APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-458/94-11

License: NPF-47

Licensee: Entergy Operations, Inc.
P.O. Box 220
St. Francisville, Louisiana

Facility Name: River Bend Station (RBS)

Inspection At: RBS, St. Francisville, Louisiana

Inspection Conducted: May 9-13, 1994

Inspectors: M. Runyan, Reactor Inspector, Engineering Branch
Division of Reactor Safety

E. Ford, Senior Resident Inspector
Division of Reactor Projects

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Approved: T. F. Westerman 6-3-94
T. Westerman, Chief, Engineering Branch Date
Division of Reactor Safety

Inspection Summary

Areas Inspected: Routine, announced inspection of maintenance program implementation (specific to diesel generators) and followup of engineering issues.

Results:

- The licensee response to a K-1 exciter shutdown relay failure was determined to be satisfactory (Section 1.1).
- The licensee had adequate procedures for processing vendor technical information and maintained a technically current diesel generator manual (Section 1.2).

- The diesel generator manual was cumbersome and difficult for personnel to use. The licensee had given a high priority to revising the manual under their manual revision program (Section 1.2).

- The licensee had a thorough and well-documented program for performing commercial grade dedications when safety-related parts were not available (Section 1.4).

- The licensee had good procedural provisions for obsolete parts and components (Section 1.4).

- The diesel generator was never unavailable due to a lack of spare parts. The licensee's involvement with the Cooper Owners Group and procurement engineering's dedication process gave the licensee additional options for obtaining spare parts (Section 1.4).

- The vendor procedures used for diesel maintenance were considered satisfactory (Section 1.5).

- The licensee maintained unused procedures for diesel maintenance work. These procedures did not reflect all vendor manual requirements (Section 1.5).

- The licensee used surveillance reports in lieu of hold points to document quality control monitoring of diesel generator maintenance activities (Section 1.6).

- Overall, testing of diesel generators and trending of test data were satisfactory (Section 1.7).

- Division I and II diesel generator instrumentation provided an excellent level of information. Division III instrumentation relied on computer alarm points for several parameters, thereby decreasing the licensee's ability to take early action in the event of degrading conditions (Section 1.7).

- Technical Specification requirements for testing the diesel generators and the fuel and lube oil were properly addressed and proceduralized (Section 1.7).

- A failure to have acceptance criteria incorporated into the vibration measuring procedures, as well as other documents, was considered a weakness (Section 1.7).

- Trending was generally performed in an effective manner by the system engineer; however, there was a lack of trending for lube oil analysis and certain vibration data (Section 1.7).

- Cylinder exhaust temperature and firing pressure data indicated that the diesel generators were well balanced (Section 1.7).

- The procedural threshold for identifying instances of repetitive maintenance was high (Section 1.8).

- Availability and reliability of the diesel generators exceeded station goals (Section 1.8).

- Labeling was marginal in the Division I and II diesel generator rooms; the licensee was planning an upgrade in these areas (Section 1.12).

- The licensee's practice of isolating the diesel jacket water expansion tank level indicator (a tygon hose) prevented continuous knowledge of tank level or water-oil contamination (Section 1.12).

- Overall, the licensee has established an excellent program for maintaining their diesel generators in a reliable condition (Sections 1.1 - 1.12).

Summary of Inspection Findings:

- Inspection Followup Item 458/9322-04 was closed (Section 2.1).

Attachments:

- Attachment - Persons Contacted and Exit Meeting

DETAILS

1 MAINTENANCE PROGRAM IMPLEMENTATION (62700)

The inspection consisted of a multifaceted examination of the licensee's program to operate and maintain the emergency diesel generators.

1.1 Followup of Ongoing Diesel Generator Issues

The Division II diesel generator failed to generate any output voltage during the performance of STP-309-0612, "Diesel Generator Division II 24 Hour Run" on May 8, 1994 (the day before the inspection began).

The licensee determined that the cause of the failed start was that the K-1 exciter shutdown relay had failed to return to the unlatched (reset) position following the preceding engine shutdown. With the relay in the latched position, the relay main contacts are closed and the potential transformers that supply the voltage regulator are shorted. This condition causes the phase-to-phase voltage to collapse, and the generator output is forced to zero. Before initial conditions were disturbed following the failure, the licensee did not verify that the K-1 relay was in the latched position; therefore, the conclusion that it was latched was based on an inference. On May 5, 1994, the Division II diesel generator was started with the field flash circuit deenergized and tagged out. The diesel generator came up to rated voltage and frequency in approximately 10 to 20 seconds due to a phenomenon known as self excitation, which can occur whenever sufficient residual magnetism exists in the generator rotor. The licensee determined that if the K-1 relay had been unlatched prior to the start failure, the generator field would have self excited even if other portions of the field flash circuit had malfunctioned. With the K-1 relay latched, the field is shorted such that self excitation is not possible. The licensee did not detect any problems with the field flash circuitry, which again appeared to indicate that the K-1 relay had caused the problem.

On May 7, 1994, the K-1 exciter shutdown relay had been replaced with a new relay to correct a faulty latch mechanism on the previously installed relay. This problem had been detected when the K-1 relay was manually latched during a maintenance run. After the K-1 relay was replaced, the diesel generator was started successfully four times before the May 8 starting failure occurred.

During an extensive troubleshooting effort, the licensee verified that all components associated with field flashing were functioning properly. The K-1 relay was manually reset approximately five times and the relay was observed to change state to the unlatched position. The relay was then electrically reset approximately 10 times by depressing the exciter shutdown reset push-button. Again, the relay unlatched as designed. The diesel maintenance mode switch was cycled approximately five times and the relay operated as expected. At the conclusion of these checks, the diesel was started four times and came

up to rated voltage and frequency each time. Throughout the troubleshooting effort, the original failure could not be duplicated.

The licensee postulated that the latch on the new relay may have had a burr or other roughness that increased the friction at the trigger lever enough to prevent its operation. The repeated cycling of the relay could have caused the high resistance condition to clear, explaining the inability to duplicate the failure.

To assure that the K-1 relay was in the proper unlatched position and that excitation was available to start the Divisions I and II diesel generators (Division III is of a different design), the licensee initiated Operations Standing Order 109, tasking electrical maintenance to verify the relay position following each diesel generator shutdown or any time the diesel generator mode switch is taken to maintenance and restored to standby (operate). This check should preclude repetition of the original failure. The licensee stated that a new, more reliable, relay is expected to be available by the end of 1994 and that this new relay would be procured and installed.

The inspectors held extensive discussions with the licensee concerning the progress of the troubleshooting efforts and the proposed corrective actions. The inspectors questioned the decision to not replace the suspect K-1 relay with a reconditioned relay in the warehouse. The licensee stated that the 25 successful cycles of the K-1 relay indicated that it was operating reliably and that it made little sense to replace it with a reconditioned relay with no operating history. With the checks delineated by Standing Order 109, the inspectors considered that the only safety-significant vulnerability (raised by the possibility that the relay could again malfunction) would be a potentially delayed restart following an inadvertent shutdown from the emergency operating mode. Nevertheless, in consideration of the licensee's troubleshooting and corrective action steps, the inspectors concluded that the reliability of the Division I and II diesel generators would be enhanced by the post-shutdown verifications, and that the licensee had adequately addressed the short-term implications of the diesel start failure.

1.2 Vendor Material

The inspectors reviewed the licensee's process for acquiring and verifying timely and usable technical information on their diesel generators. This included a review of Procedures RBNP-032 "Processing of Vendor Technical Information," Revision 6, and EDP-AA-65 "Review and Processing of Vendor Technical Information," Revision 6. The inspectors found that the Section Head-Engineering Administration was responsible for overall vendor technical information processing and performed duties such as: contacting vendors of key safety-related components annually; assuring vendor documents are entered into the supplier document handling system; coordinating the engineering review of vendor technical information; and ensuring NORMS updating (NORMS is a computerized reporting system for indexing and tracking of supplier documents). The inspectors reviewed the NORMS listing of current applicable

documents for the diesel generator equipment manual and found that those documents randomly selected for verification were present and current.

The inspectors reviewed the diesel generator manual being utilized by the licensee and noted that, as acknowledged by the licensee, it was cumbersome and difficult to use. The engineer responsible for maintenance of the manual was very knowledgeable regarding its use and had a good ability to find information. However, a system engineer responsible for the diesel generator stated that the manual was very difficult to use, but asserted that given sufficient time he could find needed information. The state of the manual placed a burden on engineers, planners, and maintenance personnel. However, the inspectors did not identify any problems that had occurred which could be clearly attributed to the manual. System engineering and licensing supervisors stated that a program for revising various manuals was in progress and that the diesel generator manual had a high priority. They also stated that a new draft manual would be available after the ongoing outage and they considered it undesirable to replace the manual until then.

A review of the following controlled drawings in the main control room regarding the diesel generators showed they were legible, had been satisfactorily updated, and would provide users with technically current and usable information.

- Fuel oil, all diesels: PID-8-9A, "System 309 Diesel Generator," Revision 8
- Cooling water/lube oil Division I & II: PID-8-9C, "System 309 Diesel Generator," Revision 7
- Cooling water/lube oil/air system: PID-8-9D, "System 309 Diesel Generator," Revision 10
- Air system, Division I: PID-8-9E, "System 309 Diesel Generator," Revision 0
- Air system, Division II: PID-8-9-F, "System 309 Diesel Generator," Revision 0

None of the above drawings had unincorporated changes. Division I and II Air Startup System Drawing PID-8-9B, "System 309 Diesel Generator," Revision 9, had two outstanding changes (MR 89-0237 dated December 11, 1992 and MR 90-0061 dated April 5, 1994). The inspectors concluded from a review of the above drawings that the diesel generator drawings were being properly maintained.

1.3 Notifications

The inspectors reviewed several licensee responses to NRC information notices and 10 CFR Part 21 notifications. The inspectors determined that the licensee had acceptably addressed and documented the technical issues described in the these documents.

1.4 Materials

The inspectors reviewed the "Nuclear Parts Classification Log" for the Division I and II diesel generators that was supplied to the licensee (and utilized by procurement engineering) by Cooper Industries for the IMO Delaval-supplied standby diesel generators. The log covered virtually all spare and replacement parts for the diesel generators and provided the manufacturer-evaluated safety classification by part number and description of the part. The log contained over 2300 items in tabular form with each item containing a description, part number, and safety classification. The inspectors randomly sampled the items and concurred with the licensee's evaluation that the log was conservative in determining which parts were safety-related.

River Bend Station diesel generator parts were procured as safety-related from vendors to the extent possible. When this was impossible, procurement personnel performed a commercial grade dedication (CGD) on a part or component basis. A review of Procedure EDP-EQ-03, "Evaluation and Justification of Commercial Grade Items for Use in Q Class-1 Applications," Revision 4, the procedure used for CGD, showed that it applied to items which were procured as commercial grade items and used as replacements in or on safety-related systems, structures, or components. It provided guidelines for establishing whether a safety-related item was commercial grade. It also established critical design and acceptance characteristics, and established actions required to dedicate items procured as commercial grade.

The procedurally-prescribed dedication process involved a determination of the part's safety function, the characteristics of the part (such as dimensions, hardness, etc.), and the method to verify critical characteristics (i.e. special tests and inspections, supplier survey, or source inspection). The licensee used one form, Verification Actions Form A, to document verifications performed during receipt inspection at the licensee's warehouse, and another form, Verification Actions Form B, to document verifications performed subsequent to issue (e.g., post-installation testing, field verifications, etc.). The inspectors concluded that, although the dedication process had been utilized relatively few times in the last 3 years (less than eight times), the licensee had a thorough process established for dedication. The inspectors reviewed several CGD packages for diesel generator parts and found the justifications to be technically sound.

As one of the primary steps in an engineering evaluation of a purchase requisition, procurement engineering determines whether an item is obsolete or unavailable. For either case, if the fit and functions are the same, they

initiate Procedure EDP-EQ-09, "Parts Interchangeability Evaluation." (If the fit is different the responsibility shifts to design engineering for a design modification.)

The inspectors inquired if any information had been received from vendors regarding obsolete parts or components. The licensee identified a letter sent out by Peebles Electric, Inc. The letter stated that their 10 CFR 50, Appendix B program was being phased out and that generator spares would not be available in the near future. The licensee replied that they had received the letter and were evaluating the following three options: (1) buy now in sufficient quantities, (2) find alternate suppliers, or (3) use the CGD process.

The materials, purchasing,and contracts department's inventory management group was responsible for spare parts management at the River Bend Station. Inventory technicians established minimum and maximum spare parts levels and were responsible for establishing reorder levels. Stocking and reorder levels were based on a combination of consumption rates, computer programs for seldom used parts, projected requirements, bill of materials, carrying costs, and replacement part lead times. From the foregoing and a review of the computer-generated list of diesel generator spares available, the inspectors concluded that there were adequate program controls and parts to support the licensee's preventive and corrective maintenance efforts. Interviews with procurement engineering, as well as inventory management personnel disclosed that the plant had never had a diesel generator unavailable due to lack of spare parts. Additionally, diesel generator spare parts orders were all completed and sent out approximately 6 months prior to and generally received 2 months before the start of Refuel 5.

The inspector noted that the licensee had designated an engineer to represent them at the Cooper Owners Group, an organization comprised of nuclear utilities having Cooper Bessemer KSV Engines. The members make available to other members their inventory of diesel generator spare parts. A procurement group supervisor stated that his group would be involved in review and acceptance of adequacy of any spare parts received in an inter-utility owners group parts transfer. The inspectors verified this statement by reviewing Procedure EDP-EQ-22, "Items with Special Considerations for Procurement, Transfer or Upgrade," Revision 0. The inspectors noted that the procedural requirements gave due consideration to the existing design basis.

1.5 Procedures and Work Instructions

The inspectors reviewed selected maintenance procedures to assess the adequacy of these procedures and to verify that vendor manual recommendations had been satisfactorily incorporated. The inspectors reviewed Procedure CMP-9094, "Emergency Diesel Disassembly, Inspection, Rework and Reassembly," Revision 3, which was applicable to the Division I and II diesel generators, and Procedure CMP-9158, "HPCS Diesel Disassembly, Inspection, Rework and Reassembly," Revision 2, which pertained to the Division III diesel generator.

The inspectors found that vendor recommendations had been incorporated into the procedures with the following two exceptions:

- Procedure CMP-9094, Section 8.2.3.10.a stated, that, with regard to the piston inspection, the piston skirt must be replaced if either oil ring side clearances exceed .030 inches. This was in conflict with the Transamerica Delaval Instruction Manual, Appendix III, which specified a replacement clearance of.020 inches.

- Procedure CMP-9158, Section 8.9.43.6, listed the minimum leak down times for the hydraulic valve lash adjusters. However, the Electro Motive Division Maintenance Manual, Section 2, included a vendor update notice (Power Pointer 5P-84) which specified different leak down times.

The inspectors presented these discrepancies to the system engineer who stated that the licensee does not use the subject procedures. When questioned, he stated that they use the vendor procedures to perform diesel maintenance, which are reviewed by licensee personnel. The inspectors questioned the practice of having approved procedures that were not completely up to date, the concern being the possibility that these procedures could be used by mistake. The licensee stated that there was no possibility of these procedures being used and further stated that they are being maintained in anticipation of possibly upgrading them in the future for use in lieu of the vendor procedures. Based on the inspectors' review, use of these procedures will require detailed review by the licensee for incorporation of vendor requirements.

Diesel generator maintenance is contractually performed by Cooper Energy Services. The inspectors reviewed selected vendor procedures used by Cooper in performing this service. The following procedures were reviewed:

- Procedure EMD-404, "Replace and Time Injectors and Adjust Lash Adjusters, Revision 0;

- Procedure EMD-419, "Replace Fuel Pump and Coupling Spider," Revision 0;

- Procedure EMD-438, "Head, Liner, Piston (Mini Pack) and Crab Bolt Removal and Replacement," Revision 1;

- Procedure RFO-403, "Evaluate the Performance of the Diesel Generator Unit and its Auxiliary Equipment Through Operational Testing," Revision 0;

- Procedure RFO-410, "Turbocharger Examination," Revision 0;

- Procedure RFO-412, "Fuel Injection Equipment Examination and Maintenance," Revision 1; and

- Procedure RFO-448, "Cylinder Head Removal and Reinstallation," Revision 1.

The inspectors found the procedures to accurately reflect information provided in the vendor manuals. All of the procedures referenced the applicable vendor information. In some cases the details of the work to be performed were found in the referenced manual in lieu of being in the procedure itself. Also, instances were noted where acceptance criteria were not included in the procedure, but were contained in the referenced vendor information. The inspectors did not consider this policy to be a concern since it appeared to be well controlled. Overall, the procedures were considered satisfactory and were easy to read and understand.

1.6 Inspection

During the inspection period, no diesel maintenance was performed. Post-maintenance testing was in the final stages for the Division II diesel generator. The inspectors reviewed the results of some completed maintenance activities. The following maintenance work orders were reviewed:

- Maintenance Work Order R203483, Division II Run to Obtain Cylinder Firing Pressures and Other Pre-Maintenance Data

- Maintenance Work Order R180701, Perform Division II Pre-Maintenance Engine Run, Testing, and Inspections

- Maintenance Work Order R180720, Perform Division I Pre-Maintenance Engine Run and Inspections

- Maintenance Work Order R180740, Perform Division II Pre-Maintenance Engine Run, Testing, and Inspections

- Maintenance Work Order R180745, Perform Division II Fuel Injection Pump, Injection Nozzle, and Linkage Inspections

A general observation noted from the review of the work orders was that the quality control witness holdpoints were consistently marked "N/A" (not applicable). The inspector questioned the licensee concerning this policy. The licensee provided the inspectors with a quality assurance surveillance report for recent maintenance on the Division II diesel generator. This was described as the method used to document quality control monitoring of the contracted maintenance activities. Based on review of the completed surveillance, the inspectors concluded that a very good quality assurance inspection had been performed. It appeared that the surveillances provided quality oversight at least equivalent to that afforded by holdpoints.

During a review of Maintenance Work Order R180745 the inspectors identified an observation. Section 6.3 delineated the disassembly and inspection of the Division II diesel generator fuel injection nozzles. It was documented that

trash was found in the assembly. The documented corrective action was to clean and remove the trash. The inspectors questioned the licensee whether a condition report should have been written to determine the source of the trash. The licensee contacted the individual who performed the inspection and was told that dust, rather than trash, had been found. The discovery of dust would not necessitate a condition report; however, the inspectors noted that the inaccurate terminology was misleading.

1.7 Testing

The inspectors reviewed procedures to verify that Technical Specification requirements were addressed and implemented . Technical Specification 4.8.1.1.2.f.8 required a 24-hour run at 3030-3130 kW. On May 10, 1994, the inspectors observed portions of the Division II run and reviewed Procedure STP-309-0612, which satisfied the requirement.

The inspectors reviewed the diesel generator fuel oil testing program implemented by Procedures CSP-0100 "Chemistry/Radiochemistry Technical Specification Surveillance," and CSP-0131 "Receipt, Storage, and Handling of Diesel Fuel Used in Standby Diesel Engines," against the requirements of Technical Specification 4.8.1.1.2. c.1 and c.2, 4.8.1.1.2.d.1 a) through d), 4.8.1.1.2.d.2 and d.3, and 4.8.1.1.2.e. A review of all three diesel generator operability test procedures (STP-309-0201, -0202, and -0203 for Division I, II and III, respectively) showed that Technical Specification 4.8.1.1.2.c.1 and c.2 requirements for fuel tank water removal were satisfied.

The inspectors reviewed the 18-Month Diesel Generator Procedure STP-309-0607, "Lockout Operability Testing Procedure," that requires the diesel generator to be stopped remotely from the control room and discussed testing practices with a cognizant engineer. It was noted that the local and the remote shutdown features were being exercised. This provided assurance that local shutdown control would be available if the diesel generator needed to be stopped quickly for industrial safety reasons.

The licensee's program for obtaining trending data on diesel generator operating parameters was implemented by Procedure PEP-0026 "Diesel Generator Trending and Failure Reporting," Revision 3A. This procedure was established to provide a reporting and recording mechanism in accordance with NRC Regulatory Guide 1.108 and Technical Specification 4.8.1.1.3 for diesel generator operating data and failures.

The Division I and II (3130 kW) diesels were each monitored for 25 engine and generator parameters that allowed for early detection of degradation, wear, heat transfer surface fouling, loss of fluid pressures, increases in filter pressure drops, and various other operating parameters. In the aggregate, this provided an excellent level of information regarding performance.

The Division III diesel generator (rated for 2600 kW and dedicated to the HPCS system) was trended for 18 parameters. These data points provided an adequate

level of information, but relied on computer alarm points to provide information on parameters such as jacket water pressure, and fuel and lube oil filter pressure differential. This decreased the licensee's ability to recognize incipient conditions and take early action to preclude or minimize detrimental effects.

The inspectors verified that the licensee had a program to monitor and trend vibration associated with the diesel generator as part of a plant-wide program established in Procedure PEP-0003 "Vibration Program," Revision 3. A review of this procedure showed an equipment list of components required to undergo vibration testing. Quarterly vibration measurements were taken and trended at approximately 15 positions on each generator. During refueling outages, a more extensive set of vibration readings were taken before and after maintenance activities to ensure that no gross operational change had occurred. These vibration results were not trended. The inspectors noted that there were no written acceptance criteria for vibration data. Discussions with the cognizant engineer disclosed that several unsatisfied requests had been made to obtain this information (vibration limits) from the vendor for the Division I and II diesel generators. The Division III diesel generator vendor had provided the data and it was available to the system engineer, but it had not been incorporated in the program. The inspectors noted another related weakness with regard to information provided to the system engineer in that the chemistry analysis results of the used lube oil samples did not show the acceptance criteria for the analyzed parameters.

The inspectors reviewed test data taken during the ongoing outage concerning cylinder exhaust temperatures and firing pressures. The acceptance criteria for exhaust temperatures was 600 to 1000 degrees F with a maximum deviation from the average of 50 degrees F. All data fell within these requirements except for the initial measurements taken on the Division II diesel generator while running at approximately 75 percent of full load (full load measurements were within specifications). Cylinder 3 and 6 exhaust temperatures were approximately 100 degrees F above the average of the other 6 cylinders. The licensee determined that the cause of this condition was weepage from the fuel injector nozzle of Cylinder 3. Cylinder 6 shared a common exhaust line. Once the situation was corrected, cylinder temperatures on the Division II diesel generator were in specification for all tested loading conditions.

Cylinder firing pressures were measured on Division I and II diesel generators at the full design basis load of 3130 kW. The acceptance criteria for each cylinder was plus or minus 75 psi from the average of all cylinders. All data fell comfortably within these parameters. In all, the exhaust temperature and firing pressure data indicated that the diesel generators were well balanced.

The inspectors discussed used oil analysis trending with the system engineer and reviewed periodic reports for lubricating oil chemistry analysis. Data was available to flag any changes in oil contaminants, wear metals, or additives. The fuel oil test results were periodically received and reviewed by the system engineer. However, trending was not being performed or maintained by the system engineer. This was considered a weakness in the

trending program. The inspectors noted, however, that historically lube oil results have been very good and are supported by data maintained by the system engineer. Another weakness noted by the inspector was a lack of acceptance criteria on the lube oil analysis worksheet for each of the 19 parameters provided to the system engineer by the chemistry department.

1.8 Maintenance History

The inspectors reviewed a spreadsheet detailing all maintenance activities associated with the diesel generators since January 1992. No observations of note resulted from this review.

The inspectors questioned the licensee concerning the methodology used to identify occurrences of repetitive maintenance. The responsibility for tracking repetitive maintenance is assigned to the maintenance planners who develop maintenance work orders. Procedure ADM-0028, "Maintenance Work Order [MWO]," Revision 12, states that a condition report will be issued if, during the planning of an MWO, five or more repetitive or related component failures are identified. The inspectors considered the numeric threshold of five to be somewhat high, but, in discussions with one maintenance planner, learned that condition reports for repetitive conditions are often initiated for as few as three incidents. Nevertheless, the inspectors noted the potential for as many as four similar failures to occur without the identification of a trend.

The inspectors reviewed the following closed condition reports:

92-0968 Crack on Division I Exhaust Cooling Blanket Near Jacket Water
93-0371 Relief Valve Mounted Horizontally
93-0470 Broken Weld on Pipe Support for Lube Oil System
93-0649 Four Bolts Could not be Tightened

In each case, the licensee appeared to have reasonably determined the root cause of the condition and initiated appropriate corrective actions.

The inspectors reviewed performance indicators compiled by the licensee to track diesel generator reliability and availability. This information indicated that the licensee was exceeding station goals in these areas. From January 1 through May 6, 1994, the down time for all three diesel generators was 84.4 hours compared to the station goal of 198 hours. For 1993, these statistics were 201.9 and 471 hours, respectively. Over this period, the average standby availability was greater than 98 percent. System reliability, which was defined as the probability that a diesel generator will start and run for 4 hours without operator action in response to a random demand, was approximately 97 percent on a 12-month sliding average. The diesel generators had not experienced a valid start failure in the last 100 start demands for all three diesel generators, although it appeared likely that the event of May 8, 1994, (see Section 1.1) would be characterized as a valid failure. The sum total of this information suggested that the licensee has maintained and tested the diesel generators in a manner conducive to reliable performance.

1.9 Qualification of Personnel

The inspectors reviewed the qualifications of the individuals performing diesel maintenance and testing. The actual maintenance work was performed by Cooper Energy Services personnel which has its own training and certification process. The pre-maintenance testing was primarily performed by licensee personnel. The inspectors reviewed the training matrix for all of the individuals performing this testing and noted that, with a few exceptions, all had received training that was sufficient to perform the required activities. Those that had not received all of the fundamental training were working with a qualified repairman.

1.10 System Engineer

The inspectors interviewed the diesel system engineer to determine the extent of his responsibilities. The engineer's responsibilities also included being backup for another system. It was noted that the system engineer does not normally review routine surveillance tests on his system, but relies on information being provided to him for possible concerns that could be trended. In addition, the system engineer provides quarterly reports for the diesels. A review of several quarterly reports showed a very good description of the condition and ongoing activities associated with the diesel generators. However, the last written report was submitted in 1993. Recent quarterly reports have been performed verbally with engineering supervision. The inspectors considered the use of a written report to be a better method of conveying this information to higher management.

1.11 Quality Assurance Audits and Surveillances

The inspectors reviewed the following quality assurance audits:

93-02-I-MAINT, Maintenance Programs, July 7, 1993

94-02-I-STPG/TS, Maintenance Programs, April 22, 1994

92-07-I-OPER, Conduct of Operations and Conformance to License Conditions, August 13, 1992

93-02-I-STPG/TS, Surveillance Test/ Technical Specification Program, March 23, 1993

The inspectors also reviewed several quality assurance surveillance reports. Based on this review, the inspectors concluded that the licensee was satisfactorily utilizing quality assurance resources to monitor activities associated with diesel generator testing and maintenance.

1.12 Walkdown

The inspectors walked down the Division I, II, and III diesel generators and observed the operation of the Division II diesel generator during a 24-hour

run. Generally, the cleanliness and material condition of the diesel generators was good, especially the Division III diesel which had been recently painted and relabeled. Labeling in the Division I and II diesel generator rooms was marginal. The licensee stated that the Division I and II diesel generator rooms would be repainted and relabeled in the same manner as Division III within approximately one year.

During its 24-hour run, the Division II diesel generator appeared to be operating smoothly with no anomalous indications or abnormal sounds.

The inspectors noted that a tygon hose was used for level indication on the jacket cooling water system expansion tank. The licensee's practice was to valve-in this indicator whenever level information was taken. The inspectors recognized that water losses from the system could be detected by other means such as floor spillage or, for internal leakage, level increase alarms in the lube oil sump. However, this is considered a poor practice in that a continuous level indication is not available. Furthermore, the opportunity to visually detect an oil-to-water leak is reduced. The licensee stated that a modification was being considered to install a level detection system that would provide continuous level indication.

2 FOLLOWUP-ENGINEERING (92903)

2.1 (Closed) Inspection Followup Item 458/9322-04

The licensee had identified that four emergency diesel generator skid-mounted lube oil relief valves were installed in a horizontal orientation. This was a potential concern because the relief valve vendor, Crosby, historically has stated that its relief valves may open prematurely or become cocked open if not mounted in the recommended vertical orientation. The licensee initiated Condition Report 93-0371 to investigate the concern. The licensee contacted Crosby, which stated that the small 1-1/2 inch x 1-1/2 inch JMB relief valves have internal parts that are very light and that, when accelerated by anticipated shock or seismic loads, would not overcome the spring pressure necessary to make the valve unseat. Crosby officials stated that the horizontal orientation of these relief valves was acceptable.

The inspectors reviewed Condition Report 93-0371 and concluded that the licensee had satisfactorily addressed the concern.

ATTACHMENT

1 PERSONS CONTACTED

1.1 Licensee Personnel

*K. Garner, Licensing Engineer
*D. Lorfing, Supervisor, Licensing
*O. Bulich, Manager, Licensing
*J. Venable, Manager, Operations
*T. Leonard, Director, Engineering
*D. Jormady, Manager, Mechanical/Civil Design
*M. Krupa, Manager, System Engineering
*M. Sellman, General Manager
*R. Biggs, Supervisor, Quality Systems
*E. Ewing, Manager, Maintenance
*R. Ackerman, Engineer
*B. Fichtenkort, Mechanical Balance of Plant (BOP) Engineering
*G. Veder, Project Manager
*J. Thompson, Supervisor, BOP Design Engineering
*D. Wheatley, Licensing
*K. Giadrosich, Manager, Quality Assurance
*S. Allan, Supervisor, Procurement Engineering
*T. Schiebel, System Engineer

1.2 Other Organizations

*W. Curran, Cajun
*W. Day, Cajun

1.3 NRC Personnel

*C. Skinner, Resident Inspector
*W. Smith, Senior Resident Inspector

*Denotes personnel attending the exit meeting

In addition to the personnel listed above, the inspectors contacted other personnel during this inspection period.

2 EXIT MEETING

An exit meeting was conducted on May 13, 1994. During this meeting, the inspectors reviewed the scope and findings of the report. The licensee acknowledged the inspection findings documented in this report. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.