

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 50-382/84-17

Construction Permit: CPPR-103  
Priority: A2

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

Inspection At: Taft, Louisiana

Inspection Conducted: April 16-20, 1984

Inspectors: *J.R. Boardman* 5/11/84  
J. R. Boardman, Reactor Inspector, Project  
Section A, Reactor Project Branch 1  
(pars. 1, 2i, 2j, 2k, 2l, 3, and 4) Date

*R.E. Hall* 5/11/84  
R. E. Hall, Chief, Technical Programs Branch  
(pars. 1, 2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h, and 4) Date

Approved: *S.A. Johnson* 5/11/84  
FTL J. P. Jaudon, Chief, Project Section A,  
Reactor Project Branch 1 Date

Inspection Summary

Inspection Conducted April 16-20, 1984 (Report 50-382/84-17)

Areas Inspected: Routine, unannounced inspection of licensee closeout actions regarding selected significant construction deficiencies (SCDs). The inspection involved 70 inspector-hours onsite by two NRC inspectors.

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

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DETAILS

1. Persons Contacted

Principle Licensee Employees

- \*T. F. Gerrets, QA Manager
- \*K. W. Cook, Nuclear Superintendent and License Manager
- \*N. Carns, Completion Manager
- \*M. J. Wise, Startup Manager
- \*J. Woods, Plant Quality Manager
- W. Morgan, Operation QA Manager
- \*M. I. Meyer, Engineering Supervisor
- \*W. J. Baldwin, Senior Operations QA Representative
- \*R. Bennett, Senior Operations QA Representative
- \*P. V. Prasanlumar, Technical Support
- \*R. B. Pathak, Electrical Engineer
- \*G. Pittman, Operations QAE
- \*M. Harris, Operations QAE
- \*C. N. Hooper, Operations QAE
- J. A. Agles, Operations QAE
- P. Jackson, Project Engineer
- Clarence Wells, Startup and Operations Coordinator
- Robert Novgrod, Supervisor, Technical Review Group
- R. Keller, Engineer

EBASCO Services, Inc. (EBASCO)

- \*J. R. Pertuit, QA Engineer
- \*J. T. Grillo, Lead Design Engineer, ESSE
- P. Citera, QA Engineer
- A. T. Bichara, Assistant Project Engineer
- A. Dagostaro, Lead Electrical Engineer, ESSE
- T. Fleischer, Engineer

NRC Personnel

- \*T. Flippo, Resident Inspector
- \*K. Whittlesay, Reactor Inspector

\*Denotes those attending the exit interview.

The NRC inspectors also interviewed other licensee and contractor personnel.

2. Review of Licensee Significant Construction Deficiencies (SCDs)

The NRC inspector reviewed the following SCDs:

a. (Open) SCD-68 Spurious Emergency Safety Feature Actuation Signal (ESFAS) Activation

A potentially generic problem identified at another nuclear power station (SONGS-3) involving a potential for inadvertent actuation of the ESFAS was researched by the licensee for the Waterford 3 Plant Protection System (PPS) wiring. This problem was identified to the NRC in February 1983, as a potential construction deficiency, and was identified as SCD 68 when it was determined to be reportable.

A Combustion Engineering (CE) field change was issued to modify the Waterford 3 wiring to reroute the trip path signals between the J3109 and J3110 connectors in the A and D channels such that separation of the J3109 connector would not provide a coincident trip signal to both channels and cause ESFAS actuation. A letter from CE, "PPS Field Modification," dated February 4, 1983 (L-SF-373) transmitted the wiring changes to the Waterford 3 project, and Purchase Order 9330082, dated June 15, 1983, was issued to authorize Electro-Mechanics, Inc., to perform the field modification, revise the PPS wire lists, and to revise the PPS technical manual and relay panel B wire lists.

During this inspection, the PPS field modification procedure for performance of the wiring changes was reviewed. It was verified that the work had been performed in accordance with the CE instructions; however, a completed copy of the wiring change checklist, showing the performance of each wiring change and the inspection by quality control inspectors was not available for review. This SCD will remain open pending the inspector's review of the signed checklists for the wiring change.

No violations or deviations were identified.

b. (Open) SCD-70 General Electric (GE) 480 Volt Switchgear Trip Coils

A construction deficiency originally identified to the NRC in March 1983, which involved the failure of GE 480 volt breakers to reclose after having been tripped was identified as SCD 70. During this inspection the following documentation was reviewed:

- (1) Nonconformance report (NCR) W3-5737, which documented the identification of the problem which had been found during testing. The NCR authorized the trouble shooting of the problem by the GE field representative and provided for testing of the proposed modification to correct the problem.
- (2) Construction Identification Work Authorization (CIWA) 831053, which provided the authorization to implement the activities of NCR W3-5737.
- (3) Design Change Notice (DCN) 1425R2, which provided the approved modification to remove the green indicating lamp from the trip coil circuit. This lamp circuit had provided a "sneak circuit" which prevented reclosure of the breaker after tripping.
- (4) Multiple CIWAs, including 837444 through 837461 and 837935, which provided work authorization for implementing DCN 1425R2 for specific 480 volt breakers.

All CIWAs reviewed by the NRC inspector for modification of the identified breakers were found to incorporate the provisions of DCN 1425R2. The CIWAs had been properly completed and reviewed, and the results had been accepted. Ebasco engineering had identified all breakers, both safety-related and nonsafety-related, to be modified under this DCN; however, during the review by the NRC inspector, CIWA documentation which would have documented the incorporation of DCN 1425R2 could not be located for six 480 volt breakers. Prior to the completion of the inspection, CIWAs were issued for verification that the breakers for which documentation was not available had been modified, or to perform the modification as required.

SCD 70 will remain open pending completion of the modification of the remaining six breakers, and review of the documentation by LP&L and the NRC.

No violations or deviations were identified.

c. (Closed) SCD-77 Inadequate Containment Purge Valve Closure Times and Flow Rates

In March 1983, LP&L reported a potential construction deficiency regarding slow closing times for the containment purge inlet and outlet valves. This was subsequently identified as SCD 77. Evaluation of this problem was documented under NCR W3-5923 and CIWAs 833442 and 834307. The evaluation determined that the slow closure time was a result of insufficient air flow from the actuator to permit the valves to stroke closed within the 5-second maximum closure time to be specified in the Technical Specifications. DCN-1415R1 was prepared to authorize installation of an additional solenoid valve in parallel with the one originally provided for each valve. Testing performed under CIWA 83A326 demonstrated the effectiveness of the modification, and stroke times for closing were shown to be less than the limit on three consecutive closure tests for each valve.

This reported construction deficiency originally included a report of less than designed flow rates through the purge system. Analysis by Ebasco engineering personnel and review by the licensee concluded that the reduced flow capacity was not a reportable construction deficiency. Discussion by the NRC inspector with the NRC licensing project manager confirmed that purge time limits and valve opening stops are incorporated into the safety evaluation, and that Technical Specifications will be based on the observed flow rates. This was also verified by review of the March 26, 1984, draft of the proposed Technical Specifications.

During this inspection, the NRC inspector reviewed the above modification documentation, and inspected the physical modifications on valves CAP 102, 104, 203, and 205. The modifications included the addition of the second solenoid valve and the enlargement of the piping between the cylinder and the solenoid valves to increase exhaust air flow rates and were observed to have been incorporated. It was also verified that the variable stop adjustment to limit maximum valve opening had been incorporated on the inboard and outboard isolation valves as required by the proposed Technical Specifications. This SCD is considered closed.

No violations or deviations were identified.

d. (Closed) SCD 85 Damaged Incore Instrumentation Guide Tubes

After completion of hot functional testing, the licensee reported damage observed on the guide tubes for the incore instrumentation. This was identified as SCD 85. During this inspection the following documentation was reviewed:

- (1) NCR W3-6422, dated June 20, 1983
- (2) CIWA 839459
- (3) CE correspondence to LP&L L-SF-496 (June 17, 1983), L-SF-500 (June 27, 1983), and C-CE-8724 (August 31, 1983)
- (4) CE detailed procedures for inspection and rework:

ICQP 9270-376A	May 11, 1983
ICQP-9270-376C	July 5, 1983
ICQP-9270-376D	July 12, 1983
ICQP-9270-376F	September 1, 1983
ICQP-9270-525	September 23, 1983

This documentation indicated that all guide tube clusters were removed and inspected. It was determined that the cause of failure has harmonic vibration aggravated by a stress concentration point at a tack weld location. To resolve the problem, CE recommended that the natural frequency of the guide tubes be changed by shortening them by 6 inches, and after installation by not using the previously used tack weld. All evaluation and modification work was performed by or under the direction of CE. This item is considered closed.

No violations or deviations were identified.

e. (Closed) SCD-87 GE AKR-4A50, 480 Volt Breaker Wiring Error

In a letter from LP&L to the NRC (W3K83-1896) dated December 6, 1983, LP&L reported the completion of corrective action for a reported construction deficiency identified as SCD 87. This letter reported the removal of a jumper wire (factory installed) between the 52x contacts and the 52w coil. This jumper was not per design drawings and is not necessary for proper breaker operation. LP&L reported that, in accordance with the recommendation of the GE field representative and the Ebasco electrical design engineer, this jumper wire had been removed from all GE AKR-4A50 breakers. A second failure originally included in SCD 87 was traced to an unrelated cause and transferred to another construction deficiency, identified as SCD 91, which replaced the defective component.

During this inspection, NCR W3-6566, which documented and traced removal of the jumper wires, was reviewed. DCN-NY-1235 authorized the removal of the wire and specifically stated that the wire was not necessary for proper breaker operation. CIWAs 838876 and 83B372 were reviewed to confirm that all safety-related breakers, including spares, had been modified in accordance with DCN-NY-1235. Physical inspection of the breaker cabinets by the NRC inspector verified that all installed breakers, including spares, had been included in the documented list of modified breakers. Since similar breakers are also used in nonsafety-related applications and are interchangeable with safety-related breakers, it was also confirmed that the modification program also included those breakers classed as nonsafety-related. This item is considered closed.

No violations or deviations were identified.

f. (Closed) SCD-89, GE AK50/AK30 Switchgear Breakers Cam Shaft Bearing Retaining Ring

In September 1983, LP&L notified the NRC of a reportable construction deficiency involving failure of the camshaft bearing in GE breakers used in 480 volt switchgear at Waterford 3. This deficiency was identified as SCD 89. NCR W3-6766 was initiated to track resolution of this problem. Subsequent inspection under this NCR revealed that similar failures were present in other similar breakers. GE, the breaker vendor, defined a modification to install a collar plate to prevent the bearing from slipping from the bearing sleeve. They also provided repair parts and detailed repair procedures. Vendor field representatives performed this modification at Waterford 3.

During this inspection, records of modification and retest of all safety-related 480 volt breakers were reviewed. It was verified that the modification had been made to all safety-related breakers and that all had been functionally tested following modification. Since the AK50/AK30 breakers are also used in nonsafety-related applications and are interchangeable with those in safety-related applications, it was also confirmed that the modification program included all AK50/AK30 breakers in use at Waterford 3, including spares. A spot check of records for selected nonsafety-related breakers confirmed that they had also been modified and retested. Physical inspection of safety-related breaker cabinets confirmed that all safety-related breakers had been included within the documented modification and retest program. This item is closed.

No violations or deviations were identified.

g. (Closed) SCD-91 GE Breaker AKR-30/AKR-50 Part Replacement

GE Service Advice Letter 175-9.11 recommended replacement of a potentially defective switch and a potentially improperly heat treated closing spring prop on all GE AKR-30 and AKR-50 480 volt breakers. This item was identified as a reportable construction deficiency and identified as SCD 91. Detailed procedures for the modification were provided as an attachment to the service advice letter. All breakers manufactured prior to May 1980, which included those in use at Waterford 3, were subject to these potential defects.

NCR W3-7144 was initiated to control the modification of all breakers of these models installed at Waterford 3. This NCR utilized the GE provided procedures, checklists, and sketches for the modification program.

During this inspection, records of modification of each safety-related breaker were reviewed. It was confirmed that all safety-related breakers had been modified, including spares, and that each breaker had been functionally tested following modification. Physical inspection of the breaker cabinets confirmed that all installed safety-related breakers had been included in the modification program. Since breakers of these models were also used in nonsafety-related applications, it was also confirmed that the modification program also included those breakers.

Replacement of the switch and closing spring prop, and the retest performed under this modification effort was confirmed to have resolved the single breaker problem (failure to close) identified originally in SCD 87 and transferred to SCD 91. Item SCD 91 is closed.

No violations or deviations were identified.

h. (Open) SCD-95 HPSI Pumps A and AB Failed to Start on SIAS

It was reported by LP&L that the high pressure safety injection (HPSI) pumps A and AB had failed to start on a safety injection actuation system (SIAS) signal during startup test SIT-TP-200. This was identified as SCD 95. Cause of the failure was traced to a failure of the trip latch cranks to return to the neutral position following trip due to binding caused by improperly aligned shaft bearings. It was determined by the GE field representative that this problem was applicable to all 4.16 KV breakers installed at Waterford 3. The corrective action defined by the GE field representative was to inspect all trip latch bearings for alignment, shim them if necessary for proper alignment, and to lubricate and retest the breaker. CIWAs 83E109, 840477 through 840483, LCIWAs 005276 through 005278, and 005547 through 005560 documented the inspection and retest program for the safety-related 4.16 KV breakers.



During this inspection, the above CIWAs and LCWIAs were reviewed and, with one exception, properly documented the inspection, alignment, lubrication, and retest of each breaker used in a safety-related application. It was also confirmed that one spare breaker had also been inspected and tested. In one case, the breaker used in Cabinet 3B3S, Cubicle 5, had apparently been inspected and retested; however, the LCWIA was not definitive in identifying the specific work activity performed in accordance with the instructions. Records available did not address the inspection and retest of 4.16 KV breakers used in nonsafety-related applications. Since these breakers appear to be interchangeable with those used in safety-related applications, it appeared to the NRC inspector that these breakers should have been included in this inspection and retest effort. Clarification of work performed under the LCWIA 005554 for the above noted breaker, and justification for not including the nonsafety-related 4.16 KV breakers in the inspection program, will be reviewed during a subsequent inspection.

No violations or deviations were identified.

i. (Closed) SCD-81 Shelf Life Exceeded on Cable Splice and Termination Tape

This SCD identified a condition in which no procedures existed to prevent the use of Okonite splicing tape, type numbers 35 and T-95, and "Nuclear Splice Cement," which had exceeded manufacturer's shelf life. The licensee recalled all such material which had exceeded shelf life, or for which shelf life expiration date was missing. Licensee documentation shows that such material was consigned to scrap.

Okonite and the licensee established a test program using the oldest unused tape and cement. Test splices were made using this over age material. Okonite stated that "results of our testing showed that splices made with tape which exceeded its shelf life performed just as well as splices made with new splicing tapes. Therefore, this report does not affect the results of the nuclear qualification of Okonite cable to IEEE 323-1974 and IEEE 383-1974." This item is closed.

No violations or deviations were identified.

j. (Closed) SCD-98 Measuring and Test Equipment (M&TE)

This SCD identified the fact that numerous M&TE usage sheets used in support of the test program were either not forwarded to the proper organization for action, or not proofed against the applicable individual M&TE usage record. This condition would have resulted in the inability to determine affected completed plant tests in those cases when the next routine calibration showed MT&E to be out-of-calibration.

The licensee reviewed MT&E usage on all safety-related starting tests, reviewing all documentation, and reconstructed records from MT&E issue records where necessary. In those cases where records were inadequate, retests were required. These retests are controlled by the LP&L condition identification and work authorization (CIWA), with CIWA results being reviewed and approved by the Joint Test Group. The NRC inspector interviewed licensee personnel and reviewed documentation related to the review of MT&E by the licensee. This item is closed.

No violations or deviations were identified.

k. (Closed) SCD-75 Station Battery Equalizing Charge Exceeds Coil Ratings

This SCD identified that the circumstances existed for any 120 volt direct current (d.c.) Associated Valve Company (ASCO) solenoid valves in the safety-related 125 volt d.c. system to be subjected to voltages above their maximum allowed voltage, 132 volts as identified by the licensee. The licensee provided the NRC inspector with a listing of safety-related d.c. ASCO solenoid valves. The licensee documented that all valves had 125 volt d.c. ratings (range of 90 volt-140 volt d.c.). The NRC inspector also reviewed maintenance and surveillance records and found no case where the coils were subjected to voltages in excess of 140 volts, since procedures at one time allowed a battery equalizing charge of 142 volts d.c. The NRC inspector noted to the licensee that the high voltage alarm point for the battery charges was 144 volts d.c., which would allow over voltage without alarming. This item is closed.

No violations or deviations were identified.

l. (Open) SCD-79 Unqualified Components in Hydrogen Analyzers

The NRC staff report on the environmental qualification of Waterford 3 dated January 5, 1983, Comment 19, identified a potential problem with the hydrogen analyzer pump bearing failures after long-term operation because of use of improper grease.

Inspection of the pumps revealed that they were acceptable in that the proper grease had been used. Evaluation by Ebasco engineering revealed, however, that the four pump motors were not Class 1E qualified. Replacement pump motors were purchased and installed. The NRC inspector reviewed documentation of these actions, and verified, by identification number, and verification of one of the four motors, accomplishment of motor replacement.

The licensee was unable; however, to retrieve documentation that the replacement motors were environmentally qualified as required.

No violations or deviations were identified.

3. Solenoid Valves Purchased for Safety-Related Applications

As part of the review of SCD-075 (see paragraph 2), the NRC inspector discussed with licensee and Ebasco engineering personnel identification by manufacturers of safety-related valves on a listing contained in backup documentation for SCD-075. The NRC inspector contacted ASCO, Mr. Bob Brown, concerning ASCO identifications for Class 1E valves required for safety-related applications. Mr. Brown stated that the following were the only ASCO designations for Class 1E solenoid valves:

- a. The prefix "NP" before any numerical designator.
- b. The following numerical designators without the "NP" prefix are used by ASCO to designate Class 1E solenoid valves.

206-380  
206-381  
206-832  
208-266  
208-448  
210-036

No other ASCO solenoid valves are certified by ASCO for Class 1E, safety-related, applications, including environmentally qualified valves to NUREG-588, or IE Bulletin 79-01.

A safety-related purchase order at Waterford 3 is any order that has at least one safety-related item. The order may contain all safety-related items, or one safety-related and many nonsafety-related items. The NRC inspector identified the following safety-related purchase orders for solenoid valves which included ASCO solenoid valves but have no Class 1E ASCO valves ordered. (Site document control vault personnel identified

the purchase orders as safety-related.) The NRC inspector was unable to verify that other valves on these orders were safety-related or, if nonsafety-related, ASCO valves were inadvertently ordered for safety-related applications.

<u>Purchase Order Number</u>	<u>ASCO Number</u>	<u>Quantity</u>
403484	HT8302C26	57
	8342A2	23
	HB8302A90	9
403492	8344A73	3
	HT8302C25	4
9102040	8302C27R	2
	8302C27F	14
	HV-200926-1	2
40359	HT8321A6E	5
	HT8321A6	2
	HTX8321A6E	4
	HT834481	8

This will remain an open item (50-382/8417-01) pending further review during a subsequent inspection.

#### 4. Exit Interview

The NRC inspectors met with the licensee representatives (denoted in paragraph 1) and T. Flippo, NRC Resident Inspector, at the conclusion of the inspection on April 20, 1984. The NRC inspectors summarized the purpose, scope, and findings of the inspection. The NRC inspectors emphasized to licensee management that the majority of the SCD documentation packages available for review lacked varying degrees of documentation necessary to close the items in question. As noted in the open items in this report, licensee personnel were unable to retrieve certain of the missing documentation, and in at least one case, all required actions may not have been completed. The importance of the licensee's review of the SCD closure package was discussed.

At the time of the exit interview, the licensee had not presented the NRC inspector with documentation to permit closure of SCD-75 (120 volt d.c. ASCO solenoid valves); specifically, certification that there had been a verification that no 120 volt d.c. ASCO valves were installed in the safety-related (IEEE Class 1E) 125 volt d.c. electrical system. This certification was sent to the NRC inspector by telecopies on April 24, 1984.