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Fred Dacimo
Site Vice President
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October 24, 2007

Re: Indian Point Nuclear
Generating Unit No. 3
Docket No. 50-286
NL-07-073

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

SUBJECT: **Proposed Change to Indian Point Unit 3 Technical Specifications Regarding Adjustment of the Low-Low Level Alarm Setpoint Range on the Refueling Water Storage Tank (RWST)**

REFERENCES:

1) NRC Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," dated September 13, 2004.

2) Entergy Letter NL-07-098, "Request for Extension of Completion Date for Indian Point Unit 3 Corrective Actions and Modifications Required by Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors"" dated October 24, 2007.

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Nuclear Operations, Inc, (Entergy) hereby requests an amendment to the Technical Specifications for Indian Point Nuclear Generating Unit No. 3 (IP3). The request is to change the Refueling Water Storage Tank (RWST) low-low level alarm setpoint range from ≥10.5 ft and ≤12.5 ft to ≥9.0 ft and ≤11.0 ft and to change the definition of the RWST "low level alarm" to "low-low level alarm". The purpose of this request is to ensure that, subsequent to a Small Break Loss of Coolant Accident, adequate water is supplied to the containment floor to eliminate the risk of air ingestion via vortexing and/or draw down at the sump strainer modules. This request is an integral part of Entergy's response to GL 2004-02 (Reference 1) and represents one of the remaining modifications required to achieve full compliance with the requirements of GL 2004-02 as documented in Reference 2.

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Entergy has evaluated the proposed change in accordance with 10 CFR 50.91 (a)(1) using the criteria of 10 CFR 50.92 (c) and Entergy has determined that this proposed change involves no significant hazards considerations, as described in Attachment 1. The proposed changes to the Technical Specifications are shown in Attachment 2. The associated TS Bases changes are provided in Attachment 3 for information purposes only. In accordance with 10 CFR 50.91, a copy of this application and the associated attachments are being submitted to the designated New York State official.

Entergy requests approval of the proposed license amendment by December 31, 2007. However, should the approval or implementation of the requested amendment be delayed beyond December 31, 2007, a risk assessment has shown that the incremental risk associated with a 6 month delay meets Regulatory Guide 1.177 criterion as described in Reference 2.

There are no new regulatory commitments being made in this submittal. If you have any questions or require additional information, please contact Mr. R. Walpole, Manager, Licensing at (914) 734-6710.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 24th, 2007.

Sincerely,

Fred R. Dacimo
Site Vice President
Indian Point Energy Center

Attachments:

1: Analysis of Proposed Technical Specification Changes Regarding Adjustment of the Low-Low Level Alarm Setpoint Range on the Refueling Water Storage Tank (RWST)

2: Markup of Technical Specification Pages for Proposed Changes Regarding Adjustment of the Low-Low Level Alarm Setpoint Range on the Refueling Water Storage Tank (RWST)

3: Markup of Technical Specification Bases Pages for Proposed Changes Regarding Adjustment of the Low-Low Level Alarm Setpoint Range on the Refueling Water Storage Tank (RWST)

cc: Mr. John P. Boska, Senior Project Manager, NRC NRR DORL
Mr. Samuel J. Collins, Regional Administrator, NRC Region 1
NRC Resident Inspector, IP3
Mr. Paul D. Tonko, President, NYSERDA
Mr. Paul Eddy, New York State Dept. of Public Service

ATTACHMENT 1 TO NL-07-073

ANALYSIS OF PROPOSED TECHNICAL SPECIFICATION CHANGES REGARDING ADJUSTMENT OF THE LOW-LOW LEVEL ALARM SETPOINT RANGE ON THE REFUELING WATER STORAGE TANK (RWST)

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286

1.0 DESCRIPTION

This letter requests an amendment to Operating License DPR-64, Docket No. 50-286 for Indian Point Nuclear Generating Unit No. 3 (IP3). The intent of this request is to change the Refueling Water Storage Tank (RWST) low-low level alarm setpoint range from ≥10.5 ft and ≤12.5 ft to ≥9.0 ft and ≤11.0 ft and to change the definition of the "low level alarm" to "low-low level alarm". The proposed change would revise Technical Specification (TS) Surveillance Requirements (SR) 3.5.4.5 and 3.5.4.6.

2.0 PROPOSED CHANGES

A. Indian Point 3 TS SR 3.5.4.5 currently states:

> "Perform CHANNEL CALIBRATION of RWST level indicating switch and ensure the low level alarm setpoint is ≥10.5 ft and ≤12.5 ft."

The proposed amendment will revise this statement to read:

> "Perform CHANNEL CALIBRATION of RWST level indicating switch and ensure the low-low level alarm setpoint is ≥9.0 ft and ≤11.0 ft."

B. Indian Point 3 TS SR 3.5.4.6 currently states:

> "Perform CHANNEL CALIBRATION of RWST level transmitter and ensure the low level alarm setpoint is ≥10.5 ft and ≤12.5 ft."

The proposed amendment will revise this statement to read:

> "Perform CHANNEL CALIBRATION of RWST level transmitter and ensure the low-low level alarm setpoint is ≥9.0 ft and ≤11.0 ft."

The associated TS Bases changes are provided in Attachment 3 for information purposes only.

3.0 BACKGROUND

The RWST supplies borated water to the Chemical and Volume Control System during abnormal operating conditions, to the refueling cavity during refueling, to the ECCS to fill accumulators, and to the ECCS and the Containment Spray System during accident conditions.

The RWST supplies the ECCS and the Containment Spray System through separate supply headers during the injection phase of a loss of coolant accident (LOCA). Motor operated isolation valves are provided to isolate the RWST from the ECCS subsystems once the system has been transferred to the recirculation mode. The switchover to the cold leg recirculation phase is manually initiated when the RWST level has reached the low-low alarm setpoint and sufficient coolant inventory to support pump operation in recirculation mode is verified to be in the containment. This TS amendment proposes to revise the RWST low-low level alarm setpoint range.

There are two additional RWST levels of interest:

1) The RWST low level that ensures that the RWST contains sufficient water to support the ECCS during the injection phase. This level is unaffected by the proposed change and remains at ≥35.4 ft as required by TS SR 3.5.4.2.

2) The low-low-low level setpoint that alerts the operator to terminate containment spray and safety injection pumps prior to emptying the RWST. This level is unaffected by the proposed change and remains at 1.5 ft as specified in the Emergency Operating Procedures.

The minimum indicated RWST level of 35.4 feet (approx. 342,200 gals.), and the existing low-low level alarms of 10.5 feet (approx. 111,100 gals.) and 12.5 feet (approx. 129,700 gals.), include consideration for instrumentation uncertainties, margin, and unusable volume of water in the tank. These water levels ensure a minimum of approximately 195,800 gals. available for injection, and approximately 66,700 gals. available for use during and following the transition from injection to recirculation (to allow continued containment spray pump operation for sump pH control).

The effect of the proposed change will be to inject more water into containment prior to the point at which recirculation is initiated (low-low level alarm setpoint). In response to Generic Letter 2004-02, new strainer modules were installed in the internal recirculation and vapor containment sumps. At the initiation of recirculation the additional water provided by the proposed TS change improves available Net Positive Suction Head (NPSH). The potential for air ingestion via vortexing and/or draw down at the sump strainer modules is also eliminated for the additional sump loading required to be considered under GL 2004-02. This amendment contributes to compliance with the regulatory requirements of GL 2004-02 and is required for the implementation of the containment sump modification program under GSI-191 for Indian Point Unit 3.

The change in definition from "low" to "low-low" alarm setpoint is so as to make the TS consistent with the control room display and Emergency Operating Procedures, and is considered an administrative change.

4.0 TECHNICAL ANALYSIS

The Indian Point Unit 3 (IP3) Technical Specifications require that a reliable quantity of borated water is available to inject into containment subsequent to design basis accidents such as large-break and small-break LOCA. Plant responses to such events rely upon an augmented volume of coolant to ensure that the assumptions of the design basis remain valid. For accidents involving use of the RWST, these assumptions include peak containment temperature, peak containment pressure, dose consequences, assurance of subcritical post-accident conditions, sump pH effects and maintenance of the reactor core in a coolable geometry. Furthermore, the design basis assumes that all required operator actions (as opposed to automatic functions) can be performed under post-accident conditions to ensure operability of equipment required for accident mitigation.

Entergy seeks to comply with the regulatory requirements of GL 2004-02. This includes modifications to the sump strainers to ensure that any accumulation of post-accident debris in the sumps will not prevent the recirculation pumps or the residual heat removal pumps from adequately cooling the core, providing recirculation spray as needed and delivering sufficient borated water to assure subcriticality in the core.

The RWST low-low level alarm setpoint is the level at which the operators may begin the transfer from injection phase to recirculation phase, an evolution commonly known as "switchover". Because of the potential for air ingestion in the ECCS pumps during the beginning of the post-LOCA recirculation phase, Entergy is proposing a reduction in the RWST low-low level alarm setpoint range from ≥10.5 ft and ≤12.5 ft to ≥9.0 ft and ≤11.0 ft.

A reduction in RWST low-low level elevation means there will be a greater quantity of water on the containment floor at switchover. Entergy has evaluated the modified containment sump configuration and determined that, for the two sumps within containment (recirculation sump and containment sump), only the containment sump, which feeds the RHR pumps, requires a higher water elevation to ensure proper pump operation. The recirculation sump, which feeds the internal recirculation (IR) pumps, has sufficient water depth to ensure proper pump operation.

Entergy has determined that a nominal RWST setpoint of 10.0 feet will provide adequate water head to minimize the risk of air ingestion into the vapor containment pump lines for the limiting accident, which in this case is the Small Break LOCA. A nominal value of 10.0 feet requires that the low-low level alarm setpoint range be ≥9.0 ft and ≤11.0 ft. If it were assumed that the operators performed an instantaneous switchover at 11.0 ft then there would be an insufficient water level in containment to ensure proper RHR pump operation. However, observations on the simulator show that several minutes elapse between reaching the low-low level alarm setpoint and the starting of the IR or RHR pumps. Therefore, by the time the switchover is complete and the recirculation pumps are in service, the RWST level is expected to be considerably lower than 10.0 feet. Thus, the revised RWST low-low level alarm setpoint range provides assurance of a minimum required water supply on the containment floor, while providing the operators with adequate time to complete the switchover evolution before the RWST low-low-low level setpoint is reached.

The proposed low-low level alarms of 9.0 feet (approx. 98,200 gals.) and 11.0 feet (approx. 116,900 gals.), continue to include consideration for instrumentation uncertainties, margin, and the unusable volume of water in the tank. These water levels ensure a minimum of approximately 217,400 gals. available for injection, and approximately 58,100 gals. available for use during and following the transition from injection to recirculation.

Entergy has reviewed the effect of the reduced RWST setpoint on all other relevant post-accident parameters, including:

- Containment temperature and pressure
- Dose consequences
- Vortex consideration in RWST due to reduced level
- Operator action time for switchover
- Subcriticality
- Flood level in containment
- Air ingestion into sump strainer
- Sump pH effects

These parameters are discussed in the paragraphs that follow. In general, accident conditions will improve as a result of the RWST low-low level alarm setpoint range change, for both Small-Break and Large-Break LOCA scenarios.

Containment Temperature and Pressure: The limiting containment temperature and pressure is established in the Large-Break LOCA scenario, for the double-ended pump suction break case. The peak pressure and temperature occur about eight minutes before the switchover time. Thus containment peak temperature and pressure are not affected by delaying the point at which switchover begins.

Dose Consequences: The LOCA dose analysis assumes a spray injection period until such time as the low-low RWST setpoint is reached, and afterwards it assumes spray continues during the recirculation phase. The change in the RWST low-low level alarm setpoint range from ≥10.5 ft and ≤12.5 ft to ≥9.0 ft and ≤11.0 ft will result in a longer spray injection period and increase the amount of sump fluid delivered through the Containment Spray System. The elemental iodine and particulate removal coefficients are much larger during the injection period than the recirculation phase. Thus, extending the injection period increases the efficiency of the post-accident iodine removal capability. Therefore, a longer injection period will reduce the dose consequences and render the existing analysis more conservative.

Vortex Consideration in RWST due to Reduced Level: The change in the RWST low-low level alarm setpoint range from ≥10.5 ft and ≤12.5 ft to ≥9.0 ft and ≤11.0 ft means a slightly lower level in the tank prior to initiation of switchover, with a subsequent reduction in RWST nozzle submergence during the switchover process. Entergy has reviewed the hydraulic effects of RWST draindown during accident response and considered a variety of possible scenarios. The limiting case begins with 3 safety injection (SI) pumps, 2 residual heat removal (RHR) pumps and two containment spray (CS) pumps in service during the injection phase. When the switchover point is reached, Emergency Operating Procedures (EOPs) direct the operator to terminate 1 SI, 2 RHR and 1 CS pump. At this point, the two remaining SI pumps and one CS pump are operating. Of these, only the two SI pumps are required to remain in service for the recirculation phase. Based on this configuration, Entergy has concluded that no vortexing will occur in the SI pumps, assuming that the operators terminate SI pump operation at the indicated low-low-low level of 1.5 feet in accordance with the EOPs.

Operator Action Time for Switchover: The switchover to recirculation begins at the low-low RWST setpoint and is completed prior to reaching the low-low-low level setpoint. The change in the RWST low-low level alarm setpoint range from ≥10.5 ft and ≤12.5 ft to ≥9.0 ft and ≤11.0 ft means that the operators will have less time to effect switchover before the low-low-low setpoint of 1.5 feet (which does not change) is reached. The low-low-low setpoint is the point at which operation of the remaining SI and CS pumps is terminated. The impact of this reduced time was evaluated on the IP3 Simulator. This demonstration showed that starting at an RWST low-low level nominal setpoint of 10.0 feet, switchover to recirculation was completed by the operators at a resulting RWST level of 4.5 feet. This is 3.0 feet higher than the low-low-low setpoint, which is more than twice as great as the maximum estimated setpoint uncertainty of 1.4 feet. This demonstrates the presence of ample margin to the low-low-low level setpoint for terminating injection.

As a point of comparison, the proposed RWST low-low level alarm setpoint range is higher than the equivalent range at Indian Point Unit 2 (IP2). The IP2 ECCS is similar to that of IP3, and the IP2 operators have demonstrated over years of training exercises that the time period bracketed by the low-low and low-low-low setpoints is more than adequate to complete switchover. This supports the conclusion that the same will be true at IP3.

Subcriticality: One of the primary concerns about recovery from any design basis accident is to assure that the core remains subcritical throughout (or, for a steam break scenario, that any return to criticality will be brief and will not result in exceeding any containment temperature/pressure design limits). For LOCA, maintenance of subcriticality is assured by mixing of reactor coolant in the sumps with borated RWST water. The change in the RWST low-low level alarm setpoint range from ≥10.5 ft and ≤12.5 ft to ≥9.0 ft and ≤11.0 ft will extend injection time and thus provide more negative reactivity than currently assumed in the design basis analysis. Thus, the point at which injection is terminated will occur slightly later in time, with both a greater sump concentration available for recirculation and a recirculation time occurring when post-trip xenon is higher.

As a practical consideration, the effect of this change is small if not negligible. However, as noted in Section 6.2.4.5 of the Entergy Stretch Power Uprate LAR (Reference 7.1), post-accident subcriticality is a parameter that is calculated on a cycle-by-cycle basis. The RWST level setpoints are included in the IP3 Reload Safety and Licensing Checklist (RSLC), which provides input to the Reload Safety Evaluation prepared for every new cycle. Any effect on criticality resulting from this minor change in the low-low level RWST alarm setpoint range would be captured in the RSLC process.

Flood Level in Containment: The setpoint establishing the minimum RWST level for operation and the low-low-low RWST level setpoint are not changing as a result of this proposed change. As a result, the total amount of water injected into containment does not change, and there is no impact on Equipment Qualification (EQ) due to flooding.

Air Ingestion into Sump Strainer: Air ingestion into the IR pump suction and RHR recirculation suction lines could occur due to two possible primary effects: vortexing and/or draw down. Based on strainer testing and calculations, Entergy has determined that the RWST switchover setpoint be changed to ≤10.2 feet to prevent air ingestion in the RHR pump suction lines.

Sump pH effects: The change in the RWST low-low level alarm setpoint range from ≥10.5 ft and ≤12.5 ft to ≥9.0 ft and ≤11.0 ft is not expected to have any significant effects on sump pH. The lower setpoint will increase the amount of RWST borated water in the sump during the injection phase, which will reduce pH, but this is compensated for by the addition of sodium hydroxide to the containment spray solution. The post-accident sump pH will thus remain above 7.0, which is a basis assumption for dose calculations. Because the sump solution remains >7.0, it is within the original plant design for materials selection and post-LOCA EQ requirements.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

Entergy Nuclear Operations, Inc. (Entergy) has evaluated the safety significance of the proposed change to the Indian Point 3 Technical Specification that revises SR 3.5.4.5 and SR 3.5.4.6. This proposed change has been evaluated according to the criteria of 10 CFR 50.92, "Issuance of Amendment". Entergy has determined that the subject change does not involve a Significant Hazards Consideration as discussed below:

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

   Response: No

The proposed changes to the Technical Specifications are consistent with the assumptions of all design basis accidents, as they exist currently and as affected subsequent to the implementation of the proposed amendment. The change in the RWST low-low level alarm setpoint range has been demonstrated to be within the safety margins for post-accident parameters and, in most cases, actually beneficial to plant post-accident response capability. The RWST is designed to respond to a variety of accidents, and, for operation in Modes 1 through 4, it serves no other purpose. Therefore, any adjustment of an intermediate level setpoint cannot increase the probability of a design basis accident. The change in the definition of the RWST "low level alarm" to "low-low level alarm" is editorial and therefore does not affect the function of the alarm. Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

   Response: No

   The proposed changes represent a minor adjustment to an existing setpoint range. The effect of the changes will be to assure recirculation flow following a LOCA with consideration for sump strainer installation, in response to GSI-191. However, the RWST will continue to perform its function in essentially the same manner that it has since original plant design. No changes in equipment operation or procedural control will result from this amendment that could possibly degrade the performance of the RWST or cause it to be operated in a manner inconsistent with existing design basis assumptions. The change in the definition of the RWST "low level alarm" to "low-low level alarm" is editorial and therefore does not affect the function of the alarm. Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

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

   Response: No

   The proposed changes improve the margin to safety, especially with respect to post-accident temperature / pressure and dose consequences during injection and, most importantly, pump performance under postulated sump debris conditions during recirculation. Significant margin is available to preclude air ingestion in the ECCS pumps, and sufficient time is available for the operators to perform the switchover to recirculation. The change in the definition of the RWST "low level alarm" to "low-low level alarm" is editorial and therefore does not affect the function of the alarm. Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based on the above, Entergy Nuclear Operations, Inc. concludes that the proposed amendment to the Indian Point 3 Technical Specifications 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.

5.2 Applicable Regulatory Requirements / Criteria

The following lists the regulatory requirements and plant-specific design bases related to the proposed change:

1) Regulatory Requirements

- The regulatory basis for TS 3.5.4, "Refueling Water Storage Tank (RWST)", is to ensure that the RWST contains sufficient borated water to support the ECCS during the injection phase; that sufficient water volume exists in the recirculation sump or the containment sump to support continued operation of the ECCS and Containment Spray System pumps at the time of transfer to the recirculation mode of cooling and that the reactor remains subcritical following a LOCA or MSLB.

- The ECCS must be designed so that its calculated cooling performance following postulated loss-of-coolant accidents conforms to the criteria set forth in 10 CFR 50.46 "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors." 10 CFR 50.46 requires, in part, that following successful initial operation of the ECCS, the calculated core temperature shall be maintained at an acceptably low value and decay heat shall be removed for the extended period of time required by the long-lived radioactivity remaining in the core.

- The General Design Criteria presented in the Indian Point 3 UFSAR are those which were in effect at the time when the plant was designed and constructed. On November 22, 1965, the Atomic Energy Commission (AEC) published and requested comments on Proposed General Design Criteria which were developed to assist in the evaluation of applications for nuclear power plant construction permits. On July 11, 1967, a revised set of General Design Criteria were published for comment. The revision reflected extensive public comments, suggestions from meetings with the Atomic Industrial Forum (AIF) and review within the AEC. In the July to October 1967 time frame, AIF Incorporated assembled nuclear industry comments and transmitted to the AEC revised wording of the 1967 Draft General Design Criteria along with a description of the changes. It was the AIF version of the 1967 General Design Criteria which formed the bases of the Indian Point 3 design. The AEC subsequently revised the 1967 version of the General Design Criteria and incorporated them into 10 CFR 50, Appendix A in 1971. Accordingly, the ECCS is designed to meet the following requirements:

    - GDC 44, "ECCS Capability".
    - GDC 45, "Inspection of ECCS".
    - GDC 46, "Testing of ECCS Components".
    - GDC 47, "Testing of ECCS", and
    - GDC 48, "Testing of Operational Sequence of ECCS".

The RWST, which is a part of the ECCS, is designed to meet the applicable requirements of 10 CFR 50.46 and the aforementioned GDC.

2) Regulatory Guidance

- The IP3 ECCS design basis (including the RWST) is described in UFSAR Section 6.2. The RWST functions and capacity requirements are included.

5.3 Environmental Considerations

The proposed changes to the IP3 Technical Specifications do not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 PRECEDENCE

As noted earlier in this document, the adjustment of the RWST low-low level alarm setpoint range will make the Indian Point Unit 3 RWST water volume assumptions closer to those of Indian Point Unit 2, which were established in 1990 (Amendment 197) and have been proven to be suitable for all post-accident responses involving the RWST.

7.0 REFERENCES

7.1 Entergy Letter NL-04-069, "Proposed Changes to Technical Specifications: Stretch Power Uprate (4.85%) and Adoption of TSTF-339", 6/3/2004

ATTACHMENT 2 TO NL-07-073

MARKUP OF TECHNICAL SPECIFICATION PAGES FOR PROPOSED CHANGES REGARDING ADJUSTMENT OF THE LOW-LOW LEVEL ALARM SETPOINT RANGE ON THE REFUELING WATER STORAGE TANK (RWST)

Bold, italics for added text ~~Strikeout~~ for deleted text

Affected Tech Spec Page: 3.5.4-2

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.5.4.1	----------NOTE---------- Only required to be performed when ambient air temperature is < 35°F or > 110°F. ---------- Verify RWST borated water temperature is ≥ 35°F and ≤ 110°F.	24 hours
SR 3.5.4.2	Verify RWST borated water level is ≥ 35.4 feet.	7 days
SR 3.5.4.3	Verify RWST boron concentration is ≥ 2400 ppm and ≤ 2600 ppm.	31 days
SR 3.5.4.4	Perform CHANNEL CHECK of RWST level.	7 days
SR 3.5.4.5	Perform CHANNEL CALIBRATION of RWST level indicating switch and ensure the ***low***-low level alarm setpoint is ≥~~10.5~~ ***9.0*** ft and ≤~~12.5~~ ***11.0*** ft.	184 days
SR 3.5.4.6	Perform CHANNEL CALIBRATION of RWST level transmitter and ensure the ***low***-low level alarm setpoint is ≥~~10.5~~ ***9.0*** ft and ≤~~12.5~~ ***11.0*** ft.	18 months

ATTACHMENT 3 TO NL-07-073

MARKUP OF TECHNICAL SPECIFICATION BASES PAGES FOR PROPOSED CHANGES REGARDING ADJUSTMENT OF THE LOW-LOW LEVEL ALARM SETPOINT RANGE ON THE REFUELING WATER STORAGE TANK (RWST)

Bold, italics for added text ~~Strikeout~~ for deleted text

Affected Tech Spec Bases Pages:
B 3.5.4-1
B 3.5.4-2
B 3.5.4-4
B 3.5.4-5
B 3.5.4-8
B 3.5.4-9

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.4 Refueling Water Storage Tank (RWST)

BASES

BACKGROUND

The RWST supplies borated water to the Chemical and Volume Control System (CVCS) during abnormal operating conditions, to the refueling cavity during refueling, to the ECCS to fill accumulators, and to the ECCS and the Containment Spray System during accident conditions.

The RWST supplies the ECCS and the Containment Spray System through separate supply headers during the injection phase of a loss of coolant accident (LOCA). Motor operated isolation valves are provided to isolate the RWST from the ECCS subsystems once the system has been transferred to the recirculation mode. The switchover to the cold leg recirculation phase is manually initiated when the RWST level has reached the low-***low*** alarm setpoint and sufficient coolant inventory to support pump operation in recirculation mode is verified to be in the containment. Use of a single RWST to supply all of the injection trains of the ECCS and Containment Spray System is acceptable since the RWST is a passive component, and passive failures are not required to be assumed to occur coincidentally with Design Basis Events.

During normal operation in MODES 1, 2, and 3, the high head safety injection (HHSI) and residual heat removal (RHR) pumps are aligned to take suction from the RWST.

The ECCS and Containment Spray System pumps are provided with recirculation lines that ensure each pump can maintain minimum flow requirements when operating at or near shutoff head conditions.

This LCO ensures that:

a. The RWST contains sufficient borated water to support the ECCS during the injection phase;

(continued)

BASES

BACKGROUND

b. Sufficient water volume exists in the recirculation sump or the containment sump to support continued operation of the ECCS and Containment Spray System pumps at the time of transfer to the recirculation mode of cooling; and

c. The reactor remains subcritical following a LOCA or MSLB.

Insufficient water in the RWST could result in insufficient cooling capacity when the transfer to the recirculation mode occurs. Improper boron concentrations could result in a reduction of SDM or excessive boric acid precipitation in the core following the LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside the containment due to improper pH in the sumps.

APPLICABLE SAFETY ANALYSES

During accident conditions, the RWST provides a source of borated water to the ECCS and Containment Spray System pumps. As such, it provides containment cooling and depressurization, core cooling, and replacement inventory and is a source of negative reactivity for reactor shutdown (Ref. 1). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of B 3.5.2, "ECCS — Operating"; B 3.5.3, "ECCS — Shutdown"; and B 3.6.6, "Containment Spray System and Containment Fan Cooler System." These analyses are used to assess changes to the RWST in order to evaluate their effects in relation to the acceptance limits in the accident analyses.

The RWST must also meet volume, boron concentration, and temperature requirements for non-LOCA events. The volume is not an explicit assumption in non-LOCA events since the required volume is a small fraction of the available volume. The deliverable volume limit is set by the LOCA and containment analyses. For the RWST, the deliverable volume is different from the total volume contained since, due to the design of the tank, more water can be contained than can be delivered.

For a large break LOCA analysis, the minimum water volume limit of ~~195,800~~ ***217,400*** gallons and the lower boron concentration limit of 2400 ppm are used to compute the post LOCA sump boron

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The IP3 ESFAS design does not include automatic switchover from the safety injection mode to the recirculation mode of operation based on low-***low*** level in the RWST coincident with a safety injection signal. This function is performed manually by the operator who must be alerted by redundant RWST low-***low*** level alarms. The switchover to the cold leg recirculation phase is manually initiated when the RWST level has reached the low-***low*** alarm setpoint and sufficient coolant inventory to support pump operation in recirculation mode is verified to be in the containment.

The RWST low-***low*** level alarm setpoint has both upper and lower limits. The upper limit is set to ensure that switchover does not occur until there is adequate water inventory in the containment to provide ECCS pump suction. (This is confirmed by recirculation and/or containment sump level indication.) The lower limit is set to ensure switchover occurs before the RWST empties, to prevent ECCS pump damage.

Requiring 2 channels of RWST low-***low*** level alarm ensures that the alarm function will be available assuming a single failure of one channel.

The RWST satisfies Criterion 3 of 10 CFR 50.36.

LCO

The RWST ensures that an adequate supply of borated water is available to cool and depressurize the containment in the event of a Design Basis Accident (DBA), to cool and cover the core in the event of a LOCA, to maintain the reactor subcritical following a DBA, and to ensure adequate level in the recirculation sump and the containment sump to support ECCS pump operation in the recirculation mode.

To be considered OPERABLE, the RWST must meet the water level, boron concentration, and temperature limits established in the SRs.

APPLICABILITY

In MODES 1, 2, 3, and 4, RWST OPERABILITY requirements are dictated by ECCS and Containment Spray System OPERABILITY

(continued)

BASES

APPLICABILITY requirements. Since both the ECCS and the Containment Spray System must be OPERABLE in MODES 1, 2, 3, and 4, the RWST must also be OPERABLE to support their operation. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops — MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops — MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Residual Heat Removal (RHR) and Coolant Circulation-High Water Level," and LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation-Low Water Level."

ACTIONS

A.1

With RWST boron concentration or borated water temperature not within limits of SR 3.5.4.3 and SR 3.5.4.1, respectively, they must be returned to within limits within 8 hours. Under these conditions neither the ECCS nor the Containment Spray System can perform its design function. Therefore, prompt action must be taken to restore the tank to OPERABLE condition. The 8 hour limit to restore the RWST temperature or boron concentration to within limits was developed considering the time required to change either the boron concentration or temperature and the fact that the contents of the tank are still available for injection.

B.1

Condition B applies when one channel of RWST low level alarm is inoperable. Required Action B.1 requires restoring the inoperable channel to OPERABLE status within 7 days. The 7 day Completion Time for restoration of redundancy to the alarm function is needed because the IP3 ESFAS design does not include automatic switchover from the safety injection mode to the recirculation mode of operation based on low-***low*** level in the RWST coincident with a safety injection signal. This function is performed manually by the operator who is alerted by the RWST low-***low*** level alarm as the primary indicator for determining the time for the switchover. The 7 day Completion Time for restoration of redundancy for this alarm function is acceptable because of the remaining alarm channel and the availability of containment and recirculation sump level indication in the containment.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.4.4 (continued)

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the RWST level instrument channel has drifted outside the limit. If the channels are within criteria, it is an indication that the RWST level instrument channels are OPERABLE.

The frequency of 7 days is based on operating experience that demonstrates that channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of displays associated with the LCO required RWST level instruments.

SR 3.5.4.5

A CHANNEL CALIBRATION of the RWST level indicating switch is performed at least every 184 days. CHANNEL CALIBRATION is a complete check of the level indicating switch loop including the required alarm. The test verifies the RWST level indicating switch responds to RWST level within the required range and accuracy. The test also verifies that the RWST level indicating switch will cause the low level alarm to annunciate at ≥~~10.5~~ ***9.0*** feet and ≤~~12.5~~ ***11.0*** feet to ensure the operator is alerted to start the switchover to the recirculation mode during accident conditions. The frequency is based on operating experience and previous license commitments.

SR 3.5.4.6

A CHANNEL CALIBRATION of the RWST level transmitter is performed at least every 18 months. CHANNEL CALIBRATION is a complete check of the RWST level transmitter loop including the required alarm. The test verifies the RWST level transmitter responds to RWST level within the required range and accuracy.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.4.6 (continued)

The test also verifies that the RWST level transmitter will cause the low-***low*** level alarm to annunciate at ≥~~10.5~~ ***9.0*** feet and ≤~~12.5~~ ***11.0*** feet to ensure the operator is alerted to start the switchover to the recirculation mode during accident conditions. The frequency is based on operating experience and previous license commitments.

REFERENCES

1. FSAR, Chapter 6 and Chapter 14.