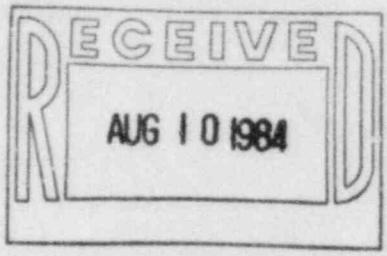
LOUISIANA
POWER & LIGHT/Waterford 3 SES/P. O. Box B/Killona, Louisiana 70066
MIDDLE SOUTH
UTILITIES SYSTEM

August 2, 1984

W3K84-1777
Q-3-A35.07.114



Mr. John T. Collins
Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76012

REFERENCE: Telecon C. Hooper (LP&L) and J. Jourdan (NRC Region IV)
on May 21, 1984
Telecon R. Gimelli (LP&L) and L. Martin (NRC Region IV)
on July 11, 1984

Dear Mr. Collins:

SUBJECT: Waterford SES Unit No. 3
Docket No. 50-382
Significant Construction Deficiency No. 114
"Possible Damage to Safety Related Equipment Due to Water Hammers"
First Interim Report

In accordance with the requirements of 10CFR50.55(e), we are hereby providing two copies of the Interim Report of Significant Construction Deficiency No. 114, "Possible Damage to Safety Related Equipment Due to Water Hammers". This item was previously reported as PRD No. 170.

If you have any questions, please advise.

Very truly yours,

T. F. Gerrets

T. F. Gerrets
Corporate Quality Assurance Manager

TFG:CNH:SSTG

Enclosure

cc: Director
Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555
(15 copies)

IE-27

1/1

cc: Director
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INTERIM REPORT OF
SIGNIFICANT CONSTRUCTION DEFICIENCY NO. 114
"DAMAGED SAFETY RELATED SYSTEMS DUE TO WATER HAMMERS"

INTRODUCTION

This report is submitted pursuant to 10CFR50.55(e). It describes the water hammer events which occurred on 5/10/84 and 5/17/84. It also describes the systems/components affected, subsequent corrective actions, and actions taken to minimize the potential for recurrence.

This deficiency has not been reported to the USNRC pursuant to 10CFR21.

DESCRIPTION

On May 9, 1984 at approximately 14:45, with Safety Injection System (SIS) train "A" aligned in the shutdown cooling (SDC) mode, the annunciator for "Loop 2 Shutdown Cooling System Hydraulic Isolation Valve Trouble" began to alarm intermittently. In accordance with annunciator response procedure OP-500-011, the motor breaker to the hydraulic actuator was opened for SIS Isol. Valve SI405A. On May 10, 1984 at about 06:48, a loss of shutdown cooling flow was observed and SI405A was indicated closed with LPSI "A" pump still running. LPSI "A" pump was immediately secured. The operators were not aware that a negative pressure existed in the Emergency Core Cooling System (ECCS). The water hammer occurred when the Refueling Water Storage Pool (RWSP) quick opening butterfly outlet valve SI106A was opened.

On May 17, 1984 at 00:50, while conducting an operability check of Containment Spray Pump (CSP) "A", personnel observed a drop in suction and discharge pressure and saw recirculation flow drop to zero. The pump was secured and valve SI106A was found closed. Due to misinterpretation of communications, SI106A was opened resulting in the second water hammer event.

Subsequent walkdowns were performed to evaluate potential damage that may have been sustained in both events. Scope of inspections were as follows:

1) Ninety-six (96) supports associated with train A of the ECCS were evaluated. Twenty (20) restraints required further evaluation, rework, or replacement.

2) Ultra-sonic (UT) and dye penetrant testing (PT), consistent with the LP&L Inservice Inspection (ISI) program, were performed on affected piping. Six PTs and five UTs were performed in areas where piping was postulated to have received the highest stresses.

3) All affected pumps (High Pressure Safety Injection (HPSI) "A", HPSI "A/B", Low Pressure Safety Injection (LPSI) "A", and Containment Spray (CS) "A") were tested in accordance with ISI surveillance procedures. X-Y vibration plots were performed on all the above pumps and maintenance was performed where necessary to assure minimum vibration.

DESCRIPTION (Continued)

4) A defective check valve within the hydraulic operator for SI405A caused the valve to close thereby interrupting SDC flow.

SAFETY IMPLICATION

Supports associated with Train "A" of the safety injection and containment spray systems were damaged by the water hammer events. If left uncorrected, the event could have potentially caused inoperability of a single train of systems designed to remove residual heat and mitigate the consequences of an accident in the event of a design basis earthquake.

CORRECTIVE ACTION

The following corrective actions were taken to assure hardware integrity:

1) The 20 questionable or damaged seismic restraints were reworked or replaced to original specifications in accordance with approved procedures.

2) Vibration data for all pumps were analyzed and passed the ISI surveillance requirements .

3) The defective check valve within the hydraulic operator for SI405A was repaired and satisfactorily tested.

4) No anomalies were observed on those portions of piping systems which had undergone Nondestructive Examination (NDE). Therefore, no further NDE was performed.

The following actions have been taken by the Operations Department to prevent system water hammer events:

1) Operating Procedures OP-500-11 and 12 have been revised to assure that respective trains are declared inoperable when power cannot be restored to the hydraulic pump motor.

2) The Operations Supervisors have been cautioned and instructed to caution their personnel concerning the water hammer events to date. Additionally, the Potential Reportable Events (PRE) reports concerning water hammer events to date have been added to the required reading list for operators.

CORRECTIVE ACTION (Continued)

3) Daily instructions were prepared which cautioned Operations personnel concerning proper valve alignments and venting of systems prior to operation to prevent water hammer events.

4) Departmental instructions (OI-01-000) addressing sound operating practices and guidelines are being developed which address such things as water hammer. Implementing these practices should reduce the probability for future operational events.

This interim report is submitted as the initial response to SCD 114. A final report will be submitted by August 31, 1984 after corrective action verification.