APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-382/89-15 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 (W-3)

Inspection At: W-3, Taft, Louisiana

Inspection Conducted: June 5-9 and June 20-21, 1989

Inspector: J. R. Boardman, Reactor Inspector, Plant Systems Section, Division of Reactor Safety — Date 7/5/89

Approved: T. F. Stetka, Chief, Plant Systems Section, Division of Reactor Safety — Date 7/6/89

Inspection Summary

Inspection Conducted June 5-9 and June 20-21, 1989 (Report 50-382/89-15)

Areas Inspected: Routine, announced inspection of Raychem heat shrinkable tubing (HST) for electrical splices and terminations, the storage of emergency diesel generator (EDG) fuel oil (FO), containment building temperature profiles, and action on previously identified inspection findings.

Results: Within the areas inspected, no violations or deviations were identified. The licensee's present programs for the control of EDG FO, and for the installation of Raychem HST for electrical connections, appeared to meet regulatory requirements. Containment building temperatures appeared to be acceptable.

DETAILS

1. Persons Contacted

LP&L Personnel

*#R. C. Azzarello, Nuclear Operations Engineering & Construction (NOEC) Manager
*#P. N. Backes, Programs Engineering Supervisor
*#D. E. Baker, Nuclear Operations Support & Assessment Manager
*#R. P. Barkhurst, Vice President Nuclear
*L. L. Bass, NOEC Supervisor
B. K. Broussard, Equipment Qualification Engineer
V. R. Coy, Electrical Design Engineering
#G. M. Davis, Event Analysis Manager
*W. E. Day, Trending, Compliance and Response Supervisor
*T. J. Gaudet, Site Licensing Support Engineer
D. D. Grubic, Site Licensing Support Engineer
J. E. Howard, NOEC Procurement/Programs Engineering Manager
G. F. Koehler, Operations Quality Assurance (QA) Audit Supervisor
#L. W. Laughlin, Site Licensing Supervisor
#T. R. Lednard, Maintenance Superintendent
#A. G. Larsen, Plant Maintenance Engineering
#J. R. McGaha, Plant Manager
#D. F. Packer, Assistant Plant Manager Operations and Maintenance
#P. V. Prasankumar, Assistant Plant Manager, Technical Services
#M. L. Raines, Lead Equipment Qualification Engineer
E. J. Ritzmann, Operations QA
#J. J. Zibritski, QA Manager

NRC Personnel

#W. F. Smith, Senior Resident Inspector
*T. R. Staker, Resident Inspector

*Denotes those persons that attended the exit meeting on June 9, 1989.
#Denotes those persons who attended the exit meeting on June 21, 1989.

In addition, the NRC inspector contacted other members of the licensee's staff.

2. Followup on Previous Inspection Findings (92701 and 92702)

a. (Closed) Violation (382/8705-01): This violation dealt with exceeding procedure acceptance criteria for testing of Limitorque valve operators.

(Closed) Unresolved Item (382/8705-02): This unresolved item dealt with the determination and evaluation of valve cycles made at thrust values above the rated value during Limitorque operation.

(Closed) Open Item (382/8705-03): This item dealt with the adequacy of bypass switch settings for Limitorque operators.

(Closed) Open Item (382/8705-04): This item dealt with the use of the MOVATS signature for establishing limit switch settings for Limitorque valve operators.

The above listed findings related to licensee actions in response to NRC Bulletin 85-03, "Motor Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings," issued November 15, 1985. NRC Inspection Report 50-382/87-05 dated May 4, 1987, was issued before the licensee's final response to this bulletin.

In a letter dated June 12, 1987, the licensee responded to violation (382/8705-01). On December 21, 1987, the licensee issued their final response to Bulletin 85-03. This response addressed the issues identified in inspection findings 382/8705-01, -02, -03, and -04. The NRC inspector reviewed the licensee's response letters and determined that they adequately addressed each finding. This review verified the completion of the licensee's corrective actions.

These items are considered closed.

b. (Closed) Open Item (382/8527-07): This item documented the lack of an industry-wide preventive maintenance program to replace electrolytic capacitors. The concern is that these capacitors could exceed their design life and fail resulting in a condition that could affect plant operation. This generic issue is being addressed by the NRC as part of the ongoing plant aging research.

c. (Closed) Open Item (382/8810-02): This item dealt with the lack of a program to ensure the proper type of grease for replacement of double sealed and double shielded antifriction bearings. This item, which was initially identified at another facility, informed the licensee of this potentially generic concern. The licensee's personnel have subsequently developed a program to control lubrication of replacement antifriction bearings.

3. Programs for Installation of Heat-Shrinkable Tubing (HST) (25017)

On June 26, 1986, the NRC issued Information Notice (IN) 86-53, "Improper Installation of Heat Shrinkable Tubing." This IN identified industry problems with the installation of HST, manufactured by Raychem, used for insulation on electrical and instrumentation splice connections and terminations.

In response to IN 86-53, the licensee initiated a review that consisted of separate inspections by equipment qualification (EQ) engineering personnel and quality control (QC) inspection personnel of approximately 211 safety-related Raychem HST installations. All splices reviewed were

ultimately resolved as acceptable. The licensee had decided to discontinue use of Raychem HST and has not made any Raychem splice installations since the performance of these inspections. The licensee has used Raychem HST only in electrical penetrations.

The NRC inspector reviewed a sampling of inspection records and EQ engineering deficiency resolutions for HST installation that the licensee inspected in response to IN 86-53. The examples reviewed were HST installations that were found to be initially unacceptable by inspection, but subsequently accepted by EQ engineering. No concerns were identified. The NRC inspector also observed approximately 84 Raychem HST installations in 5 Reactor Auxiliary Building (RAB) penetrations. As the result of these observations, wire 12 in penetration 142, module 6 had the following problems:

- On the end nearest the penetration, the wire markers appeared to have been covered by the HST. This condition could reduce the effective seal length of the HST.

- There was a nick on the penetration end that appeared to penetrate through the insulation such that the copper conductor was visible.

The NRC inspector discussed these findings with licensee personnel. As the result of these discussions, the licensee will determine the acceptability of wire 12. This is considered to be an inspector followup item.

Inspector Followup Item (382/8915-01): Review the licensee's acceptability determination of the splice and insulation nick on wire 12 in penetration 142.

The licensee has decided to revive the use of Raychem HST. As a result, the present program for installation of Raychem HST has recently been put in place. Recent program changes include revision of procedures and design drawings to enhance instructions and training for installation and inspection personnel.

4. Storage of Emergency Diesel Generator Fuel Oil (25100)

The purpose of this inspection was to verify that the licensee had an adequate quality control program for emergency diesel generator fuel oil (EDG FO) that was maintained onsite.

The specific attributes reviewed included the following for which the responses are contained in Attachment 1:

- The scope of the licensee's review of IN 87-04, "Diesel Generator Fails Test Because of Degraded Fuel";

- The existence of a permanent FO storage tank recirculating filtration system;

- The periodic cleaning of EDG FO storage tanks;
- The use of FO antioxidation and bacteriostatic additives;
- The tests performed for the presence of water, oxidation, bacterial growth, etc.;
- The prompt removal of identified water contamination;
- The periodic cleaning of strainers, filters, etc.;
- The monitoring of fouling and contamination;
- The sampling and testing of EDG FO;
- The use of duplex filters and strainers; and
- The use of differential pressure indication for determination of filter and strainer fouling.

Summary

With the completion of corrective action for Licensee Event Report (LER) 89-008-00, "Diesel Generator Fuel Oil Not Sampled per ASTM Specified Methods Due to an Inadequate Procedure," dated May 26, 1989, the licensee's program for storage of EDG FO appeared to be in compliance with NRC regulations and licensee commitments. The only anomaly identified by the NRC inspector related to the licensee's actions in response to IN 87-04 on EDG FO storage.

This response stated that the double (duplex) EDG FO strainers alarmed when 1 of the 2 integral strainer units became fouled. The other unit of the duplex strainer could be aligned and used while the fouled strainer unit was cleaned. These features were stated as providing assurance against EDG FO starvation. The NRC inspector determined, however, that the licensee's present procedures and practices align both duplex strainer units in parallel making them functionally a single (simplex) strainer. This condition eliminated the licensee's purported redundancy. The NRC inspector found that the EDG FO duplex filters were similarly aligned as a simplex filter. The operational safety aspect of this condition is being followed by the NRC resident inspectors.

The licensee's procedures relating to the EDG FO storage which were reviewed included the following:

Document No.	Revision	Title
MM-3-019	2, Change 1	Diesel Generator Fuel Oil Storage Tank Inspection
CE-2-030	2, Change 1	Maintaining Diesel Fuel Oil

OP-3-009	5, Change 2	Fuel Oil Receipt
MM-3-015	6, Change 2	Emergency Diesel Engine Inspection
MM-6-005	2	Emergency Generator Diesel Maintenance
OP-9-002	10, Change 2	Emergency Diesel Generator
CE-2-100	5, Change 2	Chemistry Technical Specifications Survellance Performance Coordination
CE-1-002	4	Logkeeping, Filing and Record Storage
CE-3-606	1	Determination of API Gravity of Diesel Fuel
CE-3-601	3	Determination of Kinematic Viscosity of Diesel Fuel
CE-3-700	5, Change 2	General Grab Sampling Techniques
CE-3-602	4	Determination of Water and Sediment in Oil (Centrifuge)

No violations or deviations were identified.

5. Licensee Event Report (LER) Followup (92700)

Through discussions with the licensee's personnel and the review of records, LER-89-008-00 was reviewed to determine that reportability requirements were fulfilled, immediate corrective action was accomplished, and corrective action to prevent recurrence had been accomplished in accordance with the Technical Specificiation (TS).

This LER dealt with the fact that the licensee's sampling of the EDG FO tanks was not in accordance with ASTM-D270-1975 as required by TS 4.8.1.1.2.c. To correct this condition, Procedure CE-3-700, "General Grab Sampling Techniques" was revised to require sampling as specified in ASTM-D270-1975.

No violations or deviations were identified.

6. Information on Containment Temperature (TI 2515/98)

The purpose of this inspection was to obtain containment average ambient operating temperature profiles for W-3 to determine its effect on the environmental qualification of equipment, and in particular, electrical insulation. The NRC inspector reviewed documentation related to the design of the containment cooling system. Containment temperature data for the periods of plant operation from February through December 1987, and June 1988 through January 1989 were also reviewed. The TS state that

the primary containment air temperature, measured at the inlet of the containment air coolers, shall not exceed 120°F. Data for the periods reviewed showed no temperatures reaching the TS limit. Containment temperature data for 12 additional locations has been taken by the licensee. No anomalies were identified as the result of this inspection. A summary of the pertinent findings is contained in Attachment 2 to this report.

7. Exit Meeting

Exit meetings were held on June 9 and 21, 1989, with those individuals denoted in paragraph 1 of this report. At this meeting, the scope of the inspection and the findings were summarized. The licensee did not identify as proprietary any of the information provided to, or reviewed by the NRC inspector.

ATTACHMENT 1

SURVEY OF LICENSEE'S RESULTS TO
SELECTED EDG FO ISSUES

Plant Name: Waterford-3 SES

Docket: 50-382

Inspector: J. R. Boardman

1. Has the licensee adequately reviewed and evaluated IE Information Notice (IN) 87-04, issued on January 16, 1987, as a result of the ANO Unit 2 EDG FO starvation event which occurred on June 27, 1986?

   The licensee's review of this IN appeared flawed. The review summary identified:

   - That duplex EDG FO strainers were installed.
   - The strainers had alarms which activated when 1 of the 2 integral strainer units was fouled.
   - The other strainer unit could then be aligned and used while the fouled unit was cleaned.
   - These features provided assurance against EDG FO starvation.

   The NRC inspector determined, however, that the licensee's procedures, and practices, aligned both strainer units in parallel. These actions made the 2 separate strainer units functionally a single (simplex) strainer and eliminated the purported redundancy. The NRC inspector identified the same parallel alignment for the EDG FO duplex filters.

2. Does the licensee have a permanent FO storage tank recirculation system which allows for complete FO inventory cleaning by filtering each refueling outage to remove accumulated particulates?

   No.

3. Are all FO storage tanks being cleaned and inspected at a minimum of 10-year intervals in accordance with Regulatory Guide 1.137?

   Technical Specification (TS) 4.8.1.1.2.g. and h. require the draining, cleaning, and inspection of the storage tanks at least once every 10 years. The first 10-year interval has not been completed.

4. Does the licensee's FO program include a regular analysis of FO samples and bottom testing for accumulated water, at the lowest point in the FO day tanks and FO storage tanks?

Technical Specification 4.8.1.1.2.b. requires that at least once every 31 days and after each operation of the diesel where the period of operation is greater than, or equal to, 1 hour a check shall be made of the diesel oil feed tanks for water. Accumulated water shall be removed.

The licensee's personnel stated that the day (feed) tanks are checked for water accumulation and drained, but the storage tanks are not checked.

Technical Specification 4.8.1.1.2.c. requires that at least once every 92 days and from new oil prior to addition to the storage tanks that a FO sample be obtained in accordance with ASTM-D270-1975. The sample shall be tested as soon as taken (or prior to adding new oil to the tank) in accordance with ASTM-D975-77 for water, sediment, kinematic viscosity, and specific gravity. Within 7 days the impurity level (insolubles) shall be determined.

These checks are being accomplished as required by the TS.

5. Is a fuel additive being used as a fuel stabilizer which will function to prevent oxidation and bacterial growth?

   Yes, the licensee's program requires that a stabilizer and a microbiocide be added to each acceptable shipment.

6. Does the licensee effectively ensure that periodic FO bottom sampling and analysis are being performed to detect high particulate concentrations in the FO supply which occurs over long-term storage due to the effects of oxidation, and biological contamination in accordance with ASTM D270-1975?

   As stated in 4. above, sampling to ASTM D270-1975 is required by the Unit TS. See LER-89-008-00 concerning the licensee's use of bottom sampling.

7. Are day tanks and integral tanks being checked for water monthly, as a minimum, and after each operation of the diesel where the period of operation was 1 hour or longer?

   Please see the response to 4. above. The licensee's personnel stated that there were no integral tanks.

8. Is accumulated water removed immediately if it is determined that water is present in the storage, integral, or day tanks?

   The licensee's personnel stated that the water was promptly removed from day tanks when found. There are no integral tanks, and storage tanks are not checked (they are not considered "feed" tanks).

9. Is the licensee replacing FO in a short period of time (about a week) if it is determined that the FO does not meet the applicable specifications?

The licensee's personnel stated that no EDG FO has been determined to be nonconforming. TS 4.8.1.1.2.c.3. requires initiation of corrective action within 72 hours to return the fuel supply to within acceptable limits.

10. Are FO components, which may be prone to fouling, being routinely monitored for indications of fouling?

    FO strainer and filter differential pressures (DPs) are recorded in the licensee's running logs. High FO strainer/filter DPs are input signals for the "Master Diesel Generator Trouble Alarm" in the control room.

11. Are FO filters and strainers being cleaned and inspected on a periodic basis per the vendor recommendations?

    Per licensee personnel, filter and strainers are cleaned and inspected every refueling outage. Periodicity and cleaning/inspection procedures meet vendor recommendations.

12. Does the FO system utilize dual element filters and strainers which permits on line cleaning of the elements, in the event of fouling, to allow continuous operation of the EDG?

    Yes, however, see 1. for alignment that defeated this feature.

13. Is there a differential pressure indicator for each duplex filter strainer for indication of fouling in accordance with ANSI N195-1976?

    There is differential pressure indication as discussed in question 10 above.

14. Are FO alarms annunciated in the main control room or incorporated into a general control room trouble alarm with local individual alarms, in accordance with ANSI N195 1976?

    High FO strainer/filter DPs are input signals for the "Master Diesel Generator Trouble Alarm" in the control room. In addition, the alarms are individually alarmed locally.

15. Are any of the instruments that perform a control function and provide an alarm seismically qualified in accordance with the IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations, IEEE 344-1975?

    The licensee's personnel stated that the instruments are seismically qualified.

ATTACHMENT 2

1. Plant Name: Waterford-3 SES

2. Docket: 50-382

3. What are the average containment temperatures during power operation as recorded by the licensee?

The following data are based on the Reactor Containment Building (RCB) temperature readings made during the summers of 1987 and 1988 at the inlet of the containment cooling units to determine compliance with the unit Technical Specifications (TS):

1987

Location	April	May	June	July	August	September
RCB-4						
A51119	109.05	109.57	110.24	110.69	110.11	105.14
A51127	107.31	107.53	107.91	108.37	108.55	104.07
RCB+21						
A51115	111.88	112.68	115.90	116.73	117.10	109.15
A51123	109.67	109.78	113.98	114.78	115.40	108.38
AVERAGE	109.48	109.89	112.01	112.64	112.79	106.68

1988

Location	June	July	August	September	October
RCB-4					
A51119	109.13	110.23	111.55	111.25	110.93
A51127	107.60	108.79	110.38	110.24	109.94
RCB+21					
A51115	114.53	115.94	117.05	116.39	115.47
A51123	114.32	115.41	116.86	116.29	115.34
AVERAGE	111.40	112.59	113.96	113.54	112.92

4. Containment temperature at which the plant is licensed to operate (i.e., operating temperature specified in the FSAR).

The containment temperature at which the plant is licensed to operate is 120°F.

5. Review the temperature readings and provide your assessment as to whether or not you believe the average temperature readings accurately reflect containment conditions, or if there is a significant difference, due to sensor location or stratification of containment atmosphere which could produce hot spots.

   The temperature readings are as prescribed by TS. Based on study DC 3073, dated April 10, 1989, performed by the licensee's Nuclear Operations Engineering (NOE) design engineering group, the measured air temperatures in the reactor head area appear excessive (152.2-152.4°F) because of the design of the air distribution system. In addition, air discharge from the head area is at a reactor building elevation above +100, where the temperature is not monitored. The design of the containment cooling system is shown on the licensee's drawings. Documentation indicated that the NRC was aware of this condition.

   The licensee's NOE design engineering group personnel stated that certain detailed design data on containment cooling, such as cooling air flow paths (as opposed the location of duct work runs), had not been identified.

   The study also identified that temperatures in the Regenerative Heat Exchanger Room are 128 degrees as opposed to the design temperature of 120 degrees. The third problem area identified in the study is at RCB elevation +46 where the temperatures are borderline (approximately 120.8 degrees). The study states that there is no environmentally qualified equipment in this third problem area.

6. What temperature(s) is used by the licensee in its equipment environmental qualification program when calculating the remaining qualified lifetime for all equipment inside containment, and are these temperatures consistent with temperatures being experienced?

   The temperature used is 120°F, except in the 2 areas where the licensee has identified higher temperatures.

7. Administrative temperature limit for the containment, if no technical specification limit exists?

   Not applicable. There is a TS limit.

8. Recent history of temperatures inside containment. Provide containment average air temperature in addition to the containment air temperatures used to compute the average air temperatures for the months of April, May, June, July, August, and September 1987.

   See the response to question 3. above.