The Light company Houston Lighting & Power P.O. Box 1700 Houston, Texas 77001 (713) 228-9211

April 26, 1985
ST-HL-AE-1242
File No.: G12.227

Mr. Robert D. Martin
Regional Administrator, Region IV
Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

Dear Mr. Martin:

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Second Interim Report Concerning Potential
Failure of Non-Seismic CCW Tank Level
and Flow Switches

On February 7, 1985, Houston Lighting & Power Company notified the Nuclear Regulatory Commission that an item regarding the potential failure of non-seismic tank level and flow switches during an earthquake was potentially reportable pursuant to 10CFR50.55(e). Attached is our second interim report on this item. Our next report will be submitted to your office by July 12, 1985.

If you should have any questions on this matter, please contact Mr. Michael E. Powell at (713) 993-1328.

Very truly yours,

J. H. Goldberg
Group Vice President, Nuclear

JSP:yd

Attachment: Second Interim Report Concerning Potential
Failure of Non-seismic Tank Level and Flow Switches

85-252

IE-27
1/1

W2/NRC2/q

cc:

Hugh L. Thompson, Jr., Director
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

N. Prasad Kadambi, Project Manager
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, MD 20814

Claude E. Johnson
Senior Resident Inspector/STP
c/o U.S. Nuclear Regulatory Commission
P. O. Box 910
Bay City, TX 77414

Dan Carpenter
Resident Inspector/South Texas Project
c/o U.S. Nuclear Regulatory Commission
P. O. Box 2010
Bay City, TX 77414

M. D. Schwarz, Jr., Esquire
Baker & Botts
One Shell Plaza
Houston, TX 77002

J. R. Newman, Esquire
Newman & Holtzinger, P.C.
1615 L Street N.W.
Washington, DC 20036

Director, Office of Inspection
and Enforcement
U.S. Nuclear Regulatory Commission
Washington, DC 20555

E. R. Brooks/R. L. Range
Central Power & Light Company
P. O. Box 2121
Corpus Christi, TX 78403

H. L. Peterson/G. Pokorny
City of Austin
P. O. Box 1088
Austin, TX 78767

J. B. Poston/A. vonRosenberg
City Public Service Board
P. O. Box 1771
San Antonio, TX 78296

Brian E. Berwick, Esquire
Assistant Attorney General for
the State of Texas
P. O. Box 12548, Capitol Station
Austin, TX 78711

Lanny A. Sinkin
3022 Porter Street, N.W. #304
Washington, D.C. 20008

Oreste R. Pirfo, Esquire
Hearing Attorney
Office of the Executive Legal Director
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Charles Bechhoefer, Esquire
Chairman, Atomic Safety & Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dr. James C. Lamb, III
313 Woodhaven Road
Chapel Hill, NC 27514

Judge Ernest E. Hill
Hill Associates
210 Montego Drive
Danville, CA 94526

Mr. Ray Goldstein, Esquire
1001 Vaughn Building
807 Brazos
Austin, TX 78701

Citizens for Equitable Utilities, Inc.
c/o Ms. Peggy Buchorn
Route 1, Box 1684
Brazoria, TX 77422

Docketing & Service Section
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Second Interim Report Concerning
Potential Failure of Non-Seismic CCW
Tank Level and Flow Switches

I. Summary

The present design of the Component Cooling Water System (CCWS) includes the use of surge tank level switches and flow switches which are not seismically qualified. In the event of an earthquake, these switches could experience contact chatter or spurious closure. Due to the pump protection logic of the CCWS, the system pumps could all be tripped and inhibited from restart by the control room operator. Restart could be accomplished from the switchgear room but additional operator response time must be considered. Further investigation revealed other Class 1E equipment potentially affected by an interface with non-seismic equipment. The final evaluation of this item, however, concluded that only the CCW tank level and flow switches could have had an adverse effect on the safety of plant operations.

II. Description of Deficiency

Component Cooling Water (CCW) surge tank level switches and CCW flow switches are designed to protect the CCW pumps from loss of suction pressure. These switches are not seismically qualified and could experience contact chatter or spurious closure during an earthquake. Due to the pump protection function of the switches, the CCW pumps could be automatically tripped and inhibited from restart by the control room operator. This could result in a complete loss of CCW. Restart however could be accomplished from the switchgear rooms, but this would require additional operator action time.

As stated in the previous report (ST-HL-AE-1203, dated March 7, 1985), during the initial investigation of this problem it was determined that there are also non-seismically qualified pressure switches in the CCW header and in each ECW pump discharge. These switches are connected to the CCW and ECW pumps such that on low pressure the standby ECW and CCW pumps are automatically started. There is no other autostart feature for the ECW pumps that is based on low system pressure.

The functions of the autostart feature have been evaluated further. This feature is not required for any safety function since other signals provide necessary pump starts during abnormal or accident conditions. Therefore, no concern exists for this non-Class 1E interface with the Class 1E pump circuits and no upgrade is necessary.

Elementary drawings of the isolation relay panels and logic drawings were reviewed to identify other non-seismically qualified devices that interface with Class 1E devices. Refer to Table 1 for a list of the interfaces. This review determined that no safety hazard exists with other interfaces.

III. Corrective Action

The CCW surge tank level switches were provided to protect the CCW system pumps from possible cavitation by automatically tripping the pumps when low-low water level was present within the tank. This function will be changed to annunciate in the main control room. The operator can then trip the CCW pumps manually. Two (2) separate level switches alert the operator to decreasing CCW surge tank level. There is also a safety grade level transmitter that provides surge tank level indication in the control room.

The CCW flow switches will be deleted or will be upgraded to be Class 1E devices that are seismically and environmentally qualified, but powered from non-Class 1E sources. In the event that the flow switches are upgraded, the existing physical separation and cable conduit will be retained. Final corrective action will be addressed in the Final Report.

IV. Recurrence Control

In order to determine whether a safety hazard might exist elsewhere in the plant due to interfaces between Class 1E and non-Class 1E devices, a comprehensive list of such interfaces was prepared (Table 1). Each of these interfaces has been evaluated and no other potential safety hazards were identified. Bechtel's Design Change Management procedure (EDP-4.73) will ensure that future system design changes will be reviewed and approved by all affected engineering disciplines.

V. Safety Analysis

To be conservative, we have assumed that there is a safety hazard present in the CCW case. The conditions that could occur upon loss of CCW is the possible loss of centrifugal charging pumps and the loss of RCP thermal barrier cooling. The loss of RCP cooling could cause damage to RCP pump seals and create a possible loss of Reactor Coolant. These possibilities are prevented by the corrective actions to be taken.

TABLE 1

NON 1E/1E DEVICE INTERFACE SUMMARY

SYSTEM	INTERFACING COMPONENT(S)	FUNCTION(S)	FAILURE RESULT(S)	REMARKS
Component Cooling Water	Component Cooling Water Pump 1A	Trip Pump on Low Surge Tank Level/Trip Pump on Low Flow - pump protection	Trip & Possibly Maintain Trip on CCW Pump	Delete Surge Tank Low Level Trip Upgrade or Delete Flow Loop
Component Cooling Water	Component Cooling Water Pump 1B	Trip Pump on Low Surge Tank Level/Trip Pump on Low Flow - pump protection	Trip & Possibly Maintain Trip on CCW Pump	Delete Surge Tank Low Level Trip Upgrade or Delete Flow Loop
Component Cooling Water	Component Cooling Water Pump 1C	Trip Pump on Low Surge Tank Level/Trip Pump on Low Flow - pump protection	Trip & Possibly Maintain Trip on CCW Pump	Delete Surge Tank Low Level Trip Upgrade or Delete Flow Loop
Component Cooling Water/Essential Cooling Water	Component Cooling Water Pump 1A/Essential Cooling Water Pump 1A	Auto Start Standby Pumps	Failure to Auto Start Standby Pump(s) on Low Pressure	o Pumps can be manually operated from CR or Relay Room o Pumps Auto Start on SI o Pumps Start on LOOP
Component Cooling Water/Essential Cooling Water	Component Cooling Water Pump 1B/Essential Cooling Water Pump 1B	Auto Start Standby Pumps	Failure to Auto Start Standby Pump(s) on Low Pressure	o Pumps can be manually operated from CR or Relay Room o Pumps Auto Start on SI o Pumps Start on LOOP
Component Cooling Water/Essential Cooling Water	Component Cooling Water Pump 1C/Essential Cooling Water Pump 1C	Auto Start Standby Pumps	Failure to Auto Start Standby Pump(s) on Low Pressure	o Pumps can be manually operated from Control Room or Relay Room o Pumps Auto Start on SI o Pumps Start on LOOP
Component Cooling Water	Component Cooling Water to NNS Loads Isolation Valves	Close Valves on Low Surge Tank Level - anticipatory NNS load isolation	Failure to Close Valves on Low Surge Tank Level	o Valves can be manually operated from Control Room o Header Isolated by 1E Surge Tank Low-3 Level Sensors
Reactor Makeup Water System	Reactor Makeup Water Pumps	Auto Start RMW Pump(s) from CVCS	Failure to Auto Start RMW Pump(s)	Pump(s) can be manually operated from Control Room - not safety function
Reactor Makeup Water System	Reactor Makeup Water Pumps	Stop RMW Pump(s) on 10-10 Tank Level	Stop & Possibly Prevent Start of RMW Pump(s) from Control Room	Both pumps can be manually operated from Relay Room - System requirements allow adequate time for action outside Control Room
Reactor Makeup Water System	Reactor Makeup System Non-Essential Services Valves	Close Valves on Low Tank Level - anticipatory NNS services isolation	Failure to Close Valves on Low Tank Level	o Valves can be manually operated from Control Room o Calculated leakage is much less than maximum makeup into tank o Tank level indication and low level alarm

NON 1E/1E DEVICE INTERFACE SUMMARY

SYSTEM	INTERFACING COMPONENT(S)	FUNCTION(S)	FAILURE RESULT(S)	REMARKS
Control Room Envelope HVAC	Control Room Makeup Isolation Dampers	Close Control Room Isolation Dampers on Smoke or Chemical Release	Failure to Close Dampers	o Dampers can be manually operated from Control Room o Failure cannot defeat safety action
Control Room Envelope HVAC	Relay Room Fire Protection Dampers	Close Control Room Fire Protection Dampers on Halon release to computer room	Failure to Close Dampers	o Dampers can be manually operated from Control Room o Failure cannot defeat safety action; SI signal opens dampers
Reactor Coolant System	Pressurizer Heaters (Backup Group 1A, 1B)	Operate Backup Heaters on Pressure & Level for normal control (Auto Mode/Manual Mode)	Failure to Operate Heaters	o Manual Operation of Backup Heaters from Auxiliary shutdown panel to re-load onto ESF bus. o Breaker position indication in Control Room (lights and ERFDADS display)
Reactor Coolant System	Reactor Coolant Pressurizer Power Operated Relief Valves	Open Pressurizer PORV for normal pressure control	Failure to Open Pressurizer PORV	o Valves can be manually operated from Control Room or Switchgear Room o Manually operated valve in series can be used if required
Chemical & Volume Control System	Boric Acid Transfer Pumps 1A, 1B	Auto Start Boric Transfer Pumps in Reactor Coolant Makeup Mode	Failure to Auto Start Pumps 1A, 1B	Pumps can be manually operated from Control Room or Switchgear Room - not a safety function
Feedwater	Feedwater Isolation Valves	Valve open permissive on: o SG Water Level o SG Pressure o Feedwater Temperature o Bypass Flow (Anti-water hammer protection)	Failure to Close Valves	o Valves can be manually operated from Control Room o Valves Close Automatically on Feedwater Isolation Signal o Failure cannot defeat safety action
RCB HVAC Normal & Supplementary Purge	RCB Normal & Supplementary Purge Isolation Valves	Close valves on HI RCB Atmosphere Radiation	Failure to Close Valves	o Valves can be manually operated from Control Room o Valves also provided with close signals from qualified, redundant purge monitors or from SI signal