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Houston Lighting & Power South Texas Project Electric Generating Station P. O. Box 289 Wadsworth, Texas 77483

January 28, 1997
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File No.: G03.08
10CFR50.54(f)

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

South Texas Project
Units 1 and 2
Docket Nos. 50-498, STN 50-499
120-Day Response to Generic Letter 96-06,
"Assurance of Equipment Operability and Containment
Integrity During Design-Basis Accident Conditions"

Reference: Letter from T. H. Cloninger, Houston Lighting & Power, to U.S. Nuclear Regulatory Commission, dated October 29, 1996 (ST-HL-AE-5501)

In the referenced letter, the South Texas Project committed to provide a written summary report in response to Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions." As requested in Generic Letter 96-06, the attached summary report addresses the impact of :

- Waterhammer or two-phase flow conditions during postulated accident conditions on containment air cooler cooling water systems, and

- Overpressurization of piping due to thermal expansion of fluid in piping systems that penetrate the containment.

Review of the South Texas Project design and operating conditions has determined that potential impact of water hammer or two-phase flow conditions in the containment air cooler cooling water systems during postulated accident conditions is enveloped by plant design. Therefore, this condition does not affect operability of the South Texas Project.

Evaluation of the overpressurization issue identified one containment penetration that could have, under conservatively postulated conditions, resulted in piping stresses exceeding ASME Code stress limits. Compensatory actions were promptly implemented to alleviate the potential for piping overpressurization. The affected piping was subsequently insulated to preclude excessive piping stress under postulated accident conditions. Analysis has shown that this condition would not have resulted in loss of containment integrity in a design basis event. The

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Nuclear Regulatory Commission was notified of the results of this evaluation by telephone on January 23, 1997.

The attached summary report provides a description of:

- Actions taken in response to the actions requested in the Generic Letter;
- Conclusions that were reached relative to susceptibility for water hammer and two-phase flow in the containment air cooler cooling water system and overpressurization of piping that penetrates containment;
- The basis for continued operability of affected systems and components as applicable; and
- Plant design changes that will be implemented and enhancements that will be considered.

If there are any questions, please contact either Mr. P. L. Walker at (512) 972-8392 or me at (512) 972-8787.

T. H. Cloninger
Vice President,
Nuclear Engineering

PLW/
Attachment: Response to Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions"

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
Houston Lighting & Power	)	Docket Nos. 50-498
Company, et al.,	)	50-499
	)	
South Texas Project	)	
Units 1 and 2	)	

AFFIDAVIT

I, T. H. Cloninger, being duly sworn, hereby depose and say that I am Vice President, Nuclear Engineering, of Houston Lighting & Power Company; that I am duly authorized to sign and file with the Nuclear Regulatory Commission the attached response to NRC Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design - Basis Accident Conditions"; that I am familiar with the content thereof; and that the matters set forth therein are true and correct to the best of my knowledge and belief.

T.H. Cloninger
Vice President,
Nuclear Engineering

STATE OF TEXAS)
)
COUNTY OF MATAGORDA)

Subscribed and sworn to before me, a Notary Public in and for the State of Texas, this 28th day of January, 1997.

LINDA RITTENBERRY
Notary Public, State of Texas
My Commission Expires 10/9/97

Notary Public in and for the
State of Texas

Response to Generic Letter 96-06,
"Assurance of Equipment Operability and Containment
Integrity During Design-Basis Accident Conditions"

Action 1:

Determine if containment air cooler cooling water systems are susceptible to either waterhammer or two-phase flow conditions during postulated accident conditions.

Response:

At the South Texas Project, containment air cooling is provided by the Reactor Containment Fan Cooler System. Under normal conditions, cooling is provided to the Reactor Containment Fan Coolers using the Reactor Containment Building Chilled Water System.

In the event of a design basis accident coincident with a Loss of Offsite Power, the source of cooling water to the Reactor Containment Fan Cooler cooling coils is switched from the Reactor Containment Building Chilled Water System to the Component Cooling Water System. Loss of electrical power to the Component Cooling Water pump will result in a decrease in flow through the Reactor Containment Fan Coolers. An analysis by the South Texas Project determined that the Component Cooling Water temperature in the Reactor Containment Fan Cooler cooling coils could rise to approximately 240°F due to high temperature containment air being drawn across the coils as the fan is coasting down until power is restored to the cooling systems by means of the Standby Diesel Generators. However, due to the installed static head in the Component Cooling Water System, the temperature will remain below saturated conditions. Therefore, void formation within the Reactor Containment Fan Cooler cooling coils will not occur under the postulated conditions.

A hydraulic network analysis was performed to assess the impact of the elevated temperature of the Component Cooling Water in the Reactor Containment Fan Coolers. After the Component Cooling Water pump is sequenced on, the hot Component Cooling Water passes through the Reactor Containment Fan Cooler outlet throttle valve. The pressure drop across the throttle valve is sufficient to reduce the local pressure below the vapor pressure of the hot water, causing the water to flash to steam and decrease the flow rate at the valve throat. For a worst case condition, the predicted decrease in Component Cooling Water flow through a Reactor Containment Fan Cooler Train is approximately 18% less than the 1800 gallons per minute assumed in the accident analyses. Also, decreasing the flow through this valve may result in hydraulic transients in the upstream piping.

The South Texas Project performed an analysis to assess the impact of the reduced Component Cooling Water flow through the Reactor Containment Fan Coolers on the containment pressure

and temperature response. The results of the analysis show that resulting containment pressure and temperature are bounded by the containment equipment qualification requirements. Furthermore, there is no adverse impact on the containment structure. Therefore, the reduced Component Cooling Water flow does not affect operability of South Texas Project Units 1 and 2.

The South Texas Project analyzed the hydraulic transient that may occur as a result of the decreased Component Cooling Water flow. The results of the analysis showed that piping and supports impacted by the hydraulic transient forces are capable of withstanding the additional transient loads and meet the ASME Code requirements.

The South Texas Project performed a 10CFR50.59 safety evaluation of the above conditions and determined that they do not represent an Unreviewed Safety Question.

Action 2:

Determine if piping systems that penetrate the containment are susceptible to thermal expansion of fluid so that overpressurization of piping could occur.

Response:

The South Texas Project evaluated piping systems that penetrate the containment on Units 1 and 2. The evaluation identified ten lines on each unit that could potentially be susceptible to thermal expansion of fluid with resultant piping overpressurization. These lines (with the Unit 1 line designators) are identified in the table below.

Line	Line #	Function
1	8"RH-1204	Returns water from reactor cavity to the Refueling Water Storage Tank during refueling
2	8"RH-1304	Returns water from reactor cavity to the Refueling Water Storage Tank during refueling
3	2" ED-1124	Containment normal sump drain to Liquid Waste Processing System
4	1" PS-1005	Upper pressurizer sample line
5	1" PS-1016	Lower pressurizer sample line
6	1" PS-1002	Reactor Coolant System hot leg sample line
7	1" PS-1003	Residual Heat Removal System loop sample line
8	1" PS-1004	Safety Injection System sample line
9	3/4" SI-1321	Safety Injection System test line
10	3"WL-1009	Reactor Coolant Drain Tank drain line to Liquid Waste Processing System

Lines 1 through 9 were found acceptable due to inherent design features of the containment isolation valve(s) installed on each line. Most of the subject lines' containment isolation valves are spring-loaded valves; i.e., the valve's disc or plug is forced against the valve seat by a spring. As the trapped fluid expands, the resultant pressure acting against the valve disc compresses the spring. Therefore, the valve will relieve water in sufficient quantity to preclude an overpressure condition. Evaluation of other types of containment isolation valves has determined that the valves will self-relieve through disc-to-seat leakage, body-to-bonnet joint leakage, or packing gland joint leakage. The South Texas Project is evaluating the adequacy of these designs as a long term solution for overpressurization. Based on the results of this evaluation, the South Texas Project will incorporate this feature into the design basis, install thermal relief measures, or provide other means to ensure overpressurization will not occur.

Line 10 was an uninsulated line used to drain the Reactor Coolant Drain Tank to the Liquid Waste Processing System. Conservative analysis of the uninsulated line identified a potential overpressurization condition during a design basis accident that could result in piping stresses exceeding ASME Code limits. To ensure operability of this piping, it was drained and an alternate means of draining the Reactor Coolant Drain Tank was established. Additional analysis showed that piping stress limits would not be exceeded if the line were insulated. Subsequently, a design change installed insulation on the piping and the line was returned to service.

None of the identified conditions would have resulted in loss of containment integrity in a design basis accident.