

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-382/84-29

Construction Permit: CPPR-103

Docket: 50-382


Licensee: Louisiana Power & Light Company (LP&L)
142 Delaronde Street
New Orleans, Louisiana 70174

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

Inspection At: Taft, Louisiana

Inspection Conducted: June 19-21, 1984

Inspector:

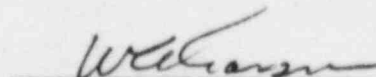


R. E. Hall, Chief, Technical Programs Branch
(para. 1, 2.a, 2.c, 2.d, 2.e, and 3)

7-25-84
Date

Other Accompanying Personnel: R. G. Rahl, Senior Engineering Specialist
EG&G Idaho, Inc.
(para. 2.b, 2.f, and 2.g)

Approved:


W. A. Crossman, Team Leader, Region IV Waterford
Task Force

9/5/84
Date

Inspection Summary

Inspection Conducted June 19-21, 1984 (Report 50-382/84-29)

Areas Inspected: Reactive, unannounced inspection of licensee closeout actions regarding selected significant construction deficiencies (SCDs). The inspection involved 40 inspector-hours onsite by one NRC inspector and one consultant.

Results: Within the areas inspected, no violations or deviations were identified.

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DETAILS

1. Persons Contacted

Principal Licensee Employees

- *L. L. Bass, Project QA Engineer
- *R. J. Bentley, On-Site Licensing Engineer
- *J. Woods, Plant Quality Assurance Manager
- *C. N. Hooper, Operations, QA Engineer
- J. Bezfamilny, Licensing Engineer
- J. Lee, Licensing Engineer
- S. K. Shete, Plant Engineer

Ebasco Services, Inc. (Ebasco)

- *J. R. Pertuit, QA Engineer
- *M. R. Harris, QA Engineer
- *K. O'Gara, Nuclear Licensing
- B. E. Mowry, ESSE - Electrical
- S. O'Conner, ESSE - Mechanical

NRC Personnel

- *T. Flippo, Resident Inspector

*Denotes those attending the exit interview.

The NRC inspectors also interviewed other licensee and contractor personnel during the inspection.

2. Review of Licensee SCDs

The NRC inspectors reviewed the following SCDs:

a. (Closed) SCD-68. Spurious ESFAS Actuation

During NRC inspection 50-382/84-17, it was determined that modifications had been made to the plant protection system (PPS) wiring to correct a potentially generic problem identified at another nuclear power station. The item was left open since the documentation did not include signed checklists for the wiring changes as required by the modification procedure. Corrective action was defined on Condition Identification Work Authorization (CIWA) 007501, dated May 18, 1984.

During this inspection, the NRC inspector reviewed the completed CIWA 007501, and confirmed that:

- a) completed data sheets had been furnished from the contractor; however, the verifications had been completed subsequent to NRC inspection 50-382/84-17,
- b) a continuity check of all rerouted wires had been made to provide assurance of proper modification. Because of plant status 12 continuity checks out of a total of approximately 64 could not be completed, and
- c) a matrix surveillance test (OP-903-106) was performed to verify proper functioning of all circuits to further confirm that all rewiring was properly performed.

SCD-68 is considered closed.

b. (Closed) SCD-88. Refueling Water Storage Pool Liner/Nozzle Overstressed Condition

In September 1983, SCD-88 was initiated as a result of the stress analysis of the two refueling water storage pool 24" nozzles using as-built loads. Extending the analyses to similar structures in the reactor auxiliary building, the fuel handling building, and the reactor building, identified the fact that two condensate storage pool 6" nozzles were also overstressed for as-built piping loads. The licensee's solution was to add restraints at the nozzles to reduce stresses in the liner walls.

During inspection 50-382/84-24, the work tracking documentation was reviewed. It included the initial report, DCN-AS-650 and DCN-AS-659, CIWAs 83C881 and 83C263, and the final report. In addition, sample calculations were reviewed for condensate storage pool nozzles PF13, PF14, PF15, PF16, PN18, PW19, and PW20. In reviewing the sample calculations, the analyst was found to have used the maximum moment about one of the selected orthogonal axes rather than the resultant bending moment. Subsequently, these calculations were reworked using the resultant bending moment. All the nozzle stresses were found to be less than the allowables. These revised calculations and their bases were reviewed during this inspection and discussed with Ebasco site support engineers.

The final report was found to be consistent with the engineering disposition. The CIWAs document the actual changes and the reanalyses demonstrate the adequacy of the changes. Based on the documentation reviewed including the reanalyses using resultant

bending moments the storage pool liner/nozzle stresses are now within allowable limits for the design condition.

SCD-88 is considered closed.

c. (Open) SCD-96. Failure of CVCS Pump Train A to Start on a Safety Injection Actuation System Signal

During NRC inspection 50-382/84-24, SCD-96 was left open pending resolution of questions regarding qualification testing of the Electros witch-31 relays used in the bus selection circuits for spare safeguards equipment capable of being swung to either the A or B safeguards assignment. Closure of the SCD was also prevented until further evaluation by Ebasco of the resolution to the question of reliability of the relays could be evaluated.

During this inspection, documentation was reviewed which presented the results of an Ebasco evaluation of the qualification testing, including seismic testing, of the 120 VAC version of the Electros witch-31 relay. Evaluation by Ebasco indicated that the addition of the rectifier would not change the resonant value of the relays, and that the seismic qualifications and seismic resonant research tests would be equally applicable to either the 125 VDC and 120 VAC applications of the relay. It was concluded that because of the small mass of the rectifier, the seismic performance of the relay would not be affected.

Evaluation of the documented incorrect wiring of the failed relay by Ebasco confirmed the conclusion of the NRC inspector that the incorrect wiring could have prevented the start of CVCS pump A; however, it could not have caused the failure of the relay coil. Proper wiring was verified by testing of each of the Electros witch-31 relays.

Reevaluation of the disposition of SCD-96 by LP&L has resulted in a determination that the Electros witch-31 relay applications do not serve a safety-related function even though they are used in a safety-related circuit. The licensee committed to submit an amended final report to the NRC concerning SCD-96. This reevaluation does not affect the previous commitments for continued testing of the relays; but, it will permit resolution of the prior concerns of the NRC inspector regarding cycle testing of replacement and installed relays.

SCD-96 will remain open pending revision of the final report to the NRC concerning the safety significance of the relays.

d. (Closed) SCD-97. Diesel Generator (DG) "B" Turbocharger Failure

In December 1983, DG-B experienced a turbocharger failure during testing. After replacement of the turbocharger, lubrication system failures and damage to cylinders and pistons was experienced during subsequent testing. This problem was identified as SCD-97.

Cause of the turbocharger failure was attributed to multiple starts without prelubrication of the turbocharger thrust bearing, or to corrosion or inadequate lubrication due to a previous operation with water contaminated lube oil from leaking lube oil coolers. Causes of the other failures were attributed to either secondary effects of the turbocharger failure or to the same causes as the turbocharger failure. Inspection of the turbocharger thrust bearing in DG-A also revealed excessive wear; however, the wear had not yet resulted in damage. DG-B was rebuilt by replacing all damaged parts including the turbocharger assembly. The turbocharger thrust bearing was replaced on DG-A. Following repair, DG-B was operated successfully for the 24-hour preoperational test run, and DG-A was operated for a 2-hour surveillance test. Turbocharger thrust bearings were then reinspected and found acceptable. Reexamination of these bearings is to be performed during surveillance procedure MM-3-015 on an 18-month frequency. Lube oil samples are removed from both diesel engines quarterly for analysis for water or other contaminants.

During this inspection, documentation including CIWAs 83D308, 83D684, 83E422, 83E559, 83E609, 840012, 840096, 840664, 841659, 007907, and 007908 was reviewed. This documentation authorized and controlled all failure identification, rework, inspection, and retest of the diesel generators. Surveillance Procedure MM-3-015, "Emergency Diesel Engine Inspection," Revision 2, was reviewed, and it was confirmed that the procedure included the 18-month inspection of the turbocharger thrust bearing. The Technical Specifications, in surveillance requirement 4.8.1.1.2, requires inspection of the diesel engines at least once per 18 months. It was also confirmed that routine maintenance card control was used to draw the quarterly oil samples which are also required by Technical Specification surveillance requirement 4.8.1.1.2. Preoperational Test Procedure SPD-39-001 was also reviewed to confirm the 24-hour test run of DG-B after replacement of the turbocharger and repair of the engine.

SCD-97 is considered closed.

e. (Closed) SCD-99. Safety Injection Tank (SIT) Isolation Valve Failures

In January 1984, LP&L reported a potential SCD regarding failure of the motor operator on one of the four SIT isolation valves. This item was subsequently identified as SCD-99. By letter dated May 19, 1984, W3K84-1281, LP&L documented their corrective actions and further indicated that two previous similar failures had also occurred on two of the other three SIT isolation valves. In each case, the failure was in the pinion gear, internal to the Limitorque operator.

During this inspection, CIWAs 82A696 (9/5/82), 833571 (3/10/83), and 005145 (1/5/84) were reviewed. These CIWAs documented the three failures and the repair actions taken, which were to replace the failed parts, inspect, and retest the valves. CIWA 836778 (April 22, 1983), which documented the evaluation of the second failure, and CIWAs 006778 (April 12, 1984) and 007602 (May 22, 1984), which documented cycle testing (132 cycles) of one valve and torque switch setting and retest of all four valves, were also reviewed. Even though no specific cause of the failures has been identified, operation of the valves during subsequent testing confirms the adequacy of the repair action since no further failures have been experienced; however, since the cause of failure was indeterminate, the sufficiency of the corrective action is not known. One postulated cause of failure was overtorquing during opening of the valve after being closed in a hot condition. This postulation will be next experienced during post core load hot functional testing. It was verified that the post core load hot functional test included the normal functional operation of these valves under heatup and cooldown conditions.

Failure parts of the valve operators were not retained by the maintenance personnel so failure analysis was limited. Inspections by both the valve and valve operator vendor representatives did not identify a cause of failure or a defect in either component. Examination of the remaining unfailed limitorque operator did not identify incipient failures or defective components.

Since the valves are locked open and are not required to function during reactor operation, either in normal or accident conditions, and since Technical Specification 3/4.5.1 requires the valves to be open (verified each 12 hours), similar failures would not have an apparent safety impact. Should the valves fail to open, as in the observed failures during heatup, reactor operation could not be initiated until the valve is opened.

SCD-99 is considered closed.

f. (Closed) SCD-102. Failure To Install Dowels and Shear Blocks

Through an internal design review in February 1984, Ebasco discovered that the dowels and/or shear blocks required by the vendor's seismic analysis had not yet been installed on the emergency feedwater pumps and there was an apparent lack of paperwork, to assure installation prior to fuel load. This initiated a review of containment spray, component cooling water, and safety injection system pumps along with other large rotating machinery. The list of equipment requiring installation of dowels and/or shear blocks was thus expanded to include the emergency feedwater pumps, motors, turbines, and the emergency diesel generators. This investigation was identified as SCD-102. The licensee contractor's solution was to install the required dowels and/or shear blocks for the affected equipment.

During this inspection, the work tracking documentation was reviewed. It included the initial report; NCR-W3-7695 and NCR-W3-7733; CIWAs 840443, 840838, 840839, and 841901; and the final report. In addition, the subject equipment was physically inspected as installed by the NRC inspector.

The final report was found to be consistent with the engineering disposition and it appears, based on documentation review and physical inspection, that the necessary dowels and shear blocks have now been installed. The CIWAs document the actual installations.

SCD-102 is considered closed.

g. (Closed) SCD-103. Radflex Wall Penetration Deficiencies

On January 10, 1984, B&B Insulation, Inc., issued technical bulletin TB-101-1030 which identified shrinkage problems associated with the material Radflex when installed under certain conditions of temperature. Since this material was used throughout Waterford-3 as a sealant for mechanical and piping penetrations, an inspection of these penetrations was necessary to assure that the sealant's function was not compromised by shrinkage. Its function is to provide radiation shielding and/or prevent the transmission of heat and smoke to adjoining areas in the event of a fire. NCR-W3-7259 describes the associated nonconforming conditions and shows the corrective action taken. This problem was identified as SCD-103.

During this inspection the work tracking documentation was reviewed. It included the original B&B Insulation, Inc., technical bulletin, the initial report, NCR-W3-7259, and the final report. The final report contained the documentation of installation, reinspection, and rework for each penetration using Radflex. Rework consisted of

removing any installed Radflex showing signs of material separation, and then placing additional Radflex material into voids identified by the visual inspection. Not allowing the material (Radflex) temperature to be more than 10° above ambient temperature at the time of dispensing prevented the recurrence of the shrinkage problem.

Based on the documentation reviewed, it was concluded that this problem has been adequately resolved.

This SCD is considered closed.

h. (Closed) SCD-74. Tompkins - Beckwith Undersize Schedules 80 Socket Welds

Subsequent to the initial licensee closure of SCD-74, LP&L system walkdown identified 12 additional possibly undersized socket welds in systems constructed by Tompkins-Beckwith, Inc. Based on acceptance criteria developed under NCR-W3-5760 which utilized minimum weld dimensions from ASME Code Case N316, six of the welds were found acceptable and the remaining six required welding to assure adequate weld size. During this inspection, NCR-W3-7680 was reviewed. The completed NCR included the initial observation of the problem, disposition instructions, and CIWA 841795. CIWA 841795 in turn included details of rework of six welds requiring buildup of weld metal. Weld travel records were also reviewed and found to document the repairs made to each of the six welds.

It was noted that the disposition of the initial LP&L observations had been incorporated into the SCD 74 record package since the additional weld repair was considered an extension of the problem resolved under that construction deficiency. SCD 74, which was left open in NRC inspection report 50-382/84-24, is considered closed based on review of the supplemental information furnished to the NRC from LP&L by letter dated May 28, 1984, W3K84-1261, and NCR-W3-7680 which was closed May 26, 1984.

No violations or deviations were noted.

3. Exit Interview

The NRC inspectors met with the licensee representatives (denoted in paragraph 1) and an NRC resident inspector at the conclusion of the inspection June 21, 1984. The NRC inspectors summarized the purpose, scope, and findings of the inspection.