



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 23, 1996

Mr. William T. Cottle
Group Vice-President, Nuclear
Houston Lighting & Power Company
South Texas Project Electric
Generating Station
P. O. Box 289
Wadsworth, TX 77483

SUBJECT: RESOLUTION OF NRC BULLETIN 88-08, "THERMAL STRESSES IN PIPING
CONNECTED TO REACTOR COOLANT SYSTEMS," SOUTH TEXAS PROJECT,
UNITS 1 AND 2 (STP) (TAC NOS. M93822 AND M93823)

Dear Mr. Cottle:

On September 21, 1990, Houston Lighting and Power Company (HL&P) provided a revised response to Bulletin 88-08 and referenced Westinghouse (W) report WCAP-12598, "NRC Bulletin 88-08 Evaluation of Auxiliary Piping for South Texas Project Units 1 and 2," dated May 1990 (proprietary). In this report, which HL&P later submitted on November 5, 1990, W concluded that the ASME Section III Class 1 design fatigue allowable would not be exceeded during the life of the plant for the normal charging, alternate charging and the auxiliary spray lines, if these lines were subjected to thermal stratification and cycling due to isolation valve leakage. HL&P had previously installed temperature monitoring instrumentation at both units, in accordance with the second option of Action 3 of Bulletin 88-08. This action requests that licensees plan and implement a program to provide continuing assurance that unisolable sections of piping connected to the reactor coolant system (RCS) will not be subjected to cyclic thermal loading, associated with leaking isolation valves, which when combined with plant operational cyclic loading could cause fatigue failure during the remaining life of the unit. W considered its evaluation as providing the required assurance, and recommended that HL&P discontinue temperature monitoring of these lines.

By letter dated September 23, 1992, the staff issued a safety evaluation (SE) which identified a number of concerns and technical issues regarding the W analysis, and indicated that insufficient justification was presented to discontinue temperature monitoring of these lines. On November 8 and 9, 1993, the staff, and its consultant, Brookhaven National Laboratory (BNL), met in Monroeville, PA, with representatives of HL&P, W and the Electric Power Research Institute (EPRI), for the purpose of discussing and resolving the technical issues identified by the staff in its SE. At this meeting, W provided information regarding the revised response, and indicated that it was based on aspects of an analytical methodology developed by W under a program sponsored by EPRI to investigate Thermal Stratification, Cycling and Striping (TASCS). By letter dated November 30, 1993, HL&P provided Supplement 1 to WCAP-12598, (proprietary). This report formally documented the material presented by HL&P and W at the Monroeville meeting. In addition, the report

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states that a fatigue evaluation, assuming a worst-case scenario for valve leakage and cycling, was performed for these lines. The evaluation showed the fatigue adequacy of these lines to be on the order of 10 years.

By letter dated April 11, 1994, the staff accepted HL&P's interim response to Bulletin 88-08, regarding the action to provide continuing assurance for the life of STP. This letter stated that the staff would continue to review this issue on a generic basis, and that upon completion, it may provide a plant-specific safety evaluation regarding long-term operation.

On September 30, 1994, EPRI provided a proprietary report to the staff, TR-103581, titled "Thermal Stratification, Cycling, and Striping (TASCS)", dated March 1994. This report was prepared by W and discusses the TASCS program and methodology, and was provided as supplementary information to WCAP-12598, Supplement 1.

The staff has evaluated Supplement 1 to WCAP-12598 and the additional information provided in the EPRI TASCS report, and has identified the following potential weaknesses in the testing which forms the basis for the TASCS methodology:

- The tests may not have identified all significant thermo-hydraulic phenomena which may contribute to thermal fatigue in the unisolable piping. Phenomena associated with turbulent penetration and described in the literature, such as helicoidal flow, have not been detected in these tests.
- No correlation has been presented between the tests and the known failure cases at Farley, Tihange and Genkai. The tests performed under the TASCS program do not correspond to the plant operating conditions described in Bulletin 88-08. The root cause of the failures at Farley and Tihange is as yet considered unidentified.

In addition, the staff has also identified other deficiencies in the TASCS methodology, as stated in detail in the SE. On this basis, the staff concludes that HL&P has not provided the requested assurance of Action 3 of Bulletin 88-08 against inadvertent leakage in the unisolable segments of the charging lines and auxiliary pressurizer spray systems at STP. HL&P should check for potential leakage in these systems, and either reestablish the previous temperature monitoring program at both units, or implement other acceptable monitoring programs that could satisfy the provisions of Action 3 of Bulletin 88-08, for the life of the plant, and provide a description of their actions to the staff.


Pursuant to 10 CFR 2.790, the staff has determined that the enclosed SE does not contain proprietary information. However, the staff will delay placing the SE in the public document room for a period of thirty (30) days from the date of this letter to provide you with the opportunity to

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comment on the proprietary aspects only. If you believe that any information in the enclosure is proprietary, please identify such information line-by-line and define the basis to the criteria of 10 CFR 2.790.

Sincerely,



Thomas W. Alexion, Project Manager
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Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Enclosure: Safety Evaluation

cc w/encl: See next page

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