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Docket No. STN 50-498/499

BCC: ACRS (16)
NSIC
TERA

Mr. G. W. Oprea, Jr.
Executive Vice President
Houston Lighting and Power Company
P. O. Box 1700
Houston, Texas 77001

Dear Mr. Oprea:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION

As a result of our continuing review of the South Texas Project FSAR, we find that we need additional information to complete our evaluation. The specific information required is in the area of instrumentation and control systems and is listed in the Enclosure to this letter.

To maintain the review schedule it is important for you to respond to this request promptly. Since this portion of the review is being conducted for the staff at ORNL, please provide a copy directly to J. Anderson concurrent with your submittal to NRC.

Please inform us when you plan to submit your responses to this request. If you desire any discussion or clarification of the enclosed request, contact D. Sells, (301) 492-7792, the Project Manager.

Sincerely,

Original signed by

Robert L. Tedesco, Assistant Director
for Licensing
Division of Licensing

Enclosure:
As stated

cc w/enclosure:
See next page

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OFFICE	LB #2/DL	LB #2/DL	A/D:LIC/DL			
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ENCLOSURE
REQUEST FOR ADDITIONAL INFORMATION

32.0 INSTRUMENTATION AND CONTROL SYSTEMS BRANCH

32.24 Please provide a discussion of how your design conforms to the following Regulatory Guides identified in the standard review plan Section 7.1.

(1) R. G. 1.12, Instrumentation for Earthquakes

(2) R. G. 1.45, Reactor Coolant Pressure Boundary Leakage Detection Systems

(3) R. G. 1.67, Installation of Overpressure Protection Devices.

32.25 In Section 7.1.2.6, conformance to Regulatory Guide 1.47 is discussed. Provide justification for not including in the list, the safety-related systems, such as the Containment Recirculation and Ventilation System, the Battery Room Ventilation System, the Fuel Handling Building Ventilation System, and the Chill Water System.

32.26 In accordance with the Standard Review Plan Section 7.1, please cross reference in Table 7.1-1 the discussions presented in Sections 7.4, 7.5 and 7.7 describing conformance to IEEE Std. 279-1971.

32.27 With regard to remote shutdown panels, describe the criteria for the installation and routing of instrumentation and control circuitries between these panels and the main control room control boards.

32.28 In Section 7.2.1.1.3 it is stated that the manual trip consists of two switches with two outputs on each switch. One output from each switch is used to actuate the train A trip breaker while, the other output actuates the train B trip breaker. Explain how this design: (a) satisfies the Single Failure Criterion for redundant trains and (b) satisfies the separation requirements for redundant trains.

32.29 Describe the Reactor Coolant System Wide Range Pressure Measurement System including number of sensors, manufacturer, Model number, sensor location and installation arrangements. If the sensors are located outside the containment, describe how this system design conforms to recommendations of R. G. 1.11 (Instrument Lines Penetrating Primary Reactor Containment) or justify any exceptions taken.

32.30 It is stated in Section 7.2.2.2.3 that the power range channels are tested by superimposing a test signal on the detector signal being received by the channel at the time of testing.

Based on this information, we are unable to conclude that the power range high neutron flux rate reactor trip circuitry is adequately tested to verify its performance capability. Provide a detailed discussion of how this portion of the nuclear instrumentation is periodically tested.

32.31 Describe the design basis, and separation and isolation criteria for: (a) "Reactor trip on turbine trip" circuitry. Also provide detailed cable routing diagrams for this trip circuitry from the sensor in the turbine building to the final actuation located in the reactor trip system. (b) the circuitries from Reactor Trip System to the BOP devices in the Turbine/Auxiliary Building.

32.32 Identify all remotely controlled valves in the Engineered Safety Features ~~Systems~~ which require power lockout during a certain mode of operation of the system to satisfy single failure criterion. It is the staff's position that your design should also satisfy the Branch Technical positions EICB-4 and EICSB-18. Provide detailed descriptions, with schematic diagrams for the circuitry associated with these valves, illustrating how the above stated staff positions are satisfied in the design.

32.33 Figure 10.4.9-1 does not provide sufficient information on control aspects pertaining to the auxiliary feedwater system. Provide a description of the instrumentation and controls associated with the automatic actuation of the auxiliary feedwater system. Provide analyses including a failure mode and effects analysis for the electrical, instrumentation and control portion of the system to demonstrate how the requirements of IEEE Std 279-1971 are satisfied.

32.34 Provide the results of analyses to show that your design of the initiation, actuation and control portions of the Main Steam Isolation Systems will perform their functions assuming any single failure in the instrumentation and control system following a steam line break accident. In this plant, redundant Main Steam Isolation Valves (MSIV) for each steam line are not provided. Therefore, these analyses must include the initiation, control and actuation systems for the Turbine Stop valves and any other valve in the main steam system downstream of the MISVs, since they perform the redundant isolation function in each steamline. These analyses shall demonstrate that the initiation, control and actuation circuits for both the MSIV's and the Turbine Stop Valve and the valves downstream of the MSIV will meet the Single Failure criterion with respect to isolation of the broken main steam line.

32.35 Identify all instrumentation and control circuits and components (both safety and non-safety) that may become submerged as a result of a LOCA. For all such components and circuits that are not qualified for service in such an environment, provide the results of an analysis to determine the following: (1) the safety significance of the failure of the components and circuits (e.g. spurious operation, loss of function, loss of accident/post accident monitoring, etc.) as a result of flooding. (2) the proposed design changes, if any, resulting from your analysis.

32.36 Describe the automatic features for switching from the injection mode to the recirculation mode which are provided to assure the proper operation of safety injection system and containment heat removal system. Your response should include related logic diagrams, schematic diagrams, and the status indication information available to the operator in the control room.

32.37 Provide the LOCA and the MSLB accident environmental envelope inside the containment to verify the adequacy of the qualification of the Class 1E equipment required to mitigate these events.

32.38 In Section 9.2.2.2.1, it is stated that component cooling water (CCW) is not supplied to RHR and containment spray heat exchangers during normal plant operation.

(a) Describe your design of initiation circuitry, control room indication and/or alarm circuitries utilized for this portion of CCW system.

(b) Provide analyses, including a failure mode and effects analysis, to demonstrate that the instrumentation and control portions relied upon to establish component cooling water to these safeguards systems will satisfy IEEE Std. 279-1971.

(c) Provide a periodic test plan for these circuitries to satisfy the recommendations of R. G. 1.22.

32.39 It is stated in Section 7.4 that there are no identifiable safe shutdown systems per se.

The applicant should clearly identify those systems that are required for safe shutdown of the reactor. The applicant should also provide a discussion of how the instrumentation and control portions of the safe shutdown systems conform to the following acceptance criteria stated in Part II of Section 7.4 of SRP.

(1) have the required redundancy

(2) meet the single failure criterion

(3) have the required capacity and reliability to perform intended safety functions on demand.

(4) are capable of functioning during and after certain design basis events such as earthquakes, accident, and anticipated operational occurrences.

(5) are testable during reactor operation.

32.40 On Figure 8.3-5, it is shown that both the 480V 3Ø AC power and the 125DC power feed each inverter. In Section 7.6.1.2, it is stated that inverter breakers have no manual controls provided on the control board, as no manual transfers for 480 VAC to 125 VDC are necessary in the event of loss of the 480 Volt AC preferred power source.

Please provide detailed schematic diagrams to illustrate the operation of the inverter and its automatic transfer capability.

32.41 We deduce from figures 7.2-3 and 7.2-4 that a single failure of the P-6 signal generation circuitry so that P-6 is energized at a power level lower than the P-6 setpoint places the reactor system in jeopardy. The operator can block out the source range trip at power levels for which it was intended for protection. In addition, the trip circuitry will not reset as the power level decreases below the P-6 setpoint during a power reduction. This appears to violate the single failure criterion. Bring your system in compliance with the single failure criterion or justify not so doing.