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

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Response to the Request for Additional Information Concerning
the proposed Amendment to Technical Specification 3.1.1.1

Reference: Letter, ST-HL-AE-4222 from W. H. Kinsey, Jr. to the USNRC Document Control Desk, dated September 28, 1992

Enclosed, Attachment 1, is the response to the request for additional information concerning the above referenced letter. The information was requested by the NRC during a telephone conference on October 26, 1992. The safety evaluation for the proposed revision to the shutdown margin has been clarified as we discussed. Clarifications are marked by a "change bar" in the left column of the text.

If you should have any questions concerning this matter, please contact Mr. A. W. Harrison at (512) 972-7298 or me at (512) 972-7205.

William J. Jump

William J. Jump
General Manager,
Nuclear Licensing

SDP/ag

Attachment: Safety Evaluation for the Proposed Revision to the Shutdown Margin, Revision 1

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Safety Evaluation for the Proposed Revision to the Shutdown Margin Revision 1

1.0 Summary

Two licensing changes are proposed to the South Texas Project Technical Specifications. The first change is to replace the variable shutdown margin requirements for Modes 1 and 2 with a constant value. The intent of the variable shutdown margin is to prevent the loss of shutdown margin during a boron dilution accident only in Modes 3 and 4. The shutdown margin requirement for Modes 1 and 2 is a constant value of 1.75% $\Delta\rho$. This submittal does not propose a change to the licensing basis for the shutdown margin for Modes 1 and 2.

The second change clarifies when an overall reactivity balance is to be performed to confirm core design predictions, and hence validate shutdown margin.

The effects of the proposed changes do not pose a significant increase in hazards.

2.0 Purpose

The first proposed change replaces the variable shutdown margin requirements for Modes 1 and 2 with a constant value. The shutdown margin requirement for Modes 1 and 2 should not have been included in Figure 3.1-1. The presence of the variable shutdown margin requirements for Modes 1 and 2 places an unnecessary restriction on the design of the reactor core at beginning of life conditions.

A change is also requested to the surveillance Specification 4.1.1.1.2. This change reflects the fact that a measured reactivity balance can only be performed when the reactor is critical.

3.0 Description of Change

The proposed change to the shutdown margin specification constitutes a correction in the manner in which the shutdown margin for Modes 1 and 2 are presented in Technical Specification 3.1.1.1. The variable shutdown margin for Modes 1 and 2 is replaced by a single value of 1.75% $\Delta\rho$. The shutdown margin for Modes 3 and 4 remains unchanged.

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Since a measured reactivity balance can only be performed when the reactor is critical, a statement is added to Specification 4.1.1.1.2 which states that the provisions of Specification 4.0.4 are not applicable.

The proposed changes modify Figure 3.1-1 of Technical Specification 3.1.1.1 and add a sentence to Specification 4.1.1.1.2. These changes are shown on the marked-up Technical Specification section in Attachment 3.

4.0 Safety Evaluation

The purpose of this section is to discuss the impact of the proposed change on the design and licensing basis of the plant.

As described in the BASIS for Specification 3.1.1.1, the most restrictive condition in Modes 1 and 2 occurs at end of life (EOL), with T_{avg} at no load operating temperature, and is associated with a postulated steam line break accident and resulting reactor coolant system (RCS) cooldown. For the South Texas Project, a minimum shutdown margin of 1.75% $\Delta\rho$ is required to control the reactivity transient.

The presence of the variable shutdown margin requirements for Modes 1 and 2 places an unnecessary restriction on the design of the reactor core at beginning of life conditions. The use of longer fuel cycles will cause the reactor core to be more reactive at beginning of life (BOL). This, in turn, causes the "all rods in" (minus the most reactive stuck rod) critical boron concentration to increase at beginning of life. By using the current Figure 3.1-1 of Technical Specification 3.1.1.1, additional shutdown margin over 1.75% $\Delta\rho$ is required for critical boron concentrations over 900 ppm. Since the safety analyses were performed using a constant shutdown margin of 1.75% $\Delta\rho$, any increase in shutdown margin over 1.75% $\Delta\rho$ does not increase the margin to safety. Likewise, the proposed modification of Figure 3.1-1 does not reduce the margin to safety for Modes 1 and 2.

For Modes 3 and 4, the most restrictive condition occurs at beginning of life when the boron concentration is greatest. In these modes, the required shutdown margin is composed of a constant requirement and a variable requirement, which is a function of the RCS boron concentration. The constant shutdown

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margin requirement of 1.75% $\Delta\rho$ is based on an uncontrolled RCS cooldown from a steamline break accident. The variable shutdown margin requirement is based on results of a boron dilution accident analysis, where the shutdown margin is varied as a function of RCS boron concentration, to guarantee a minimum time for operator action after a boron dilution alarm.

Therefore, based on the above, the shutdown margin requirements for Modes 1 and 2 are separable from those for Modes 3 and 4.

Additionally, Technical Specifications 3.1.3.1 (control rod operability and alignment), 3.1.3.5 (shutdown rod insertion limits), and 3.1.3.6 (control rod insertion limits) establish conditions which restrain shutdown margin to within safety analysis assumptions for Modes 1 and 2. The conditions are in terms which pertain to routine reactor operation (control rod alignment and insertion limits). These specifications also define specific surveillance requirements and specific means to accomplish the surveillance. If a shutdown margin verification is required, that action is specified in these specifications. Specifications 3.1.3.1, 3.1.3.5, and 3.1.3.6 are, in essence, an expansion of Specification 3.1.1.1, specifically for Modes 1 and 2.

The proposed change does not constitute a change to the design basis of the plant since the design limit for Modes 1 and 2 remain at 1.75% $\Delta\rho$.

Specification 4.0.4 states that "entry into an Operational Mode ... shall not be made unless the Surveillance Requirement(s) associated with the Limiting Condition for Operation has been performed within the stated surveillance interval or as otherwise specified." As Surveillance Specification 4.1.1.1.2 is currently written, Specification 4.0.4 would require that a core reactivity balance be performed for all Operational Mode evolutions for which Specification 3.1.1.1 is applicable. However, since the reactor must be in a critical condition for a core reactivity balance to be performed, it is not possible to perform the surveillance for all evolutions. Therefore, Surveillance Specification 4.1.1.1.2 is modified to be exempted from the requirements of Specification 4.0.4.

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The effect of exempting Surveillance Specification 4.1.1.1.2 from the requirements of Specification 4.0.4 would mean that a reactivity balance would not be performed as the reactor is brought from Mode 5 to 4, 4 to 3, 3 to 2, and 2 to 1. Performing a reactivity balance in Modes 3, 4 and 5, and prior to criticality in Mode 2 is not physically possible. As part of a normal reactor startup process, an Estimated Critical Condition (ECC) is performed. If the ECC is in error by a specified amount, plant procedures are followed to ascertain the source of the error and to take appropriate action.

The performance of the ECC provides the first confirmation of the analytical predictions. This effectively proves the validity of the analytical predictions in place of the reactivity balance surveillance. The first reactivity balance performed as a formal surveillance is done at a stable power in Mode 1. The surveillance is performed at stable conditions to minimize errors in the comparison to analytical predictions.

The proposed change in the surveillance requirement does not affect the accuracy of the parameters used in the shutdown margin calculation performed for Specification 3.1.1.1.

The proposed changes do not constitute a change to the design basis of the plant.

5.0 Conclusion

The proposed changes to the Technical Specifications, as described above, are acceptable because the proposed changes to shutdown margin for Modes 1 and 2 do not pose a significant increase in hazard or involve a significant reduction in a margin of safety. HL&P requests approval of the proposed changes.