROL, AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control

LCO 3.5.2 DRAIN TIME of RPV water inventory to the top of active fuel (TAF) shall be ≥ 36 hours.

AND

One low pressure ECCS injection/spray subsystem shall be OPERABLE.

APPLICABILITY: MODES 4 and 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required ECCS injection/spray subsystem inoperable.	A.1 Restore required ECCS injection/spray subsystem to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to establish a method of water injection capable of operating without offsite electrical power.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. DRAIN TIME < 36 hours and ≥ 8 hours.	C.1	Verify secondary containment boundary is capable of being established in less than the DRAIN TIME.	4 hours
	AND		
	C.2	Verify each secondary containment penetration flow path is capable of being isolated in less than the DRAIN TIME.	4 hours
	AND		
	C.3	Verify one standby gas treatment (SGT) subsystem is capable of being placed in operation in less than the DRAIN TIME.	4 hours
D. DRAIN TIME < 8 hours.	D.1	----------NOTE---------- Required ECCS injection/spray subsystem or additional method of water injection shall be capable of operating without offsite electrical power. ----------	
		Initiate action to establish an additional method of water injection with water sources capable of maintaining RPV water level > TAF for ≥ 36 hours.	Immediately
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. (continued)	D.2	Initiate action to establish secondary containment boundary.	Immediately
	AND		
	D.3	Initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room.	Immediately
	AND		
	D.4	Initiate action to verify one SGT subsystem is capable of being placed in operation.	Immediately
E. Required Action and associated Completion Time of Condition C or D not met. OR DRAIN TIME < 1 hour.	E.1	Initiate action to restore DRAIN TIME to ≥ 36 hours.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.5.2.1	Verify DRAIN TIME ≥ 36 hours.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.2	Verify, for a required ECCS injection/spray subsystem, the suppression pool water level is ≥ 12 ft 7 inches.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.3	Verify, for the required ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.4	[DELETED]	[DELETED]
SR 3.5.2.5	----------NOTES---------- 1. Operation may be through the test return line. 2. Credit may be taken for normal system operation to satisfy this SR. ---------- Operate the required ECCS injection/spray subsystem for ≥ 10 minutes.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.6	Verify each valve credited for automatically isolating a penetration flow path actuates to the isolation position on an actual or simulated isolation signal.	In accordance with the Surveillance Frequency Control Program

(continued)

3.6 CONTAINMENT SYSTEMS

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

LCO 3.6.1.3 Each PCIV, except reactor building-to-suppression chamber vacuum breakers, shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3

ACTIONS

----------NOTES----------

1. Penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for systems made inoperable by PCIVs.
4. Enter applicable Conditions and Required Actions of LCO 3.6.1.1, "Primary Containment," when PCIV leakage results in exceeding overall containment leakage rate acceptance criteria.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Only applicable to penetration flow paths with two PCIVs. ---------- One or more penetration flow paths with one PCIV inoperable except for MSIV leakage not within limit.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. AND	4 hours except for main steam line AND 8 hours for main steam line

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. One or more penetration flowpaths with one or more MSIVs not within leakage rate limit.	D.1	Restore leakage rate to within limit.	8 hours
E. Required Action and associated Completion Time of Condition A, B, C, or D not met.	E.1	Be in MODE 3.	12 hours
	AND		
	E.2	Be in MODE 4.	36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One required DG inoperable.	B.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	B.2	Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	AND		
	B.3	Initiate action to restore required DG to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.2.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.1.3 and SR 3.8.1.9. ----------	
	The following SRs are applicable for AC sources required to be OPERABLE: SR 3.8.1.1 SR 3.8.1.2 SR 3.8.1.3 SR 3.8.1.4 SR 3.8.1.5 SR 3.8.1.6 SR 3.8.1.9	In accordance with applicable SRs

Attachment 4

Proposed Technical Specifications Bases Changes (Mark-up)

Cooper Nuclear Station, Docket No. 50-298, License No. DPR-46

(26 pages follow)

B 3.3 INSTRUMENTATION

B 3.3.5.3 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation

BASES

BACKGROUND

The RPV contains penetrations below the top of the active fuel (TAF) that have the potential to drain the reactor coolant inventory to below the TAF. If the water level should drop below the TAF, the ability to remove decay heat is reduced, which could lead to elevated cladding temperatures and clad perforation. Safety Limit 2.1.1.3 requires the RPV water level to be above the top of the active irradiated fuel at all times to prevent such elevated cladding temperatures.

Technical Specifications are required by 10 CFR 50.36 to include limiting safety system settings (LSSS) for variables that have significant safety functions. LSSS are defined by the regulation as "Where a LSSS is specified for a variable on which a safety limit has been placed, the setting must be chosen so that automatic protective actions will correct the abnormal situation before a Safety Limit (SL) is exceeded." The Analytical Limit is the limit of the process variable at which a safety action is initiated to ensure that a SL is not exceeded. Any automatic protection action that occurs on reaching the Analytical Limit therefore ensures that the SL is not exceeded. However, in practice, the actual settings for automatic protection channels must be chosen to be more conservative than the Analytical Limit to account for instrument loop uncertainties related to the setting at which the automatic protective action would actually occur. The actual settings for the automatic isolation channels are the same as those established for the same functions in MODES 1, 2, and 3 in ~~LCO 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation," or~~ LCO 3.3.6.1, "Primary Containment Isolation Instrumentation".

With the unit in MODE 4 or 5, RPV water inventory control is not required to mitigate any events or accidents evaluated in the safety analyses. RPV water inventory control is required in MODES 4 and 5 to protect Safety Limit 2.1.1.3 and the fuel cladding barrier to prevent the release of radioactive material should a draining event occur. Under the definition of DRAIN TIME, some penetration flow paths may be excluded from the DRAIN TIME calculation if they will be isolated by valves that will close automatically without offsite power prior to the RPV water level being equal to the TAF when actuated by RPV water level isolation instrumentation.

The purpose of the RPV Water Inventory Control Instrumentation is to support the requirements of LCO 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control," and the definition of DRAIN TIME. There are functions that ~~are required for manual initiation or operation of the ECCS~~

BASES

BACKGROUND (continued)

~~injection/spray subsystem required to be OPERABLE by LCO 3.5.2 and other functions that~~ support automatic isolation of Residual Heat Removal subsystem and Reactor Water Cleanup system penetration flow path(s) on low RPV water level.

~~The RPV Water Inventory Control Instrumentation supports operation of core spray (CS) and low pressure coolant injection (LPCI). The equipment involved with each of these systems is described in the Bases for LCO 3.5.2.~~

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

With the unit in MODE 4 or 5, RPV water inventory control is not required to mitigate any events or accidents evaluated in the safety analyses. RPV water inventory control is required in MODES 4 and 5 to protect Safety Limit 2.1.1.3 and the fuel cladding barrier to prevent the release of radioactive material should a draining even occur.

A double-ended guillotine break of the Reactor Coolant System (RCS) is not ~~postulated~~ considered in MODES 4 and 5 due to the reduced RCS pressure, reduced piping stresses, and ductile piping systems. Instead, an event is ~~postulated~~ considered in which ~~a single operator error or~~ an initiating event allows draining of the RPV water inventory through a single penetration flow path with the highest flow rate, or the sum of the drain rates through multiple penetration flow paths susceptible to a common mode failure ~~(e.g., seismic event, loss of normal power, single human error)~~. It is assumed based on engineering judgement, that while in MODES 4 and 5, one low pressure ECCS injection/spray subsystem can be manually initiated to maintain adequate reactor vessel water level.

As discussed in References 1, 2, 3, 4 and 5, operating experience has shown RPV water inventory to be significant to public health and safety. Therefore, RPV Water Inventory Control satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii).

Permissive and interlock setpoints are generally considered as nominal values without regard to measurement accuracy.

The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis.

Core Spray and Low Pressure Coolant Injection Systems

1.a, 2.a. ~~Reactor Pressure – Low (Injection Permissive)~~[DELETED]

BASES

APPLICABLE SAFETY ANSLYSES, LCO, and APPLICABILITY (continued)

~~Low reactor pressure signals are used as permissives for the low-pressure ECCS injection/spray subsystems manual injection functions. This function ensures that, prior to opening the injection valves of the low-pressure ECCS subsystems, the reactor pressure has fallen to a value below these subsystems' maximum design pressure. While it is assured during MODES 4 and 5 that the reactor pressure will be below the ECCS maximum design pressure, the Reactor Pressure – Low signals are assumed to be OPERABLE and capable of permitting initiation of the ECCS.~~

~~The Reactor Pressure – Low signals are initiated from four pressure transmitters that sense the reactor dome pressure. The transmitters are connected to four trip units. The outputs of the trip units are connected to relays whose contacts are arranged in a one-out-of-two taken twice logic.~~

~~The Allowable Value is low enough to prevent overpressurizing the equipment in the low pressure ECCS.~~

~~The four channels of Reactor Pressure – Low Function are required to be OPERABLE in MODES 4 and 5 when ECCS manual initiation is required to be OPERABLE by LCO 3.5.2.~~

1.b, 2.b. ~~Core Spray and Low Pressure Coolant Injection Pump Discharge Flow – Low (Bypass)~~[DELETED]

~~The minimum flow instruments are provided to protect the associated low-pressure ECCS pump from overheating when the pump is operating and the associated injection valve is not fully open. The minimum flow line valve is opened when low flow is sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump.~~

~~One flow transmitter per ECCS subsystem is used to detect the associated subsystems' flow rates. The logic is arranged such that each transmitter causes its associated minimum flow valve to open. The logic will close the minimum flow valve once the closure setpoint is exceeded. The LPCI minimum flow valves are time delayed such that the valves will not open for 3.5 seconds after the switches detect low flow. The time delay is provided to limit reactor vessel inventory loss during the startup of the Residual Heat Removal (RHR) shutdown cooling mode.~~

~~The Pump Discharge Flow – Low Allowable Values are high enough to ensure that the pump flow rate is sufficient to protect the pump, yet low enough to ensure that the closure of the minimum flow valve is initiated to allow full flow into the core.~~

BASES

APPLICABLE SAFETY ANSLYSES, LCO, and APPLICABILITY (continued)

~~One channel of the Pump Discharge Flow – Low Function is required to be OPERABLE in MODES 4 and 5 when the associated Core Spray or LPCI pump is required to be OPERABLE by LCO 3.5.2 to ensure the pumps are capable of injecting into the Reactor Pressure Vessel when manually initiated.~~

RHR System Isolation

3.a. Reactor Vessel Water Level – Low, Level 3

The definition of DRAIN TIME allows crediting the closing of penetration flow paths that are capable of being isolated by valves that will close automatically without offsite power prior to the RPV water level being equal to the TAF when actuated by RPV water level isolation instrumentation. The Reactor Vessel Water Level – Low, Level 3 Function associated with RHR System isolation may be credited for automatic isolation of penetration flow paths associated with the RHR System.

Reactor Vessel Water Level – Low, Level 3 signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. While four channels (two channels per trip system) of the Reactor Vessel Water Level – Low, Level 3 Function are available, only two channels (both in the same trip system) are required to be OPERABLE.

The Reactor Vessel Water Level – Low, Level 3 Allowable Value was chosen to be the same as the Primary Containment Isolation Instrumentation Reactor Vessel Water Level – Low, Level 3 Allowable Value (LCO 3.3.6.1), since the capability to cool the fuel may be threatened.

The Reactor Vessel Water Level – Low, Level 3 Function is only required to be OPERABLE when automatic isolation of the associated penetration flow path is credited in calculating DRAIN TIME.

This Function isolates the Shutdown Cooling Isolation Valves.

Reactor Water Cleanup (RWCU) System Isolation

4.a. Reactor Vessel Water Level – Low Low, Level 2

The definition of DRAIN TIME allows crediting the closing of penetration flow paths that are capable of being isolated by valves that will close

BASES

APPLICABLE SAFETY ANSLYSES, LCO, and APPLICABILITY (continued)

automatically without offsite power prior to the RPV water level being equal to the TAF when actuated by RPV water level isolation instrumentation. The Reactor Vessel Water Level – Low Low, Level 2 Function associated with RWCU System isolation may be credited for automatic isolation of penetration flow paths associated with the RWCU System.

Reactor Vessel Water Level – Low, Low, Level 2 signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. While four channels (two channels per trip system) of the Reactor Vessel Water Level – Low Low, Level 2 Function are available, only two channels (both in the same trip system) are required to be OPERABLE.

The Reactor Vessel Water Level – Low Low, Level 2 Allowable Value was chosen to be the same as the ECCS Reactor Vessel Water Level – Low Low, Level 2 Allowable Value (LCO 3.3.5.1), since the capability to cool the fuel may be threatened.

The Reactor Vessel Water Level – Low Low, Level 2 Function is only required to be OPERABLE when automatic isolation of the associated penetration flow path is credited in calculating DRAIN TIME.

This Function isolates the Group 3 valves.

ACTIONS

A Note has been provided to modify the ACTIONS related to RPV Water Inventory Control instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition discovered to be inoperable or not within limits will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable RPV Water Inventory Control instrumentation channels provide appropriate compensatory measures for separate inoperable Condition entry for each inoperable RPV Water Inventory Control instrumentation channels.

~~A.1~~

~~Required Action A.1 directs entry into the appropriate Condition referenced in Table 3.3.5.3-1. The applicable Condition referenced in the~~

BASES

ACTIONS (continued)

~~Table is Function dependent. Each time a channel is discovered inoperable, Condition A is entered for that channel and provides for transfer to the appropriate subsequent Condition.~~

~~B.1 and B.2~~A.1, A.2.1, and A.2.2

RHR System Isolation, Reactor Vessel Water Level – Low Level 3, and Reactor Water Cleanup System, Reactor Vessel Water Level – Low Low, Level 2 functions are applicable when automatic isolation of the associated penetration flow path is credited in calculating DRAIN TIME. If the instrumentation is inoperable, Required Action ~~B.1~~A.1 directs ~~an immediate declaration that~~immediate action to place the channel in trip. With the inoperable channel in the tripped condition, the remaining channel will isolate the penetration flow path on low water level. If both channels are inoperable and placed in trip, the penetration flow path will be isolated. Alternatively, Required Action A.2.1 requires the associated penetration flow path(s) ~~are~~ to be immediately declared incapable of automatic isolation. Required Action ~~B.2~~A.2.2 directs initiating action to ~~calculation~~calculate ~~of~~ DRAIN TIME. The calculation cannot credit automatic isolation of the affected penetration flow paths.

~~C.1~~

~~Low reactor pressure signals are used as permissives for the low-pressure ECCS injection/spray subsystems manual injection functions. If the permissive is inoperable, manual initiation of ECCS is prohibited. Therefore, the permissive must be placed in the trip condition within 1 hour. With the permissive in the trip condition, manual initiation may be performed.~~

~~The Completion Time of 1 hour is intended to allow the operator time to evaluated any discovered inoperabilities and to place the channel in trip.~~

~~D.1~~

~~If a Core Spray or Low Pressure Coolant Injection Pump Discharge Flow – Low bypass function is inoperable, there is a risk that the associated low pressure ECCS pump could overheat when the pump is operating and the associated injection valve is not fully open. In this condition, the operator can take manual control of the pump and the injection valve to ensure the pump does not overheat.~~

BASES

ACTIONS (continued)

~~The 24 hour Completion Time was chosen to allow time for the operator to evaluate and repair any discovered inoperabilities. The Completion Time is appropriate given the ability to manually ensure the pump does not overheat.~~

BASES

ACTIONS (continued)

~~E.1~~

~~With the Required Action and associated Completion Time of Condition C or D not met, the associated low pressure ECCS injection/spray subsystem may be incapable of performing the intended function, and must be declared inoperable immediately.~~

SURVEILLANCE REQUIREMENTS

~~As noted in the beginning of the SRs, the SRs for~~ The following SRs apply to each RPV Water Inventory Control instrument Function ~~are found~~ in ~~the SRs column of~~ Table 3.3.5.3-1.

Amendment 260 did not include SRs to verify or adjust the instrument setpoint derived from the allowable value using a channel calibration or a surveillance to calibrate the trip unit. This is because a draining event in MODES 4 or 5 is not an analyzed accident and, therefore, there is no accident analysis on which to base the calculation or a setpoint. As noted in the safety evaluation, the purpose of the functions is to allow ECCS manual initiation or to automatically isolate a penetration flow path, but no specific RPV water level is assumed for those actions. Therefore, the MODE 3 allowable value was chosen for use in MODES 4 and 5, as it will perform the desired function. Calibrating the functions in MODES 4 and 5 is not necessary, as TSs 3.3.5.1 and 3.3.6.1 continue to require the functions to be calibrated on an established interval. Also, there are no accident analysis assumptions on response time. (Reference 6)

SR 3.3.5.3.1

Performance of the CHANNEL CHECK ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the instrument channels could be an indication of excessive instrument drift in one of the channels or something even more serious. A CHANNEL CHECK guarantees that undetected outright channel failure is limited; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL FUNCTIONAL TEST.

Agreement criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the instrument has drifted outside its limit.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

supply sufficient power for proper operation of the applicable equipment. Therefore, the power supply to the bus is transferred from offsite power to DG power when the voltage on the bus drops below the Loss of Voltage Function Allowable Values (loss of voltage with a short time delay). This ensures that adequate power will be available to the required equipment.

Upon loss of voltage, relay 27/1F1 (27/1G1) will initiate a start signal to DG1 (DG2), load shedding of all motors on 4.16 kV Emergency Bus 1F (1G), and load shedding of the non-essential Motor Control Centers (MCCs) and non-essential motors fed from critical 480 V Bus 1F (1G).

The 4.16 kV Emergency Bus Undervoltage (Loss of Voltage) Allowable Value is low enough to prevent inadvertent power supply transfer, but high enough to ensure that power is available to the required equipment. The Time Delay Allowable Values are long enough to provide time for the offsite power supply to recover to normal voltages, but short enough to ensure that power is available to the required equipment.

One channel of 4.16 kV Emergency Bus Undervoltage (Loss of Voltage) Function and Time Delay Function per associated 4.16 kV emergency bus is available and is only required to be OPERABLE when the associated DG is required to be OPERABLE in MODES 1, 2 and 3. Refer to LCO 3.8.1, "AC Sources-Operating," ~~and 3.8.2, "AC Sources-Shutdown,"~~ for Applicability Bases for the DGs.

2.a, 2.b 4.16 kV Emergency Bus Normal Supply Undervoltage (Loss of Voltage)

Loss of voltage on the SWGR 1A to 1F (1B to 1G) bus tie indicates that offsite power is not available from the normal source (NSST or SSST). Therefore, in order to allow the emergency bus to be powered from the alternate offsite power source (ESST) or the DG, relay 27/1FA-1 (27/1GB-1) will cause the normal supply breaker to the 4.16 kV emergency bus, 1FA (1GB) to trip following the actuation of the Function 1 channels following a short time delay.

The 4.16 kV Emergency Bus Normal Supply Undervoltage (Loss of Voltage) Allowable Value is low enough to prevent inadvertent power supply transfer, but high enough to ensure that power is available to the required equipment. The Time Delay Allowable Values are chosen to assure timely operation for a loss of voltage condition, but not allow spurious operation during momentary voltage dips created by motor starts.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

One channel of 4.16 kV Emergency Bus Normal Supply Undervoltage (Loss of Voltage) Function and Time Delay Function per associated 4.16 kV emergency bus is available and is only required to be OPERABLE when the associated DG is required to be OPERABLE in MODES 1, 2, and 3. Refer to LCO 3.8.1, "AC Sources-Operating," ~~and 3.8.2, "AC Sources-Shutdown,"~~ for Applicability Bases for the DGs.

3.a, 3.b 4.16 kV Emergency Bus ESST Supply Undervoltage (Loss of Voltage)

Loss of voltage on the ESST-1F (1G) bus tie indicates that offsite power is not available from the alternate offsite source (ESST). Therefore, in order to allow the 4.16 kV emergency bus to be powered from the DG following loss of the alternate offsite source, relay 27/ET-1 (27/ET-2) will cause the ESST-1F (1G) breaker 1FS (1GS) to trip following a short time delay, which in turn will allow the DG output breaker to close.

The 4.16 kV Emergency Bus ESST Supply Undervoltage (Loss of Voltage) Allowable Value is low enough to prevent inadvertent power supply transfer, but high enough to ensure that power is available to the required equipment. The Time Delay Allowable Values are long enough to provide time for the offsite power supply to recover to normal voltages, but short enough to ensure that power is available to the required equipment.

One channel of 4.16 kV Emergency Bus ESST Supply Undervoltage (Loss of Voltage) Function and Time Delay Function per associated 4.16 kV emergency bus is available and is only required to be OPERABLE when the associated DG is required to be OPERABLE in MODES 1, 2, and 3. Refer to LCO 3.8.1, "AC Sources-Operating," ~~and 3.8.2, "AC Sources-Shutdown,"~~ for Applicability Bases for the DGs.

4.a, 4.b, 4.c 4.16 kV Emergency Bus Undervoltage (Degraded Voltage)

A reduced voltage condition on a 4.16 kV emergency bus indicates that, while offsite power may not be completely lost to the respective emergency bus, available power may be insufficient for starting large ECCS motors without risking damage to the motors that could disable the ECCS function. Therefore, power supply to the bus is transferred from normal offsite power to alternate offsite power or to onsite DG power when the voltage on the bus drops below the Degraded Voltage Function Allowable Value (degraded voltage with a time delay).

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

This ensures that adequate power will be available to the required equipment.

A degraded voltage condition on 4.16 kV Emergency Bus 1F (1G) is monitored by relays 27/1F2 (27/1G2) and 27/1FA2 (27/1GB2). Any momentary voltage dips caused by starting of large motors will not operate undervoltage relays. When 4.16 kV Emergency Bus 1F (1G) is powered from either the SSST or NSST, a degraded voltage on 4.16 kV Emergency Bus 1F (1G) below a nominal value of 3,880 V for approximately 12.5 seconds sensed by both relays 27/1F2 (27/1G2) and 27/1FA2 (27/1GB2) will trip the tie breaker 1FA (1GB) unless a LOCA seal-in signal is present, in which case time delay relay 27X7/1F (27X7/1G) will be bypassed and breaker 1FA (1GB) will trip if voltage on 4.16 kV Emergency Bus 1F (1G) is below a nominal value of 3,880 V for 7.5 seconds.

The Bus Undervoltage Allowable Value is low enough to prevent inadvertent power supply transfer, but high enough to ensure that sufficient power is available to the required equipment. The Time Delay Allowable Value is long enough to provide time for the offsite power supply to recover to normal voltages, but short enough to ensure that sufficient power is available to the required equipment.

Two channels of 4.16 kV Emergency Bus Undervoltage (Degraded Voltage) Function and Time Delay Function per associated bus are available and are required to be OPERABLE when the associated DG is required to be OPERABLE in MODES 1,2, and 3. Refer to LCO 3.8.1 ~~and LCO 3.8.2~~ for Applicability Bases for the DGs.

5.a, 5.b 4.16 kV Emergency Bus ESST Supply Undervoltage (Degraded Voltage)

A reduced voltage condition on a 4.16 kV emergency bus indicates that, while offsite power may not be completely lost to the respective emergency bus, available power may be insufficient for starting large ECCS motors without risking damage to the motors that could disable the ECCS function. Therefore, power supply to the bus is transferred from the alternate offsite power source to onsite DG power when the voltage on the bus drops below the Degraded Voltage Function Allowable Value (degraded voltage with a time delay). This ensures that adequate power will be available to the required equipment.

When 4.16 kV Emergency Bus 1F (1G) is energized from the ESST, degraded voltages will be sensed by only one relay 27/1F2 (27/1G2).

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Any momentary voltage dips caused by starting of large motors will not operate undervoltage relays. When 4.16 kV Emergency Bus 1F (1G) is powered from the ESST, a degraded voltage on 4.16 kV Emergency Bus 1F (1G) for approximately 15 seconds will trip breaker 1FS (1GS). The nominal 15 second time delay consists of the nominal 7.5 second time delay from relay 27/1F2 (27/1G2) plus a nominal 7.5 second time delay from time delay relay 27X15/1F (27X15/1G). After the ESST breaker 1FS (1GS) trips, the Loss of Voltage protection system will start the associated DG and will trip all 4,000 volt motor breakers and non-essential MCC breakers. The 4.16 kV Emergency Bus Undervoltage (Degraded Voltage) Allowable Value is low enough to prevent inadvertent power supply transfer, but high enough to ensure that sufficient power is available to the required equipment. The Time Delay Allowable Value is long enough to provide time for the offsite power supply to recover to normal voltages, but short enough to ensure that sufficient power is available to the required equipment.

One channel of 4.16 kV Emergency Bus Undervoltage (Degraded Voltage) Function and Time Delay Function per associated bus is available and is only required to be OPERABLE when the associated DG is required to be OPERABLE in MODES 1, 2, and 3. Refer to LCO 3.8.1 ~~and LCO 3.8.2~~ for Applicability Bases for the DGs.

ACTIONS

A Note has been provided to modify the ACTIONS related to LOP instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable LOP instrumentation channels provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable LOP instrumentation channel.

A.1

With one or more channels of a Function inoperable, the Function is not capable of performing the intended function. Therefore, only 1 hour is allowed to restore the inoperable channel to OPERABLE status. If the channel is not restored to OPERABLE status in 1 hour, Condition B must be entered and its Required Action taken.

BASES

ACTIONS (continued)

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

B.1

If any Required Action and associated Completion Time are not met, the associated Function is not capable of performing the intended function. Therefore, the associated DG(s) is declared inoperable immediately. This requires entry into applicable Conditions and Required Actions of LCO 3.8.1 ~~and LCO 3.8.2,~~ which provide appropriate actions for the inoperable DG(s).

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs (Note 1), the SRs for each LOP instrumentation Function are located in the SRs column of Table 3.3.8.1-1.

The Surveillances are further modified by a Note (Note 2) to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 2 hours provided the associated Function maintains initiation capability. Initiation capability is maintained provided that the following can be initiated by the Function for one DG or emergency bus as applicable (if part of that Function): DG start, disconnect from offsite power source, DG output breaker closure, and load shed. Upon completion of the Surveillance, or expiration of the 2 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken.

SR 3.3.8.1.1

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications. Any setpoint adjustment shall be

BASES

SURVEILLANCE REQUIREMENTS (continued)

consistent with the assumptions of the current plant specific setpoint methodology.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.3.8.1.2

A CHANNEL CALIBRATION is a complete check of the relay circuitry and associated time delay relays. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. There is a plant specific program which verifies that the instrument channel functions as required by verifying the as-left and as-found settings are consistent with those established by the setpoint methodology. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.3.8.1.3

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required actuation logic for a specific channel. The system functional testing performed in LCO 3.8.1 ~~and LCO 3.8.2~~ overlaps this Surveillance to provide complete testing of the assumed safety functions.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), RPV WATER INVENTORY CONTROL, AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

B 3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control

BASES

BACKGROUND

The RPV contains penetrations below the top of active fuel (TAF) that have the potential to drain the reactor coolant inventory to below the TAF. If the water level should drop below the TAF, the ability to remove decay heat is reduced, which could lead to elevated cladding temperatures and clad perforation. Safety Limit 2.1.1.3 requires the RPV water level to be above the top of active irradiated fuel at all times to prevent such elevated cladding temperatures.

APPLICABLE SAFETY ANALYSES

With the unit in MODE 4 or 5, RPV water inventory control is not required to mitigate any events or accidents evaluated in the safety analyses. RPV water inventory control is required in MODES 4 and 5 to protect Safety Limit 2.1.1.3 and the fuel cladding barrier to prevent the release of radioactive material to the environment should an unexpected draining event occur.

A double-ended guillotine break of the Reactor Coolant System (RCS) is not ~~postulated~~ considered in MODES 4 or 5 due to the reduced RCS pressure, reduced piping stresses, and ductile piping systems. Instead, an event is considered in which ~~single operator error or~~an initiating event allows draining of the RPV water inventory through a single penetration flow path with the highest flow rate, or the sum of the drain rates through multiple penetration flow paths susceptible to a common mode failure (~~e.g., seismic event~~an event that creates a drain path through multiple vessel penetrations located below top of active fuel, such as, loss of normal power, ~~,~~or a single human error). It is assumed, based on engineering judgement, that while in MODES 4 and 5, one low pressure ECCS injection/spray subsystem can maintain adequate reactor vessel water level.

As discussed in References 1, 2, 3, 4, and 5, operating experience has shown RPV water inventory to be significant to public ~~heath~~ health and safety. Therefore, RPV Water Inventory Control satisfies Criterion 4 of 10 CFR 50.36(c)(2)(ii).

LCO

The RPV water level must be controlled in MODES 4 and 5 to ensure that if an unexpected draining event should occur, the reactor coolant water level remains above the top of the active irradiated fuel as required by Safety Limit 2.1.1.3.

BASES

The Limiting Condition for Operation (LCO) requires the DRAIN TIME of RPV water inventory to the TAF to be ≥ 36 hours. A DRAIN TIME of 36 hours is considered reasonable to identify and initiate action to mitigate unexpected draining of reactor coolant. An event that could cause loss of RPV water inventory and result in the RPV water level reaching the TAF in greater than 36 hours does not represent a significant challenge to Safety Limit 2.1.1.3 and can be managed as part of normal plant operation.

One low pressure ECCS injection/spray subsystems is required to be OPERABLE and capable of being manually aligned and started from the control room to provide defense-in-depth should an unexpected draining event occur. OPERABILITY of the ECCS injection/spray subsystem includes any necessary valves, instrumentation, or controls needed to manually align and start subsystem from the control room. A low pressure ECCS injection/spray subsystem consists of either one Core Spray (CS) subsystem or one Low Pressure Coolant Injection (LPCI) subsystem. Each CS subsystem consists of one motor driven pump, piping, and valves to transfer water from the suppression pool to the RPV. Each LPCI subsystem consists of one motor driven pump, piping, and valves to transfer water from the suppression pool to the RPV. In MODES 4 and 5, the RHR System cross tie shutoff valve is not required to be closed.

~~The LCO is modified by a Note which allows a required LPCI subsystem to be considered OPERABLE during alignment and operation for decay heat removal if capable of being manually realigned (remote or local) to the LPCI mode and is not otherwise inoperable. Alignment and operation for decay heat removal includes when the required RHR pump is not operating or when the system is realigned from or to the RHR shutdown cooling mode. This allowance is necessary since the RHR System may be required to operate in the shutdown cooling mode to remove decay heat and sensible heat from the reactor. Because of the restrictions on DRAIN TIME, sufficient time will be available following an unexpected draining event to manually align and initiate LPCI subsystem operation to maintain RPV water inventory prior to the RPV water level reaching the TAF.~~

APPLICABILITY

RPV water inventory control is required in MODES 4 and 5. Requirements on water inventory control in other MODES are contained in LCOs in Section 3.3, "Instrumentation", and other LCOs in Section 3.5, "ECCS, ~~RCIC, and~~ RPV Water Inventory Control, and RCIC System". RPV water inventory control is required to protect Safety Limit 2.1.1.3 which is applicable whenever irradiated fuel is in the reactor vessel.

BASES

ACTIONS (continued)

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1

This Surveillance verifies that the DRAIN TIME of RPV water inventory to the TAF is ≥ 36 hours. The period of 36 hours is considered reasonable to identify and initiate action to mitigate draining of reactor coolant. Loss of RPV water inventory that would result in the RPV water level reaching the TAF in greater than 36 hours does not represent a significant challenge to Safety Limit 2.1.1.3 and can be managed as part of normal plant operation.

The definition of DRAIN TIME states that realistic cross-sectional areas and drain rates are used in the calculation. A realistic drain rate may be determined using a single, step-wise, or integrated calculation considering the changing RPV water level during a draining event. For a Control Rod RPV penetration flow path with the Control Rod Drive Mechanism removed and not replaced with a blank flange, the realistic cross-sectional area is based on the control rod blade seated in the control rod guide tube. If the control rod blade will be raised from the penetration to adjust or verify sealing of the blade, the exposed cross-sectional area of the RPV penetration flow path is used.

The definition of DRAIN TIME excludes from the calculation those penetration flow paths connected to an intact closed system, or isolated by manual or automatic valves that are ~~locked, sealed, or otherwise secured in the closed position~~closed and administratively controlled, blank flanges, or other devices that prevent flow of reactor coolant through the penetration flow paths. A blank flange or other bolted device must be connected with a sufficient number of bolts to prevent draining ~~in the event of an Operating Basis Earthquake~~. Normal or expected leakage from closed systems or past isolation devices is permitted. Determination that a system is intact and closed or isolated must consider the status of branch lines ~~and ongoing plant maintenance and testing activities~~.

The Residual Heat Removal (RHR) Shutdown Cooling System is only considered an intact closed system when misalignment issues (Reference 6) have been precluded by functional valve interlocks or by isolation devices, such that redirection of RPV water out of an RHR subsystem is precluded. Further, RHR Shutdown Cooling System is only considered an intact closed system if its controls have not been

BASES

SURVEILLANCE REQUIREMENTS (continued)

transferred to Alternate Shutdown, which disables the interlocks and isolation signals.

The exclusion of a single penetration flow paths, or multiple penetration flow paths susceptible to a common mode failure, from the determination of DRAIN TIME ~~must~~should consider the ~~potential~~ effects of temporary alterations in support of maintenance ~~a single operator error or initiating event on items supporting maintenance and testing~~ (rigging, scaffolding, temporary shielding, piping plugs, ~~snubber removal,~~ freeze seals, etc.). If reasonable controls are implemented to prevent ~~If failure of~~ such ~~items~~ temporary alterations from ~~could result and would~~ caus~~e~~ing a draining event from a closed system or between the RPV and the isolation device, the effect of the temporary alterations on DRAIN TIME need not be considered. Reasonable controls include, but are not limited to, controls consistent with the guidance in NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 4, NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," or commitments to NUREG 0612, "Control of Heavy Loads at Nuclear Power Plants." ~~the penetration flow path may not be excluded from the DRAIN TIME calculation.~~

Surveillance Requirement 3.0.1 requires SRs to be met between performances. Therefore, any changes in plant conditions that would change the DRAIN TIME requires that a new DRAIN TIME be determined.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.5.2.2

The minimum water level of 12 ft 7 inches required for the suppression pool is periodically verified to ensure that the suppression pool will provide adequate net positive suction head (NPSH) for the CS subsystem or LPCI subsystem pump, recirculation volume, and vortex prevention. With the suppression pool water level less than the required limit, the required ECCS injection/spray subsystem is inoperable.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.3

The flow path piping has the potential to develop voids and pockets of entrained air. Maintaining the pump discharge lines of the required ECCS injection/spray subsystems full of water ensures that the ECCS subsystem will perform properly. This may also prevent a water hammer following an ECCS ~~initiation signal~~actuation. One acceptable method of ensuring that the lines are full is to vent at the high points.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.5.2.4

~~Verifying the correct alignment for manual, power operated, and automatic valves in the required ECCS subsystem flow path provides assurance that the proper flow paths will be available for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an initiation signal is allowed to be in a nonaccident position provided the valve will automatically reposition in the proper stroke time. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.~~

~~The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.~~[DELETED]

SR 3.5.2.5

Verifying that the required ECCS injection/spray subsystem can be manually aligned, and the pump started and operate for at least 10 minutes demonstrates that the subsystem is available to mitigate a draining event. This SR is modified by two Notes. Note 1 states that ~~T~~testing the ECCS injection/spray subsystem may be done through the ~~recirculation~~test return line ~~is necessary~~ to avoid overfilling the refueling cavity. Note 2 states that credit for meeting the SR may be taken for normal system operation that satisfies the SR, such as using the RHR mode of LPCI for ≥ 10 minutes. The minimum operating time of 10 minutes was based on engineering judgement.

TS 3.5.1, "ECCS – Operating," which is applicable in MODES 1, 2, and 3, contains SR 3.5.1.7, SR 3.5.1.8, and SR 3.5.1.9, which require verification that the ECCS pumps develop the specified flow rate. It is not

BASES

SURVEILLANCE REQUIREMENTS (continued)

necessary to perform similar flow rate tests during the relatively small fraction of an operating cycle when the plant is in MODES 4 and 5 to ensure the pumps are capable of maintaining water level above the TAF. Most RPV penetration flow paths would only permit a drain rate of tens or hundreds of gallons per minute. Therefore, the thousands of gallons a minute flow rates specified in the TS 3.5.1 SRs are not needed to mitigate an unexpected draining event. There are no safety analyses which establish a minimum pump flow needed to respond to an unexpected draining event. Therefore, there is no basis for establishing a minimum flow rate for the SR that is consistent with the specified safety function in MODES 4 and 5. (Reference 7)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.5.2.6

Verifying that each valve credited for automatically isolating a penetration flow path (e.g., RHR, RWCU) actuates to the isolation position on an actual or simulate RPV water level isolation signal is required to prevent RPV water inventory from dropping below the TAF should an unexpected draining event occur.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.5.2.7

~~The required ECCS injection/spray subsystem shall be capable of being manually operated from the Control Room.~~ This Surveillance verifies that ~~the~~ a required CS or LPCI subsystem ~~(including the associated pump and valve(s)) can be manually operated to provide additional RPV water inventory, if needed~~can be manually aligned and started from the control room, including any necessary valve alignment, instrumentation, or controls, to transfer water from the suppression pool to the RPV.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

REFERENCES

1. Information Notice 84-81, "Inadvertent Reduction in Primary Coolant Inventory in Boiling Water Reactors During Shutdown and Startup," November 1984.

2. Information Notice 86-74, "Reduction of Reactor Coolant Inventory Because of Misalignment of RHR Valves," August 1986.

3. Generic Letter 92-04, "Resolution of the Issues Related to Reactor Vessel Water Level Instrumentation in BWRs Pursuant to 10 CFR

BASES

LCO (continued)

MSIVs must meet additional leakage rate requirements. Other PCIV leakage rates are addressed by LCO 3.6.1.1, "Primary Containment," as Type B or C testing.

This LCO provides assurance that the PCIVs will perform their designed safety functions to minimize the loss of reactor coolant inventory and establish the primary containment boundary during accidents.

APPLICABILITY

In MODES 1, 2, and 3, a DBA could cause a release of radioactive material to primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, PCIVs are not required to be OPERABLE and the primary containment purge and vent valves are not required to be normally closed in MODES 4 and 5. ~~Certain valves, however, are required to be OPERABLE when the associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment Isolation Instrumentation." (This does not include the valves that isolate the associated instrumentation.)~~

ACTIONS

The ACTIONS are modified by a Note allowing penetration flow path(s) to be unisolated intermittently under administrative controls. These controls consist of stationing a dedicated operator at the controls of the valve, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for primary containment isolation is indicated.

A second Note has been added to provide clarification that, for the purpose of this LCO, separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable PCIV. Complying with the Required Actions may allow for continued operation, and subsequent inoperable PCIVs are governed by subsequent Condition entry and application of associated Required Actions.

BASES

ACTIONS (continued)

E.1 and E.2

If any Required Action and associated Completion Time cannot be met ~~in MODE 1, 2, or 3,~~ the plant must be brought to MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.1.3.1

This SR ensures that the 24 inch primary containment purge and vent valves are closed as required or, if open, open for an allowable reason. If a purge or vent valve is open in violation of this SR, the valve is considered inoperable. The SR is modified by Note 1 stating that the SR is not required to be met when the purge and vent valves are open for the stated reasons. Note 1 states that these valves may be opened in one supply line and one exhaust line for inerting, de-inerting, pressure control, ALARA or air quality considerations for personnel entry, or Surveillances that require the valves to be open. Note 2 modifies the SR by requiring both Standby Gas Treatment (SGT) subsystems OPERABLE and only one SGT subsystem operating when these purge and vent valves are open in accordance with Note 1.

BASES

APPLICABLE SAFETY ANALYSES (continued)

controlled. Relaxations from typical MODES 1, 2, and 3 LCO requirements are acceptable during shutdown MODES, based on:

a. The fact that time in an outage is limited. This is a risk prudent goal as well as a utility economic consideration.

b. Requiring appropriate compensatory measures for certain conditions. These may include administrative controls, reliance on systems that do not necessarily meet typical design requirements applied to systems credited in operation MODE analyses, or both.

c. Prudent utility consideration of the risk associated with multiple activities that could affect multiple systems.

d. Maintaining, to the extent practical, the ability to perform required functions (even if not meeting MODES 1, 2, and 3 OPERABILITY requirements) with systems assumed to function during an event.

In the event of an accident during shutdown, this LCO ensures the capability of supporting systems necessary for avoiding immediate difficulty, assuming either a loss of all offsite power or a loss of all onsite (diesel generator (DG)) power.

The AC sources satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 1).

LCO

One offsite circuit supplying the onsite Class 1E power distribution subsystem(s) of LCO 3.8.8, "Distribution Systems - Shutdown," ensures that all required loads are powered from offsite power. An OPERABLE DG, associated with a 4.16 kV critical bus required OPERABLE by LCO 3.8.8, ensures that a diverse power source is available for providing electrical power support assuming a loss of the offsite circuit. Together, OPERABILITY of the required offsite circuit and the ability to manually start a DG ensures the availability of sufficient AC sources to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents). ~~Automatic initiation of the required DG during shutdown conditions is specified in LCO 3.3.8.1, LOP Instrumentation.~~

The qualified offsite circuit must be capable of maintaining rated frequency and voltage while connected to its respective critical bus, and of accepting required loads during an accident. Qualified offsite circuits are those that are described in the USAR and are part of the licensing basis for the unit. The offsite circuit consists of incoming breaker and

BASES

LCO (continued)

disconnect to the startup or emergency station service transformer, associated startup or emergency station service transformer, and the respective circuit path including feeder breakers to all 4.16 kV critical buses required by LCO 3.8.8.

The required DG must be capable of ~~starting~~being manually started, accelerating to rated speed and voltage, connecting to its respective critical bus ~~on detection of bus undervoltage~~, and accepting required loads. ~~This sequence must be accomplished within 14 seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and must continue to operate until offsite power can be restored to the critical buses. These capabilities are required to be met from a variety of initial conditions such as DG in standby with engine hot and DG in standby with engine at ambient conditions.~~

~~Proper sequencing of loads, including tripping of nonessential loads, is a required function for DG OPERABILITY. The necessary portions of the Service Water System and Ultimate Heat Sink are also required to provide appropriate cooling to the required DGs.~~

It is acceptable during shutdown conditions, for a single offsite power circuit to supply both 4.16 kV critical buses. No fast transfer capability is required for offsite circuits to be considered OPERABLE.

APPLICABILITY

The AC sources are required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment to provide assurance that:

a. Systems that provide core cooling are available;

b. Systems needed to mitigate a fuel handling accident are available;

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

AC power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.1.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A have been modified by a Note to indicate that when Condition A is entered with no AC power to any required 4.16 kV critical bus, ACTIONS for LCO 3.8.8 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit whether or not a division is de-energized. LCO 3.8.8 provides the appropriate restrictions for the situation involving a de-energized division.

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1

SR 3.8.2.1 requires the SRs from LCO 3.8.1 that are necessary for ensuring the OPERABILITY of the AC sources in other than MODES 1, 2, and 3. SR 3.8.1.8 is not required to be met since only one offsite circuit is required to be OPERABLE. SR 3.8.1.7, SR 3.8.1.10 and SR 3.8.1.11 are not required to be met because DG start and load within a specified time and response on a loss of offsite power or ECCS initiation signal is not required. Refer to the corresponding Bases for LCO 3.8.1 for a discussion of each SR.

This SR is modified by a Note~~. The reason for the Note is to preclude~~ which precludes requiring the OPERABLE DG(s) from being paralleled with the offsite power network or otherwise rendered inoperable during the performance of SRs, and to preclude deenergizing a required 4.16 kV critical bus or disconnecting a required offsite circuit during performance of SRs. With limited AC sources available, a single event could compromise both the required circuit and the DG. It is the intent that these SRs must still be capable of being met, but actual performance is not required during periods when the DG and offsite circuit is required to be OPERABLE.

~~Note 2 states SR 3.8.1.11 is considered to be met without the ECCS initiation signals OPERABLE when associated ECCS initiation signals are not required to be OPERABLE per Table 3.3.5.1-1. This SR demonstrates the DG response to an ECCS signal in conjunction with~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~a loss of power signal. When ECCS system(s) are not required to be OPERABLE, the DG is not required to start in response to ECCS initiation signals. This is consistent with the ECCS instrumentation requirements. However, the DG is still required to meet the other attributes of SR 3.8.1.11 when associated ECCS initiation signals are not required to be OPERABLE.~~

REFERENCES

1. 10 CFR 50.36(c)(2)(ii).