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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 1 TO

FACILITY OPERATING LICENSE NO. NPF-76

HOUSTON LIGHTING & POWER COMPANY

SOUTH TEXAS PROJECT, UNIT 1

DOCKET NO. 50-498

1.0 INTRODUCTION

By letters dated May 23, 1988, Houston Lighting & Power Company, (HL&P, the licensee) requested an amendment to the Technical Specifications (TSs) appended to Facility Operating License No. NPF-76 for South Texas Project, Unit 1 (STP-1). The proposed amendment would delete all references to Excessive Cooldown Protection and associated items. Background information was contained in HL&P letter dated April 18, 1988. Additional information was provided in HL&P letter of May 18, 1988.

2.0 DISCUSSION

Excessive cooldown protection, as presently installed on South Texas Project, consists of Safety Injection actuation and steamline isolation from two out of three low-low compensated T-cold signals from any loop with the reactor tripped or below 10% power, feedwater isolation and turbine trip from two out of three low compensated T-cold signals in any loop with reactor tripped or below 10% power or from two out of three high feedwater flow signals in any loop with the reactor tripped or below 10% power, interlocked with two out of four RCS low flow signals or two out of four low T-avg signals.

Excessive cooldown protection was in the original design of South Texas Project to prevent the Reactor from returning critical subsequent to a steam system piping failure or inadvertent opening of steam generator relief or safety valve, or excessive main feedwater addition. South Texas Project has subsequently adopted NRC approved licensing criterion which permits return to criticality following the above mentioned events. The analyses for these events as described in Chapter 15 of the FSAR shows the possibility of return to criticality following these events. Two portions of the original excessive cooldown protection, emergency boration system and main steam isolation on any safety injection, were deleted prior to issuance of the operating license for South Texas Project, Unit 1.

On March 30, 1988, STP-1 experienced a loss of offsite power, a reactor trip, and safety injection event. In reviewing the event, the licensee determined that the Low-Low Compensated T-Cold Excessive Cooldown Protection circuitry will initiate a safety injection actuation if charging flow is maintained after the Reactor Coolant Pumps stop or trip. This condition is unique to the STP design as a result of the inclusion of excessive cooldown protection circuitry. This condition is considered to be undesirable since it results in unwarranted cycling of safeguards equipment and complicates the response to less significant events. The licensee concludes that anytime the Reactor Coolant Pumps are stopped while charging flow is maintained, a safety injection actuation will occur due to excessive cooldown protection.

Not only is this an undesirable situation during normal operation but, the condition creates a special problem for conducting two required tests; the shutdown from outside the Control Room test, and the loss of offsite power (LOOP) test. During both of these tests, the conditions will be present in which the excessive cooldown protection can be expected to cause a safety injection (SI) actuation. Conducting the tests with the excessive cooldown protection in place will cause the operators to mitigate a safety injection as part of the tests. This is beyond the scope of the tests and significantly complicates plant response.

3.0 EVALUATION

The staff has reviewed the licensee's evaluation of removal of the excessive cooldown protection on the appropriate accident analyses.

3.1 Inadvertent Opening of a Steam Generator Relief or Safety Valve causing a Depressurization of the Main Steam System (FSAR Chapter 15.1.4)

Although safety injection will no longer actuate from two out of three low-low compensated T-cold in any loop, it will actuate from two out of three low compensated steamline pressure signals from any loop or from two out of four low pressurizer pressure signals. In addition, redundant action will close the main feedwater valves following a reactor trip and a Safety Injection signal will rapidly close all feedwater control valves and feedwater isolation valves and trip the main feedwater pumps. Closure of the fast-acting main steam isolation valves (MSIVs) will be accomplished from either low compensated steamline pressure above the P-11 setpoint, or from high negative steamline pressure rate signal below the P-11 setpoint. The original analyses for these events show that safety injection is initiated by low pressurizer pressure. No credit is taken in the original analysis for mitigation from the excessive cooldown protection.

3.2 Steam System Piping Failures Inside Or Outside Containment (FSAR Chapter 15.1.5)

Although Safety Injection will no longer actuate from two out of three low-low compensated T-cold in any loop, it will actuate from 2 out of 3 low compensated steamline pressure signals from any loop, from two out of four low pressurizer pressure signals, or from two out of three high containment pressure signals. In addition, redundant isolation of the

main feedwater flow is provided, in that normal control action will close the main feedwater valves following a reactor trip and a Safety Injection signal will rapidly close all feedwater control valves and feedwater isolation valves and trip the main feedwater pumps. Closure of the fast-acting main steam isolation valves (MSIVs) will be accomplished from either low compensated steamline pressure above the P-11 setpoint, from high negative steamline pressure rate signal below the P-11 setpoint, or from two out of three High-2 containment pressure signals. The original analyses for these events show that safety injection is initiated by low steam line pressure. No credit is taken in the original analysis for mitigation from the excessive cooldown protection.

3.3 Mass and Energy Release for Postulated Secondary System Pipe Ruptures Inside the Containment

No credit was taken in the original analysis for mitigation of the consequences from actuation of excessive cooldown protection.

The deletion of excessive cooldown protection (which results in a protection system functionally equivalent to RESAR 3S Protection Systems) does not have any effect upon the probability of occurrence of a malfunction of equipment important to safety in that the only physical changes on equipment important to safety is the deletion of the actuation signals from the protection system. The reduction in unnecessary cycling of Engineered Safeguards Equipment will have a positive effect upon reducing the potential of malfunction of equipment important to safety.

3.4 Implementation of Circuitry Changes

During a meeting on May 6, 1988, the licensee proposed that the simplest method to delete the Excessive Cooldown Protection is by cutting the signal wires from the Process Instrument Cabinet to the ESFAS Cabinet. All of the logic circuit boards within the ESFAS cabinet will not be replaced until the first refueling. All the surveillance test provision will not be changed except the monthly analog Channel functional test procedure will be modified to indicate the disconnection between the process instrument cabinet and the ESFAS Cabinet. The T-cold analog signal which provides monitoring function will be maintained. The intertie between the process instrument cabinet and the ESFAS Cabinet is the relay to contact connection. Cutting signal wires will not affect the logic circuit operation inside the ESFAS Cabinet. Any malfunction within the ESFAS Cabinet still can be detected by the surveillance test provision. No jumpers or lifting leads are required to accomplish this modification. Therefore, the staff finds that the proposed circuitry changes are acceptable.

4.0 EMERGENCY CIRCUMSTANCES

After the March 30, 1988 event, an analysis determined the root cause. The licensee then directed the vendor, Westinghouse, to consider the

options and propose a solution. This required a review of the original design basis for the excessive cooldown actuation circuitry and the impact of its removal on the FSAR analyses. Westinghouse completed its review and made a recommendation on May 14, 1988. The licensee expedited the TS change request review through both the Plant Operations Review Committee and the Nuclear Safety Review Board. Approval of the TS change is needed in order to avoid a delay in the plant testing and startup. The affected power ascension tests, LOOP and shutdown outside the control room are scheduled to begin by midnight, May 24, 1988 with the reactor at 30% power. Attempting to conduct the tests prior to the removal of the excessive cooldown protection is expected to result in SI actuation which will complicate the conductance of the tests, may obscure some of the results. The SI actuation will cause an additional challenge to the system and an additional transient on the plant. Using the normal procedures for processing the TS change will result in a delay in the startup schedule.

5.0 NO SIGNIFICANT HAZARDS CONSIDERATION

The Commission's regulation in 10 CFR 50.92 state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if the operation of the facility in accordance with the amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or
(2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or
(3) Involve a significant reduction in a margin of safety.

The evaluation in Section 3.0 shows that deletion of the excessive cooldown protection will have no effect on the probability and no significant effect on the consequences of any of the accidents previously evaluated. The proposed change does not create a possibility of a new or different accident, and does not affect any margins of safety.

Based on the above evaluation, the staff concludes that operation of the facility in the proposed manner would not involve a significant increase in the probability or consequences of an accident previously evaluated, would not create the possibility of a new or different kind of accident from any accident previously evaluated, and would not involve a significant reduction in a margin of safety.

Accordingly, we conclude the amendment involves no significant hazards consideration.

6.0 STATE CONSULTATION

In accordance with the Commission's regulations, consultation was held with the State of Texas by telephone. The State expressed no concern from both the standpoint of safety and the standpoint of the no significant hazards consideration determination.

7.0 ENVIRONMENTAL CONSIDERATION

The amendment involves a deletion of the excessive cooldown protection circuitry. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposures. The Commission has made a final no significant hazards consideration finding with respect to this amendment. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Section 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

8.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: May 24, 1988

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