ENTERGY

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September 28, 1992

1CAN099203

U. S. Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Technical Specifications Change Request
Concerning Sodium Hydroxide Tank Required Level

Gentlemen:

Attached for your review and approval is a proposed Technical Specifications (TS) change revising the required Arkansas Nuclear One - Unit 1 (ANO-1) sodium hydroxide (NaOH) tank level as specified in TS 3.3.4(B). This change also deletes the value for the weight of NaOH specified in TS 3.3.4(B), and revises the Bases for TS 3.3.4 to reflect the new level value.

This change is required in order to reduce the number of nuisance alarms received in the control room due to the limitations of available instrumentation when combined with the narrow NaOH tank level range currently specified in TS 3.3.4(B). Expanding the TS required indicated level range for the ANO-1 NaOH tank will eliminate these unnecessary alarms which detract from the control room environment and distract the control board operators.

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1) using criteria in 10CFR50.92(c) and it has been determined that this change involves no significant hazards considerations. The bases for these determinations are included in the attached submittal.

Entergy Operations requests that the effective date for this change be 30 days after NRC issuance of the amendment to allow for distribution and procedural revisions necessary to implement this change. Although this request is neither exigent nor emergency, your prompt review and approval is requested in order to eliminate this source of control board operator distraction.

Very truly yours,

J. W. Yelverton

JWY/CWS/sjf

Attachments

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A001
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cc: Mr. James L. Milhoan
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STATE OF ARKANSAS)
) SS
COUNTY OF LOGAN)

Affidavit

I, J. W. Yelverton, being duly sworn, subscribe to and say that I am Vice President, Operations ANO for Entergy Operations, that I have full authority to execute this affidavit; that I have read the document numbered 1CAN099203 and know the contents thereof; and that to the best of my knowledge, information and belief the statements in it are true.

J. W. Yelverton

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for the County and State above named, this 28th day of September, 1992.

Sandy Siebenmorgen
Notary Public

My Commission Expires:

May 11, 2000

ATTACHMENT

PROPOSED TECHNICAL SPECIFICATION

IN THE MATTER OF AMENDING

LICENSE NO. DPR-51

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT ONE

DOCKET NO. 50-313

DESCRIPTION OF PROPOSED CHANGES

The proposed change revises the values for the Arkansas Nuclear One - Unit 1 (ANO-1) sodium hydroxide (NaOH) tank level indication specified in Technical Specifications (TS) 3.3.4(B) from a value of 34 +1.0/-0.8 ft. to a value of 33.2 ± 1.8 ft. The weight of NaOH specified in TS 3.3.4(B) has been deleted. This change also revises the Bases of TS 3.3.4 to reflect the change in NaOH tank level range.

BACKGROUND

NaOH is added to the reactor building (RB) spray system to enhance radio-iodine absorption in the event of a major loss of coolant accident (LOCA). The addition of NaOH to the RB spray solution adjusts the solution to an alkaline pH to promote iodine hydrolysis (in which iodine is converted to nonvolatile forms). This pH value considers the environmental qualifications of equipment in the RB that may be subjected to the spray solution, limiting the introduction of conditions that may induce caustic stress corrosion cracking of mechanical system components.

The existing NaOH tank level instrumentation accuracy specifications and level measurement range in combination with the existing TS limits result in numerous nuisance alarms being generated by the level alarm switch. This can occur while the level indication remains subjectively unchanged. That is, changes in the ambient conditions (such as temperature) can result in small signal variations capable of generating an alarm while producing no discernible level indication change. This is due to the sensitivity and narrow dead-band of the level alarm switch. This is especially troublesome when the level signal is essentially equal to the alarm switch setting which results in a repetitive alarm/clear condition on a "daily" cycle. Other appropriate available instrumentation has been evaluated and would provide no significant improvement.

The alarm is annunciated in the control room, requiring the control board operators to diagnose and correct the cause of the alarm. Upon receipt of a high level alarm in the NaOH tank, the required action is to drain NaOH solution out of the tank until the level alarm is cleared, while ensuring that the indicated NaOH tank level is within the TS required level range. This waste NaOH solution must then be processed for release. Due to the instrument loop hysteresis, this draining evolution can result in a final level near the lower end of the TS required level range. A subsequent change in ambient conditions can then result in the generation of a low level alarm. The corrective action required involves adding a sufficient quantity of NaOH solution to the NaOH tank level until the low level alarm clears, while ensuring that the indicated NaOH tank level remains within the TS level range. Again, due to the instrument loop hysteresis, this fill evolution can result in a final level near the upper end of the TS required level range. This hysteresis effect in combination with the existing TS limits, therefore, tends to preclude operating at the nominal NaOH tank level and enhances the probability of generating level alarms. Revising the NaOH tank level range to 33.2 ± 1.8 ft. will allow setting the NaOH tank level alarm set points such that normal variations in tank level indication introduced by ambient condition changes will be accommodated, eliminating this source of distraction for the control board operators and unnecessary chemical and radiological waste generation.

DISCUSSION OF CHANGE

A submittal to the NRC requesting amendment of the ANO-1 TS to allow a return to full power operation (letter 1CAN089002 dated August 7, 1990) also requested a change to the Borated Water Storage Tank (BWST) level (TS 3.3.1(G)). Bounding cases for allowable NaOH and boron concentrations and allowable BWST and NaOH tank levels were analyzed and shown to be acceptable. Although the primary purpose of the calculations was to justify the change in required BWST level, considerable margin was also added to the assumed NaOH tank level range. The changes allowing a return to full power operation, including the BWST level change, were approved by the NRC as Amendment No. 140, dated December 5, 1990. The same review and re-evaluation of all potentially impacted analyses that was performed to support the change in required BWST level is also applicable to this revision of the NaOH tank level range.

General areas considered in evaluating the NaOH tank level range change were:

1) Post Loss of Coolant Accident (LOCA) RB water level,
2) Low pressure injection (LPI) and RB spray pump performance during Post Loca RB sump recirculation,
3) Post LOCA RB pressure and temperature profiles,
4) Post LOCA off-site dose, and
5) RB sump vortexing analysis

A review of the analyses associated with these general areas is summarized below. Since the TS maximum level of 35.0 ft. remains unchanged by this amendment request, only the NaOH tank minimum level is discussed in this review.

Post LOCA RB Water Level

The minimum Post LOCA RB sump water level calculations assume a minimum flow from the NaOH tank of 5,000 gallons, based upon an initial tank volume of 10,600 gallons. This initial volume corresponds to a minimum NaOH tank level of 30.7 ft.

LPI and RB Spray Pump Performance

The NPSH calculations for the LPI and RB Spray pumps reference a minimum post LOCA sump water level. The level calculation was based on assumed minimum levels in the Reactor Coolant System, BWST, Core Flood Tanks and NaOH tank. The minimum NaOH flow into the sump assumed for the purposes of the level calculation was 5000 gallons. This flow was based on an initial NaOH tank volume of 10,600 gallons (30.7 ft.). The LPI and RB Spray pump NPSH values will not be adversely effected by the proposed change in the TS level of the NaOH tank.

Post LOCA RB Pressure and Temperature

The ANO-1 RB pressure and temperature analysis conservatively neglects the NaOH tank volume and therefore places no limiting assumptions on NaOH tank level or volume.

Post LOCA Off-site Dose

The ANO-1 LOCA off-site dose consequences are analyzed for the maximum hypothetical accident and are based upon a minimum NaOH tank level of 30.7 ft. However, this analysis also assumes a minimum RB sump pH of 8.5. This pH assumption has been verified using a minimum NaOH tank level of 30.84 ft. Therefore, the bounding minimum NaOH tank level is shown to be 30.84 ft. for this analysis.

RB Sump Vortexing Analysis

On the basis of the results of the ANO Post-Accident Water Level analysis, the minimum post LOCA sump level will be elevation 340.8 ft (Floor El. 336.5 ft + 4.27 ft.). This calculation was based on assumed minimum levels in the Reactor Coolant System, BWST, Core Flood Tanks and NaOH Tank. The minimum NaOH flow into the sump assumed for the purposes of this calculation was 5000 gallons. This flow was based on an initial NaOH tank volume of 10,600 gallons (30.7 ft.). Vortex suppressers installed in the Unit 1 sump will effectively suppress vortexes for sump water levels above elevation 337.17 ft. Sump vortexing will therefore not be a problem, assuming an initial NaOH Tank level of 30.7 ft.

Of the analyses affected by variations in minimum NaOH tank level, the Post LOCA Off-site Dose assumptions requiring a NaOH tank minimum level of 30.84 ft. is limiting. All analyses affected by NaOH tank lower level variation have been shown to be bounded by a lower level of 30.84 ft. as discussed above. The potential instrument error for the NaOH tank level indication instrumentation is bounded by error values of 0.80 ft. and 0.47 ft for the maximum and minimum NaOH tank safety analysis levels, respectively. Instrument error calculations for the NaOH tank level instruments are attached to this submittal. Other instrument error calculations using this methodology have been reviewed and accepted by the NRC. Using an allowed TS range of 33.2 $\pm$ 1.8 ft. results in the following NaOH tank level conditions:

NaOH Tank Level	Significance
35.87 ft	Maximum level analyzed in Safety Analysis
35.80 ft	Maximum actual level at indicated TS maximum level with worst case instrument loop error
35.0 ft	TS Maximum level
33.2 ft	Nominal TS level
31.4 ft	TS Minimum level
30.93 ft	Minimum actual level at indicated TS minimum level with worst case instrument loop error
30.84 ft	Minimum level (most restrictive) analyzed in Safety Analysis

The weight of NaOH referenced in TS 3.3.4(B) is extraneous and redundant information in that NaOH tank level requirements and concentration requirements are specified. Deleting the weight of NaOH in TS 3.3.4(B) removes this extraneous information and is considered as an administrative change.

The Bases change for TS 3.3.4 reflects the change in TS 3.3.4(B) by referencing the new NaOH tank level range.

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

An evaluation of the proposed change has been performed in accordance with 10CFR50.91(a)(1) regarding no significant hazards considerations using the standards in 10CFR50.92(c). A discussion of these standards as they relate to this amendment request follows:

Criterion 1 - Does Not Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated.

NaOH tank level is not an initiator of any event analyzed in the Safety Analysis. The accident mitigation features of the plant are not affected by the proposed amendment, as the most limiting analysis affected by the change in minimum NaOH tank level has been shown to be bounded by the proposed level range. The proposed level range adequately ensures that values assumed for the minimum NaOH tank level remain bounded with an allowance for worst case instrument error. The deletion of NaOH weight is intended to remove extraneous and redundant information from the specification and is administrative in nature. The minimum and maximum NaOH concentrations are not affected by this change. The Bases change is proposed to maintain consistency in the ANO-1 TS and is also administrative in nature.

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

Criterion 2 - Does Not Create the Possibility of a New or Different Kind of Accident from Any Previously Evaluated.

The scope of the change does not establish a potential new accident precursor. All analyses associated with NaOH tank level and volume have been shown to be bounded by the proposed level range for the NaOH tank with adequate margin for worst case instrument loop error. The deletion of NaOH weight is intended to remove extraneous and redundant information from the specification and is administrative in nature. The minimum and maximum NaOH concentrations are not affected by this change. The Bases change is proposed to maintain consistency in the ANO-1 TS and is also administrative in nature.

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

Criterion 3 - Does Not Involve a Significant Reduction in the Margin of Safety.

All analyses associated with NaOH tank level and volume have been shown to be bounded by the proposed range for the NaOH tank level with adequate margin for worst case instrument loop error. The deletion of NaOH weight is intended to remove extraneous and redundant information from the specification and is administrative in nature. The minimum and maximum NaOH concentrations are not affected by this change. The Bases change is proposed to maintain consistency in the ANO-1 TS and is also administrative in nature.

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