

APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-382/89-22

Operating License: NPF-38

Docket: 50-382

Licensee: Louisiana Power & Light Company (LP&L)
317 Baronne Street
New Orleans, Louisiana 70160

Facility Name: Waterford Steam Electric Station, Unit 3 (Waterford-3)

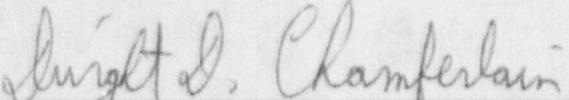
Inspection At: Taft, Louisiana

Inspection Conducted: July 1-31, 1989

Inspectors: W. F. Smith, Senior Resident Inspector, Project
Section A, Division of Reactor Projects

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Section A, Division of Reactor Projects

Approved:


D. D. Chamberlain, Chief, Project Section A

8-9-89
Date

Inspection Summary

Inspection Conducted July 1-31, 1989 (Report 50-382/89-22)

Areas Inspected: Routine, unannounced inspection of plant status, onsite followup of events, monthly maintenance observation, monthly surveillance observation, operational safety verification, followup of previously identified items, licensee event report followup, and balance of plant inspection.

Results: One violation was identified in paragraph 4.e involving inadequate corrective action. In September 1988, the licensee identified missing seismic supports in the core protection calculator (CPC) cabinets. Corrective action included inspections to verify that seismic supports and fasteners were installed in all control room cabinets. This action was apparently flawed, because in July 1989 more missing seismic supports were identified.

The inspectors reviewed licensee action in response to a plant event where the operators manually tripped the plant in response to equipment problems causing a loss of steam generator water level control. Operator action was prompt and appropriate in response to the problem and no problems were found with licensee actions.

The balance of plant (BOP) inspection did not reveal any weaknesses. Appropriate programs appeared to be in place, and based on the plant's excellent availability record, the appearance of the plant, and the absence of leaks, the programs appeared to be successful to the extent observed by the NRC staff.

DETAILS1. Persons ContactedPrincipal Licensee Employees

- R. P. Barkhurst, Vice President, Nuclear Operations
- *J. R. McGaha, Plant Manager, Nuclear
- P. V. Prasankumar, Assistant Plant Manager, Technical Support
- *D. F. Packer, Assistant Plant Manager, Operations and Maintenance
- J. J. Zabritski, Quality Assurance Manager
- U. E. Baker, Manager of Nuclear Operations Support and Assessments
- R. G. Azzarello, Manager of Nuclear Operations Engineering
- *W. T. Labonte, Radiation Protection Superintendent
- G. M. Davis, Manager of Events Analysis Reporting & Responses
- *L. W. Laughlin, Onsite Licensing Coordinator
- T. R. Leonard, Maintenance Superintendent
- A. F. Burski, Manager of Nuclear Safety and Regulatory Affairs
- R. S. Starkey, Operations Superintendent
- A. S. Lockhart, Management Systems Manager

*Present at exit interview.

In addition to the above personnel, the inspectors held discussions with various operations, engineering, technical support, maintenance, and administrative members of the licensee's staff.

2. Plant Status (71707)

The plant was operating at full power at the start of the inspection period. On July 12, 1989, power was reduced to 63 percent in order to replace a defective component in the Steam Generator Feed Pump A speed control circuit. After returning the pump to service, the plant was returned to full power on July 13, 1989. On July 15, 1989, the plant was manually tripped when the No. 1 Main Feedwater Control Valve failed shut. After repairs to the valve, the plant was returned to full power on July 18, 1989. This is discussed in paragraph 3.a below. The plant remained at full power through the end of the inspection period.

3. Onsite Followup of Events (93702)a. Reactor Manually Tripped on Loss of Steam Generator Water Level Control

On July 15, 1989, at 7:19 a.m., while the reactor was at full power, the feedwater regulating valve for No. 1 steam generator went shut due to failure of a control circuit card in the master controller. The operators immediately took manual control of the feedwater regulating valve at 47 percent water level (and decreasing rapidly),

but the system could not respond quickly enough to restore level. At the 31 percent water level, the reactor was manually tripped, as directed by the shift supervisor. The automatic reactor trip setpoint was 27.4 percent. From the time the feedwater regulating valve was shut until the reactor was tripped, only 18 seconds transpired. Emergency feedwater was automatically actuated, and all other systems responded normally. Operator action was prompt and appropriate in response to the problem. The master controller was subsequently repaired, in addition to some unrelated shutdown repairs. By 4:37 p.m. on July 17, 1989, the plant was back on the grid, and by 8 a.m. on July 18, 1989, the plant was back at full power. Licensee will issue a Licensee Event Report (LER) for this event and the report will be due on August 14, 1989. The inspectors reviewed the incident with the licensee and found no problems with licensee actions.

b. Testing of Emergency Feedwater (EFW) System Cross Connect Valves

On July 19, 1989, the licensee informed the inspectors of a discovery that the emergency cross connect valve between the Auxiliary Component Cooling Water (ACCW) pump discharge headers and the EFW pump suction were not included in the Inservice Test (IST) Program. Based on certain assumptions made in the Waterford-3 FSAR, the safety function of the valves (ACC-114 A & B and -116 A & B) was to provide an emergency source of EFW supply during the design basis tornado and post-LOCA, long-term cooling because there would be an insufficient volume available in the Condensate Storage Pool (CSP). Based on these assumptions, the 170,000 gallons of water in the CSP required by Technical Specification (TS) 3.7.1.3 would be depleted before placing the plant into forced cooldown. Thus, the 180,000 gallon volume in either of the ACCW cooling tower basins would be needed to achieve that end. The failure to test these crossover valves appeared to place the EFW system in an inoperable condition.

The licensee conducted a prompt evaluation to determine the operability of ACC-114 A & B and -116 A & B and examined the adverse chemistry implications that could apply to testing the valves. Stroking them could contaminate the high purity CSP makeup water with impure ACCW cooling tower basin water. The inspectors reviewed the licensee evaluation on July 21, 1989. The evaluation concluded that the valves were operable on the bases that: (1) the valves showed no outward signs of degradation, (2) there would be several hours available during the postulated accident scenarios to permit removal of valve internals if they should fail and water was needed, (3) administrative controls were placed in effect such that cooldown would be expedited more quickly than conservatively assumed in the FSAR such that ACCW basin water would not be needed, and (4) the CSP water inventory would be maintained at 90 percent of CSP capacity rather than the 82 percent required by TS 3.7.1.3.

The licensee committed to conduct an additional review of the FSAR accident analyses and the requirements of ASME Code Section XI. It appeared that reducing the time the plant was kept in hot standby during the above accident scenarios would reduce the EFW demand to within the capability of the CSP. If such became the case, the valves would not come under the purview of the IST program. This would also eliminate the potential of degrading the purity of CSP water during IST of the valves. The inspectors will track the completion of the reviews and resulting actions under Inspector Followup Item (IFI) 382/8922-01.

Under the current safety evaluation of the FSAR, it was presumed that the above valves were to be tested under the licensee's IST program in accordance with ASME Code Section XI. Since TS 4.0.5 required performance of this testing to meet the operability requirements of TS 3.7.1.2 (EFW System), the plant was operated in a condition prohibited by TS. This was in violation of NRC regulations, however, the condition was discovered and promptly evaluated by the licensee. A Notice of Violation for this violation is not being issued in accordance with Section V.G.1 of the NRC's Enforcement Policy. The licensee will report the details of this incident to the NRC in accordance with 10 CFR Part 50.73.

4. Monthly Maintenance Observation (62703)

The station maintenance activities affecting safety-related systems and components in accordance with the below listed work authorizations (WA) were observed and documentation reviewed to ascertain that the activities were conducted in compliance with approved procedures, Technical Specifications, and appropriate industry codes or standards.

- a. WA 01040725. On July 11, 1989, the inspector observed portions of the packing and plunger replacement on Reactor Coolant System Charging Pump B. No problems were identified.
- b. WA 01040859. During the licensee's investigation of a high temperature (268°F) condition on ACCW Pump B inboard motor bearing, the bearing was found to have rotated out of position by approximately 45°. The babbitt was damaged and the bearing antirotation pin was missing. The inspector observed the bearing replacement on July 12, 1989. In addition, the antirotation pin was verified installed on the motor outboard bearing and the pump inboard bearing was verified to be in satisfactory condition. The licensee reviewed maintenance records and determined that the inboard motor bearing was replaced during maintenance in 1982. Maintenance records for similar motors were reviewed, and the licensee determined that no other bearing replacements have been performed since the plant was placed in operation. This appeared to be an isolated incident attributable to a maintenance error in 1982.

- c. WA 01041296. On July 26, 1989, the inspectors observed portions of the No. 2 Diesel Fire Pump overhaul. Maintenance personnel appeared to be careful and deliberate as they performed the work, and the intent of the vendor technical manual was being followed. No problems were identified.
- d. WA 01041140. On July 13, 1989, Chemical and Volume Control System Charging Pump B tripped on overload. The licensee investigated and determined that the outboard connecting rod bearing bolt had failed, and then the other end of the connecting rod fractured. Eventually, the shortened connecting rod jammed against the pump block, which stalled the pump and caused the overload trip. The connecting rod also gouged the lower cross head base, and the connecting rod cam on the eccentric shaft (driver) had rotated out of position. The cross head base was repaired, and the eccentric shaft and connecting rod were replaced. In addition, the bearing bolts on all three connecting rods were replaced. While inspecting the pump, the system engineer observed what appeared to be a crack on the inboard cylinder block bore. A liquid penetrant test (PT) was performed to confirm the existence of a crack with results indicating that there was no crack. Later, when preparing to install pump packing, mechanics observed penetrant in the area of the above apparent crack. A subsequent PT and further investigation revealed that the crack existed and extended approximately 3 inches towards the stuffing box and about 2 inches into the suction valve port. The inspector observed portions of the disassembly and reassembly of the pump, and no problems were identified. The pump operated and was capacity tested with satisfactory results. At the end of the inspection period, the licensee was performing an operability analysis to determine if the pump could be returned to service with the existing crack. The licensee is evaluating the generic implications of this problem with assistance from the vendor. Followup of the licensee's analysis and further investigation on the pump failure is an Inspector Followup Item (IFI 382/8922-02).
- e. WA 01042244. On July 27, 1989, the licensee was inspecting the CPC panels in preparation for a modification to reduce control room noise. Seismic support brackets for the CPC cooling fans were found in the cabinet but not completely installed. The licensee noted that the drawings for the CPC cabinets did not show these brackets but determined by discussion with Combustion Engineering that these brackets were installed during the seismic qualification of the CPC cabinets. The licensee then proceeded to promptly install the brackets. The inspector observed the installation of the brackets in CPC Cabinet D. The inspector noted that the CPC fan support brackets were not in a location that would prevent discovery by a visual inspection. During installation, the inspector observed that an additional two fasteners were not installed on components in the cabinet. This was identified to the licensee for corrective action. Previously, missing seismic supports for the fixed incore amplifier drawer were found in the CPC cabinets. These supports were installed in September 1988. The licensee's corrective actions for the missing

incore amplifier drawer supports included inspections to verify that seismic supports and fasteners were installed in control room cabinets (NRC Inspection Report 50-382/88-25). These inspections were completed by the licensee on October 4, 1988. In December 1988, the licensee identified in LER 382/88-034 missing seismic supports in the B-qualified safety parameter display cabinet, which was in the Technical Support Center. These missing supports were not identified during the licensee's previous inspection because the scope was limited to control room panels. The licensee's failure to take adequate corrective action in response to the previous findings with regard to missing supports in control room cabinets is considered an apparent violation of NRC requirements (382/8922-03).

5. Monthly Surveillance Observation (61726)

The inspectors observed the surveillance testing of safety-related systems and components listed below to verify that the activities were being performed in accordance with the Technical Specifications. The applicable procedures were reviewed for adequacy, test instrumentation was verified to be in calibration, and test data was reviewed for accuracy and completeness. The inspectors ascertained that any deficiencies identified were properly reviewed and resolved.

- a. Procedure OP-903-005, Revision 5, "Control Element Assembly Operability Check." On July 12, 1989, the inspector observed portions of the performance of control element assembly operability check. No problems were identified.
- b. Procedure OP-903-063, Revision 6, "Chilled Water Pump Operability Verification." On July 13, 1989, the inspector observed the operability testing on Essential Service Chilled Water Pump B. The inspector observed that permanent markings for vibration survey readings were not installed (see NRC Inspection Report 50-382/89-08). This was identified to the licensee and installation of vibration survey points was in progress by the end of the inspection period.

No violations or deviations were identified.

6. Operational Safety Verification (71707)

The objectives of this inspection were to: (1) ensure that this facility was being operated safely and in conformance with regulatory requirements, (2) ensure that the licensee's management controls were effectively discharging the licensee's responsibilities for continued safe operation, (3) assure that selected activities of the licensee's radiological protection programs are implemented in conformance with plant policies and procedures and in compliance with regulatory requirements, and (4) inspect the licensee's compliance with the approved physical security plan.

The inspectors conducted control room observations, plant inspection tours, reviewed logs, and licensee documentation of equipment problems.

Through in-plant observations and attendance of the licensee's plan-of-the-day meetings, the inspectors maintained cognizance over plant status and Technical Specification action statements in effect.

On July 26, 1989, the licensee took the control room ventilation system Train A air handler out of service to perform routine preventive maintenance. The air handler unit was out of service for over 5 days. Problems were encountered with a conflict between the licensee's generic procedure for bearing grease changeout and the vendor's requirements. A previous problem with lubrication of the Control Room Ventilation System Train B air handler bearings was identified in January 1988. At the end of this inspection period, the licensee removed the controlled area ventilation system emergency filtration Unit B from service to correct problems related to lubrication of air handler bearings. In addition, problems with high vibration on the control room air handler units were being investigated. The adequacy of licensee's disposition of past and present concerns with with lubrication and vibration on engineered safety features air handler units is an unresolved item (382/8922-04) pending further review of this area by the inspector.

No violations or deviations were identified.

7. Followup of Previously Identified Items (92701)

- a. (Closed) Violation 382/8813-01: Performance of maintenance activities without the appropriate instructions related to cleanliness control. The inspector verified that the committed corrective actions were taken and were still in effect. This item was reviewed during a regional followup inspection during the period October 24-23, 1988. See Inspection Report 50-382/88-26, dated November 17, 1989. The item was left open due to an apparent conflict between two paragraphs in the licensee's cleanliness procedure. The licensee resolved the conflict by explaining the intent of the procedure in a memorandum dated November 11, 1988. The inspectors reevaluated the apparent conflict in view of the documented explanation and found no problem with the procedure as written. This item is closed.
- b. (Closed) Violation 382/8819-01: Failure to report events to NRC pursuant to 10 CFR Part 50.73. The appropriate Licensee Event Reports (LERs) were issued by September 30, 1988, 2 weeks prior to the committed date of October 15, 1988. This item was reviewed during the regional followup inspection (50-382/88-26) described above and left open pending review of the licensee's actions to prevent recurrence, which the licensee failed to address in the original response dated September 26, 1988. On January 26, 1989, the licensee's supplemental response stated that actions were taken to ensure that events are properly evaluated for reportability. To date, these actions appear to have been effective. This item is closed.

- c. (Closed) Violation 382/8819-02: Failure to acknowledge alarming control room annunciators in a timely manner. The original response, dated September 26, 1988, failed to address the licensee's actions to prevent recurrence. The supplemental response, dated January 26, 1989, addressed appropriate personnel counseling, discussions at a shift supervisors' meeting on January 13, 1989, and actions to eliminate nonvalid indications such that operators will have more confidence in all indications. The inspectors also reviewed an August 19, 1988, change to Operating Procedure OP-4-020, Revision 0, "Bypassed and Inoperable Status Indication System," and found no problems. Daily observations by the inspectors over the past year since the violations occurred have not revealed any further problems in this area. The licensee has made considerable progress in achieving a "dark board" in the control room when all systems are normal, and the operators have been responsive to alarming annunciators. This item is closed.

No violations or deviations were identified.

8. Licensee Event Report (LER) Followup (90712)

The following LERs were reviewed and closed. The inspectors verified that reporting requirements had been met, causes had been identified, corrective actions appeared appropriate, generic applicability had been considered, and that the LER forms were complete. The inspectors confirmed that unreviewed safety questions and violations of technical specifications, license conditions, or other regulatory requirements had been adequately described.

- a. (Closed) LER 382/89-003, "Inadvertent Actuations of Low Pressure Safety Injection Pump Due to Personnel Error."

This LER was reviewed and left open in NRC Inspection Report 50-382/89-17 due to inappropriate corrective action taken as result of the incident but not specifically reflected in the LER. The licensee changed Operating Procedure OP-903-011, Revision 4, "High Pressure Safety Injection Pump Preservice Operability Check," in such a manner as to make it even more difficult for the operators to perform the task in a cautious and thorough manner. On July 7, 1989, the procedure was revised again, this time in a more logical and reasonable manner. This completed the corrective actions associated with the LER.

- b. (Closed) LER 382/89-005, "Failure to Perform EDG Surveillance when CCW Train A Inoperable."

No violations or deviations were identified.

9. Balance of Plant (BOP) Inspection (71500)

The purpose of this inspection was to verify the effectiveness of the preventive and corrective maintenance programs for BOP systems, determine the effectiveness of management attention to the correction of BOP problems, and determine the adequacy of the licensee's root cause analyses as they relate to BOP problems.

The inspectors found that the BOP maintenance program and the nuclear steam supply systems (NSSS) safety-related maintenance program were basically one and the same. The principal difference was found in the area of Quality Assurance (QA). In the BOP, the site QA organization had little or no involvement. Quality in workmanship was the responsibility of the performing department. The second difference was the purchasing of material and spare parts for the BOP. Certificates of compliance were not required for BOP material, although the licensee used exact replacement parts unless engineering allowed otherwise.

The inspectors reviewed the maintenance program and related documents and verified that equipment failures in the BOP were evaluated for input into the preventive maintenance programs. Equipment failures and adverse trends were evaluated and adjustments made to the preventive maintenance program as appropriate. The licensee implemented a failure and trend analysis program in specific areas such as motor operated valves, component vibration, pump performance, and diesel generator performance. These were all implemented by approved procedures. In addition, there was a provision for trending other areas as delineated in Maintenance Administrative Procedure MD-01-016, Revision 1, "Failure and Trend Analysis." Through this program, Maintenance Engineering could be requested to trend any specific area of concern. The requests were logged and tracked to completion. In 1988, 11 such projects were requested; 5 have been completed. In 1989, as of the end of June, 17 had been requested and 2 were closed. This indicated that many were still in progress. The licensee also had an Availability Improvement Program where the relative impact on plant availability by specific components, BOP and NSSS and changes thereto, was evaluated.

The BOP preventive maintenance (PM) program was handled the same as the NSSS (safety-related) program. PM recommendations from vendors were included in the program, correctly reflected in the maintenance procedures, and based on manufacturer's documents. Corrective maintenance (as well as PM) items were documented by work authorization packages and were included in history records. The BOP PM program included appropriate periodic calibration and testing of protective instruments and controllers.

Approved work authorizations were used for all nonroutine and routine BOP work activities with the exception of Quality Assurance. The same level of approval was used for BOP and NSSS work authorizations.

Typically, replacement parts and materials for the BOP were exact replacements. If changes were proposed, it was necessary to obtain the appropriate engineering reviews and approvals. Since safety evaluations, seismic considerations, and replacement part certification documentation was of less concern for BOP, substitutions were easier to process. Warehouse inspection for BOP material was the same as for NSSS to the extent that incoming material was compared with purchase contracts and the provisions specified.

Postmaintenance testing for BOP equipment was usually limited to a functional test or just observing that the repaired equipment operated without a problem after the repair. In many cases, a step was added to the work authorization to verify that the repair was successful by running the equipment, conducting a soap bubble test on air systems, conducting a vibration survey on rotating equipment, etc.

Management support of the correction of BOP problems has been commensurate with the potential threat to reactor safety, or overall plant availability. Management has been very successful in reducing the number and frequency of plant trips caused or complicated by BOP problems.

The overall excellent appearance, absence of leaks, and excellent availability of Waterford-3 reflect a BOP maintenance program that was responsive and cost effective. Maintenance personnel appeared to be knowledgeable and experienced in maintaining the BOP. No problems were identified.

No violations or deviations were identified.

10. Exit Interview

The inspection scope and findings were summarized on August 1, 1989, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspectors' findings. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection.