

APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-382/88-06

Operating License: NPF-48

Docket: 50-382

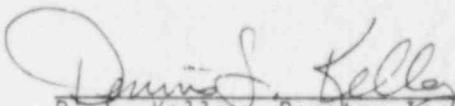
Licensee: Louisiana Power & Light Company (LP&L)
317 Baronne Street
New Orleans, Louisiana 70160

Facility Name: Waterford 3 Steam Electric Station (W3 SES)

Inspection At: Taft, Louisiana

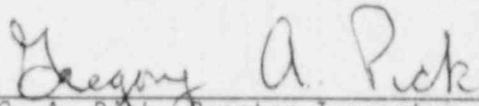
Inspection Conducted: February 29 through March 4, 1988

Inspectors:



D. L. Kelley, Reactor Inspector, Test Programs
Section, Division of Reactor Safety

4/12/88
Date



G. A. Pick, Reactor Inspector, Operational
Programs Section, Division of Reactor Safety

April 12, 1988
Date

Accompanying
Personnel:

P. O. Chopra, D. L. Wigginton, and
A. Notafrancesco, Nuclear Reactor Regulation

Approved:



W. C. Seidle, Chief, Test Programs Section
Division of Reactor Safety

4/12/88
Date

Inspection Summary

Inspection Conducted February 29 through March 4, 1988 (Report 50-382/88-06)

Areas Inspected: Nonroutine, announced inspection of diesel generator
reliability/operability and Technical Specifications reportability.

Results: Within the two areas inspected, no violations or deviations were identified; however, the inspection team members expressed their concern over LP&L's nonconservatism in regard to "A" diesel generator operation outside of its design basis.

DETAILS1. Persons Contacted

- *G. E. Wuller, Operational Licensing
- *M. J. Meisner, Licensing Manager
- *S. A. Alleman, Quality Assurance Manager
- *P. V. Prasankumar, Assistant Plant Manager, Plant Technical Services
- *N. S. Carnes, Nuclear Plant Manager
- *R. P. Barkhurst, Vice President, Nuclear
- *R. S. Starkey, Operations Superintendent
- *D. E. Baker, Event Analysis Manager
- P. N. Backes, Assistant to Plant Manager, Special Projects
- C. R. Gains, Staff Assistant
- R. A. Legere, Plant Engineering, System Engineer
- K. McBee, Instrument and Control
- L. Laughlin, Licensing
- M. K. Smith, Electrical Supervisor

The NRC inspector also interviewed other selected licensee personnel.

*Denotes those licensee personnel attending the exit interview.

2. Diesel Generator Reliability/Operability

A special Region IV inspection team composed of two Region IV reactor inspectors and three representatives from the Office of Nuclear Reactor Regulation were dispatched to W3 SES on February 29, 1988. The team's objective was to assess the reliability of the "A" train diesel generator to perform its design safety function until the scheduled refueling outage in April 1988.

a. Background

W3 SES is equipped with two Cooper-Bessemer emergency diesel generators. The diesel generators are lined up in the emergency start mode during reactor power operation. The W3 SES Technical Specifications (TS) require certain periodic tests to be performed to demonstrate operability. Technical Specification 4.8.1.1.2-4(b) specifies the starting methods for the tests. There are four start signals specified: manual, simulated loss-of-offsite power by itself, simulated loss-of-offsite power in conjunction with an emergency safety feature (ESF) actuation test signal, and an ESF actuation signal by itself. The last three start classifications are emergency starts. In the emergency start mode, all trips are bypassed except engine overspeed and generator high differential fault trip. In the manual start mode, several other trips are active. One such trip is turbo charger low lube oil pressure. When

the engine is started, all engine trips are bypassed for 15 seconds. At the end of 15 seconds, in the manual start mode, all the engine trips are active.

In June 1987, during two consecutive days when the manual start mode was used, the "A" diesel engine tripped after the 15-second bypass timed out. The trips were annunciated as low turbo lube oil pressure. Each time it was restarted, the engine ran satisfactorily. This trip circuit continued to degrade until in October 1987, and thereafter, the engine manual start had to be initiated twice each time a manual start was initiated. Consistently, the turbo charger low lube oil pressure would trip the engine on the first attempt to start. The subsequent start would result in satisfactory operation.

b. Inspection

Because of the licensee's misinterpretation of the reporting requirements for valid and nonvalid failures, the gradual deterioration from the design basis for the "A" diesel generator was not apparent to the NRC. When the condition became known to the NRC, the question of reliability and operability arose. Region IV determined that an immediate team inspection would be required to make these determinations.

The team identified above arrived on site on February 29, 1988. Prior to the arrival of the team, the Region IV W3 SES docket file was searched for all Licensee Event Reports (LERs) and special reports from 1984 to the present. The results of the docket search revealed no new information and did not identify reports of these diesel generator start problems.

The team met with the LP&L diesel generator system engineer and several technical support personnel. The team received a detailed briefing from the licensee's technical staff and reviewed in detail the electrical and pneumatic control system diagrams. These documents were Cooper-Bessemer Pneumatic Drawing KSV-36-11 and Control Wiring Diagram 65-553-110, Sheets 1-3 and 16.

To verify that the oil pressure was indeed not an issue, the licensee started the "A" diesel generator in the emergency mode. There were three team members at the diesel generator to monitor the turbo charger lube oil pressure and the overall engine start process. Two team members were in the control room to observe the starting process and monitor the remote instrumentation. The local condition indication prior to engine start for the turbo charger oil pressure was 3 psig. After engine start, the pressure rose to 7.5 psig (5 psig is minimum). As the engine warmed up, the pressure leveled out at 8.0 psig. The team also verified that the low turbo charger oil pressure trip and alarm did not reset in 15 seconds as designed, but did reset a short time later.

Additional discussion with the system test engineer and review of the diesel generator outage schedule disclosed that the pneumatic control system on the "A" diesel generator is going to be rebuilt. The control air system rebuilding and the diesel generator work will be monitored by the NRC during the April 1988 refueling outage.

A review of licensee procedures was conducted by the NRC inspectors to determine if a program for identification and correction of adverse plant system and equipment conditions was in place. The procedures included in the review are listed below:

NPD-0005, Revision 1, "Corrective Action," dated October 26, 1987.

QAP-012, Revision 6, "Corrective Action," dated February 26, 1988.

UNT-5-002, Revision 7, "Condition Identification," dated July 7, 1987.

UNT-5-015, Revision 0, "Work Authorization Preparation and Implementation," dated July 20, 1987.

MD-1-014, Revision 2, "Conduct of Maintenance," dated December 19, 1987.

In addition to the above procedures, a series of Potential Reportable Events (PRE) from 1985 to 1988 were examined. The PREs selected were all identified problem occurrences with the emergency diesel generators. A list of the PREs examined is contained in Attachment 1 to this report.

c. Findings

(1) Procedural Review

- ° A system of adverse condition identification is in place.
- ° The identification system is used.
- ° Provisions for scheduling of corrective maintenance are in effect.
- ° Directions for the production of detailed work instruction are provided.
- ° The licensee also included the philosophy of timely correction of adverse conditions.

(2) Potential Reportable Events Associated With A Diesel Engine

- The engine trip in the manual start mode is caused by a failure of the pneumatic control system to reset the turbo charger low oil pressure trip prior to the time out 15-second delay of the engine trips.
- The failure is probably caused by internal air leakage in the pneumatic control system.
- The low oil pressure trip is completely bypassed when the diesel generator is in the emergency start mode (this is the normal lineup when the reactor is in Modes 1, 2, 3, or 4).
- There have been, from January 1986 to present, 58 emergency starts with one failure. The failure was due to an electrical component failure in the engine governor control system.

Note: The "B" emergency diesel generator experienced air leakage problems of a different nature. A mini-outage to repair those air leakage problems was conducted in early February of this year and the problems were satisfactorily corrected. Therefore this report does not address the "B" emergency diesel generator.

d. Conclusions

The conclusions drawn by the team were that:

- (1) The 'A' diesel generator will satisfactorily perform its safety function.
- (2) The present manual start problem does not pose a significant safety problem that would preclude continued power plant operation to the scheduled refueling outage in April 1988.
- (3) The purpose of the manual start test surveillance requirements of TS 4.8.1.1.2.a is to verify the overall condition (not just the safety function) of EDG 'A'. This testing function has been defeated since June 1987.
- (4) Although LP&L was aware of the spurious lube oil pressure trip problem and the operation of the diesel engine was different than the design basis, no corrective actions were taken to find the root cause and effect necessary repairs in a timely manner.
- (5) The diesel generators at W3 SES have been start tested very frequently. There were a total of 104 starts for Diesel Generators "A" and "B" during the year 1987. Many of these

starts were performed as part of the Engineered Safety Feature Actuation Signal (ESFAS) subgroup relay functional test. The NRC inspectors believe the operability of these relays can be demonstrated without actually starting the diesel generators. The licensee plans to reevaluate their test procedures to see if the operability of the ESFAS relays can be demonstrated without starting the emergency diesel generators.

3. Technical Specifications Reportability

The inspection team reviewed the PREs related to the diesel generators to determine reportability as required by the Technical Specifications. The NRC inspectors concluded that several of the PRE's should have been reported in accordance with Technical Specification 4.8.1.1.3. This was previously identified in NRC Inspection Report 50-382/87-25 (Unresolved Item 382/8725-05) and will be followed up by the resident inspector.

The Region IV reactor inspectors reviewed the below listed PREs to determine whether their disposition was in agreement with the requirements of 10 CFR 50.73. The listing includes the PRE number, whether LP&L has closed the PRE file and in which Plant Operations Review Committee (PORC) meeting the PRE was reviewed:

| <u>PRE No.</u> | <u>Status</u> | <u>PORC Meeting No.</u> |
|----------------|---------------|-------------------------|
| 87-044 | Open | 87-123 |
| 87-045 | Closed | 87-104 |
| 87-062 | Closed | 87-104 |
| 87-063 | Open | 87-100 |
| 87-066 | Closed | 87-100 |
| 87-067 | Closed | 87-153 |
| 87-080 | Closed | 87-123 |
| 87-082 | Closed | 87-153 |
| 87-085 | Closed | 88-001 |
| 87-088 | Open | 88-010 |
| 87-089 | Closed | 87-146 |
| 87-090 | Closed | 88-001 |
| 87-091 | Closed | 87-134 |
| 87-104 | Closed | 87-149 |
| 87-114 | Open | 88-001 |
| 87-115 | Closed | 88-010 |

The disposition by LP&L of the PREs listed above were determined to be in accordance with the requirements of 10 CFR 50.73. Review of the remaining PREs will be completed in later NRC inspections.

No violations or deviations were identified.

4. Exit Interview

The Region IV reactor inspector summarized the inspection scope and findings on March 4, 1988, with the licensee representatives identified in paragraph 1.

ATTACHMENT 1

The following Potential Reportable Event (PRE) reports were reviewed that concerned diesel generator problems:

| <u>PRE No.</u> | <u>Report</u> | <u>Subject</u> |
|----------------|---------------|---|
| 85-148 | - | EDG B wouldn't start following maintenance |
| 85-201 | LER 85-054 | Loss of offsite power |
| 85-208 | SR 85-022 | EDG A Surveillance Test Failure |
| 86-007 | | EDG B Tripped |
| 86-020 | | EDG A Tripped |
| 86-036 | SR 86-004 | EDG A Tripped |
| 86-105 | | EDG A Turbo bearing seized during maintenance |
| 86-113 | | EDG A Tripped on overspeed |
| 87-013 | | EDG B Fuel Injector Leak |
| 87-047 | | EDG A Test Failure due to air leak |
| #87-059 | | EDG A Trip - Lo Turbo charger lube oil pressure |
| #87-061 | | EDG A Trip - Lo Turbo charger lube oil pressure |
| 87-073 | | EDG A Spurious Bearing Temperature Trip |
| 87-086 | | EDG B Failed control circuit fuses |
| #87-106 | | EDG A Trip - Lo Turbo charger lube oil pressure |
| #87-113 | | EDG A Trip - Lo Turbo charger lube oil pressure |
| #88-005 | | EDG A Trip - Lo Turbo charger lube oil pressure |
| #88-015 | | EDG A Trip - Lo Turbo charger lube oil pressure |

#Occurred on manual diesel engine starts.