

The Light company

Houston Lighting & Power

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January 28, 1983

ST-HL-AE-2487

File No.: G20.02.01

10CFR50.90

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

South Texas Project Electric Generating Station
Unit 1

Docket No. STN 50-498

Proposed Technical Specification Change
for Accumulator Boron Concentration

Pursuant to 10CFR50.90, Houston Lighting & Power (HL&P) hereby proposes to amend its Operating License, NPF-71, by incorporating the attached proposed change into the Technical Specifications, Nureg-1255, for South Texas Unit 1. We would appreciate your expeditious review of this matter.

Specifically, the proposed change to Technical Specification 3.5.1 raises the upper limit on the accumulator boron concentration to match the upper limit on the RWST, which is 2700 ppm, allowing easier chemistry control.

Discussion

For South Texas Unit 1, the Technical Specification's maximum boron concentration for the RWST is 2700 ppm while the maximum concentration for the accumulator is 2600 ppm. Thus, the RWST boron concentration may exceed the current allowable limit for the accumulators. Since the RWST is the source of borated water for the accumulators, the higher allowable boron concentration limit could lead to a violation of the maximum boron concentration Technical Specification limit for the accumulators. To alleviate this possible violation, HL&P proposes to raise the South Texas Unit 1 accumulator boron concentration limit to 2700 ppm. The present accumulator boron concentration of 2600 ppm was chosen based upon LOCA, non-LOCA and sump pH analyses. The match up for accumulator and RWST boron concentration to allow easier chemistry control was inadvertently missed.

The Safety Evaluation for Significant Hazards Consideration associated with LOCA-related accident analyses is provided in Attachment 1, while a tabular summary of the results for each LOCA-related accident analyses is provided in Attachment 2. The Safety Evaluation for the Significant Hazards Consideration for Non-LOCA accidents and Sump pH is provided in Attachment 3.

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A Subsidiary of Houston Industries Incorporated

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Significant Hazards Consideration

The Commission has provided standards in 10CFR50.92(c) for determining whether a significant hazards consideration exists. A proposed amendment to an Operating License for a facility involves a no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in the margin of safety. HL&P has reviewed the proposed change and determined that:

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated because it does not constitute a change to the assumptions and bases for the FSAR accident analysis either in failure/accident initiation mode or accident mitigation mode. See also Attachments 1-3 for the Significant Hazards Consideration for LOCA, Non-LOCA and Sump pH analyses.
2. The proposed amendment does not create the possibility of a new or different kind of accident than previously evaluated for the reasons provided in one above.
3. The proposed amendment does not involve a significant reduction in the margin of safety because the Bases for the Technical Specification have not been changed and for the reasons provided in one above.

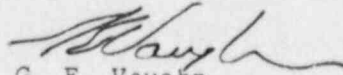
Based on the information contained in this submittal and the NRC Final Environmental Assessment for South Texas Units 1 & 2, HL&P has concluded that pursuant to 10CFR51, there are no significant radiological or non-radiological impacts associated with the proposed action and that the proposed license amendment will not have a significant effect on the quality of the human environment.

The South Texas Project Unit 1 Nuclear Safety Review Board has reviewed and approved the attached proposed revision to the Operating License.

In accordance with 10CFR50.91(b), HL&P is providing the State of Texas with a copy of this proposed amendment.

Pursuant to the requirements of 10CFR170.12 9c), enclosed with this amendment request is the application fee of \$150.00.

If you should have any questions on this matter, please contact Ms. F. A. White at (512) 972-7985.



G. E. Vaughn
Vice President
Nuclear Plant Operations

GEV/MK/lzs

- Attachment:
- 1) Safety Evaluation for an Increase in the Technical Specification Accumulator Boron Concentration for LOCA-related Analyses
 - 2) Tabular Summary of LOCA-related Analyses
 - 3) Safety Evaluation for Significant Hazards Consideration for Non-LOCA accidents and Sump pH.
 - 4) Proposed Technical Specification 3.5.1 and FSAR Table 6.3-1.
 - 5) Check No. 108131

Houston Lighting & Power Company

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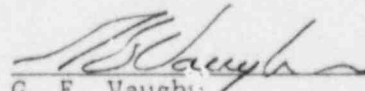
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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter)
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Houston Lighting & Power) Docket Nos. 50-498
Company, et al.,)
)
South Texas Project)
Units 1 and 2)

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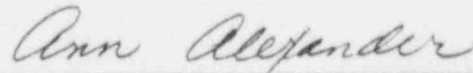
G. E. Vaughn being duly sworn, hereby deposes and says that he is Vice President, Nuclear Plant Operations, of Houston Lighting & Power Company; that he is duly authorized to sign and file with the Nuclear Regulatory Commission the attached proposed amendment to Technical Specification 3.5.1; is familiar with the content thereof; that the matters set forth therein are true and correct to the best of his knowledge and belief.



G. E. Vaughn
Vice President
Nuclear Plant Operations

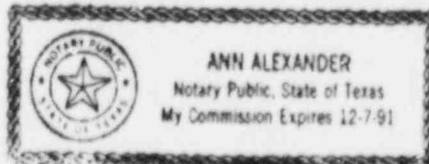
STATE OF TEXAS)
)
COUNTY OF MATAGORDA)

Subscribed and sworn to before me, a Notary Public in and for Matagorda County, Texas this *29th* day of *January*, 1988.



Notary Public in and for the State of Texas

My commission expires:



Attachment 1
SAFETY EVALUATION FOR AN INCREASE IN THE TECHNICAL
SPECIFICATION ACCUMULATOR BORON CONCENTRATION FOR LOCA-RELATED ACCIDENTS

LARGE BREAK LOCA - FSAR CHAPTER 15.6.5

The current FSAR large break LOCA analysis for South Texas Units was performed using the NRC approved 1981 Evaluation Model with BART. This analysis resulted in a Peak Clad Temperature (PCT) of 2127 °F for the double-ended cold leg guillotine (DECLG) break with a discharge coefficient of CD=0.6, under maximum safety injection flow conditions.

The large break LOCA analysis does not explicitly model the boron concentration level of the accumulators. Reactor trip occurs due to voids generated by the rapid depressurization associated with the large break transient. Though not modelled in the analysis any additional boron injected due to the increase in the technical specification concentration level would increase the margin by which the core is maintained in a subcritical condition.

The calculated PCT is not a function of the boron concentration level in the core. Thus, an increase in the accumulator boron concentration would have no adverse effect on the large break LOCA analysis results.

SMALL BREAK LOCA - FSAR CHAPTER 15.6.6

As with the large break analysis, the small break LOCA analysis for South Texas Units 1 and 2 does not take credit for the boron concentration level in the accumulators. Reactor trip occurs due to low pressurizer level and the reactor is maintained in a subcritical state by the control rods. Though not modelled in the analysis any additional boron injected due to the increase in the technical specification concentration level would increase the margin by which the core is maintained in a subcritical condition.

The calculated PCT is not a function of the boron concentration level in the core. Thus, an increase in the accumulator boron concentration would have no adverse effect on the small break LOCA analysis results.

STEAM GENERATOR TUBE RUPTURE (SGTR) - FSAR CHAPTER 15.6.3

For the steam generator tube rupture analysis in the South Texas FSAR, reactor trip and safety injection are assumed to occur due to low pressurizer pressure. Since the capacity of the high head safety injection pumps is greater than the break flow rate, RCS pressure will stabilize at the point where the break flow rate is equal to the SI flow rate. This equilibrium pressure and break flow rate are assumed to persist for 30 minutes, at which time it is assumed that the primary to secondary break flow is terminated.

Since the RCS pressure equilibrates well above the accumulator injection setpoint, accumulator injection does not occur for the SGTR analysis. Thus, an increase in the accumulator boron concentration limit will have no effect on the analysis results.

Attachment 1
SAFETY EVALUATION FOR AN INCREASE IN THE TECHNICAL
SPECIFICATION ACCUMULATOR BORON CONCENTRATION FOR LOCA-RELATED ACCIDENTS

HOT-LEG SWITCH OVER TO PREVENT POTENTIAL BORON PRECIPITATION - FSAR
CHAPTER 6.3.2.5

Post-LOCA hot leg recirculation switchover time is determined for inclusion in emergency operating procedures to ensure no boron precipitation in the reactor vessel following boiling in the core. This time is dependent on power level and the reactor coolant system (RCS), refueling water storage tank (RWST), and accumulator water volumes and boron concentrations. An increase in the maximum boron concentration level of the accumulator from 2600 ppm to 2700 ppm will result in a small increase in the sump average boron concentration; however, the change is less than 1.0% and will not affect the time to switchover to hot leg recirculation.

BLOWDOWN REACTOR VESSEL AND LOOP FORCES - FSAR CHAPTER 3.6

The blowdown hydraulic loads resulting from a loss of coolant accident are considered in Section 3.6 of the South Texas FSAR. The LOCA blowdown hydraulic loads generated within the first few seconds of the transient are not a function of the boron concentration level in the accumulators. It follows that an increase in the boron concentration level in the accumulators would have no effect on the LOCA hydraulic forces calculation.

POST-LOCA LONG-TERM COOLING REQUIREMENT TO MAINTAIN SUBCRITICALITY - FSAR
CHAPTER 15.6.5

The Westinghouse licensing position for satisfying the requirements of 10CFR Part 50 Section 50.46 Paragraph (b) Item (5) "Long Term Cooling" is defined in WCAP-8339. The Westinghouse Evaluation Model commitment is that the reactor will remain shut down indefinitely by borated ECCS water residing in the sump following the postulated LOCA and when SI switchover is accomplished. Since credit for the control rods is not taken for large break LOCA, the borated ECCS water provided by the accumulators and the RWST must have a boron concentration that, when mixed with other water sources, will result in the reactor core remaining subcritical, assuming all control rods out.

Since minimum boron concentration levels are assumed in the calculation, an increase in the maximum boron concentration level for the accumulators would not affect the calculation results. Thus, an increase in the maximum boron concentration limit will have no effect on the calculation of the post-LOCA RCS/sump boron concentration requirement to maintain subcriticality to ensure long-term core cooling as presented in the South Texas FSAR Section 15.6.5.

Attachment 1
SAFETY EVALUATION FOR AN INCREASE IN THE TECHNICAL
SPECIFICATION ACCUMULATOR BORON CONCENTRATION FOR LOCA-RELATED ACCIDENTS

CONTAINMENT MASS AND ENERGY RELEASES - CHAPTER 6.2

The effect of an increase in the accumulator boron concentration limit on the LOCA mass and energy release analyses has been evaluated for the South Texas Project.

The LOCA mass and energy release analyses do not explicitly model the accumulator boron concentration levels. The LOCA mass and energy release analysis results are not affected by boron concentration levels of the RWST or accumulators. Therefore, the LOCA mass and energy release analysis results will be unaffected by an increase in the accumulator boron concentration.

SOUTH TEXAS LONG TERM COOLING ANALYSIS - RESPONSE TO RSB QUESTIONS 440.38 and 440.39

The South Texas Long Term Cooling Analysis considered small RCS cold leg breaks and a feedline break. In two of the cases considered, accumulator injection did not occur. In the 1.5 inch break case, the RCS boron concentration would increase due to an increase in the accumulator boron concentration. Since this would result in higher shutdown margin, it follows that an increase in accumulator boron concentration level will have no effect on the analysis results.

ROD-EJECTION LONG TERM MASS RELEASES AND DOSE CALCULATIONS - FSAR TABLE 15.4-4 AND CHAPTER 15.4.8.3

A small break LOCA analysis is performed assuming a break in the upper head the size of a control rod drive shaft in order to determine the primary coolant mass released from the steam generator safety valves. This information is then used to compute the radiological consequences of a rod ejection accident.

The FSAR Rod-Ejection mass release calculations were performed using the WFLASH Evaluation Model. As with the large and small break LOCA analyses the rod-ejection analysis does not explicitly model the boron concentration levels of the RWST or accumulators. The mass releases calculated for the rod ejection analysis are not dependent on the amount of boron present in the RCS. It follows that there would be no change to the mass releases for an increase in the accumulator boron concentration. With no change in the mass releases, there would be no change in the dose calculation. Thus, the Rod-Ejection Long Term Mass and Energy Calculations would not be affected by an increase in accumulator boron concentration.

Attachment 2
SAFETY EVALUATION FOR AN INCREASE IN THE TECHNICAL
SPECIFICATION ACCUMULATOR BORON CONCENTRATION FOR LOCA-RELATED ANALYSIS

<u>FSAR CHAPTER</u>	<u>ACCIDENT DESCRIPTION</u>	<u>IMPACT ON RESULTS</u>
15.6.5	Large Break LOCA	No adverse effect. Maintain the PCT within the 10CFR50.46 limit.
15.6.5	Small Break LOCA	No adverse effect maintain significant margin to the 10CFR50.46 PCT limit.
15.4.8	Rod Ejection Long Term Mass and Energy Releases and Dose Calculations	No adverse effect on the integrated mass flow and integrated safety valve flow, which maintains the radiological consequences within the 10CFR100 exposure guidelines.
6.2	Containment Subcompartment and Long Term Mass and Energy Release	No adverse effect on mass and energy releases.
15.6.3	Steam Generator Tube Rupture	No adverse effect on mass releases.
3.6	Blowdown Reactor Vessel and Loop Forces	No adverse effect on the LOCA hydraulic forcing functions.
15.6.5	Post-LOCA Long Term Core Cooling	No adverse effect on the post-LOCA sump boron concentration.
6.3.2.5	Hot Leg Switchover to Prevent Potential Boron Precipitation	No adverse effect on the post-LOCA hot leg switchover time

Attachment 3
SAFETY EVALUATION FOR SIGNIFICANT HAZARDS CONSIDERATION
FOR NON-LOCA ACCIDENTS AND SUMP pH

Non-LOCA

The current licensing basis value for the boron concentration of the water in the accumulators is between 2400 and 2600 ppm as specified in Technical Specification (Tech Spec) section 3/4.5.1. This safety evaluation supports an increase in the upper limit to 2700 ppm (having the same upper limit as presently specified for the RWST (Tech Spec section 3/4.5.5)). According to the Tech Specs (section 3/4.5.1), the N_2 cover pressure limit on the accumulators is between 590 and 670 psig. The only non-LOCA licensing-basis events that could possibly be impacted by this limit change are the hypothetical steamline break transient and the steamline break mass/energy release in which the RCS depressurizes due to the massive cooldown created by the steam generator blowdown. A review of the current licensing-basis analysis for these events indicates that the minimum RCS pressure observed for the limiting transient is >1000 psia and the accumulators (which have passive actuation) do not actuate. Thus, there is no impact on the results of either analysis due to an increase in the maximum boron concentration in the accumulators. Because the results of the steamline break events (core response and mass/energy release) are unaffected by this change, and because no other non-LOCA licensing-basis event is affected, the conclusions in the FSAR with respect to DNBR, RCS pressure, fuel/cladding temperatures and secondary side mass/energy release remain valid.

Sump pH

In connection with increasing the upper limit of the accumulator boron concentration, the impact of this change on the sump pH at the Emergency Core Cooling System switch-over point has to be evaluated. It was determined that the boron concentration has a negligible effect on the sump pH at the switch-over point and in the long term. For all cases evaluated, the sump pH at the switchover point is greater than the 7.5 pH criteria stated in the Final Safety Analysis Report, Section 6.2.

The effect on LOCA related analysis of increasing the maximum boron concentration level from 2600 ppm to 2700 ppm has been evaluated in Attachment 1. The results of the evaluation showed that for the LOCA related accidents there would be no adverse effect on the analysis results.

The modification of the Safety Injection Accumulator maximum allowable boron concentration from 2600 ppm to 2700 ppm has a negligible effect on the pH of the sump. Operation with this maximum allowable boron concentration does not increase the probability of occurrence or the consequences of an accident nor malfunction of equipment important to safety previously evaluated in the FSAR. Nor does it create the possibility for an accident or malfunction of a different type than any evaluated in the FSAR or decrease the margin of safety as defined in the basis for any technical specification. Therefore, operation with this maximum allowable boron concentration does not involve an unreviewed safety question.