ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	50-458
License Nos.:	NPF-47
Report No.:	50-458/98-17
Licensee:	Entergy Operations, Inc.
Facility:	River Bend Station
Location:	5485 U.S. Highway 61 St. Francisville, Louisiana
Dates:	September 20 through October 31, 1998
Inspectors:	G. D. Replogle, Senior Resident Inspector N. P. Garrett, Resident Inspector J. L. Dixon-Herrity, Senior Resident Inspector, Grand Gulf
Approved by:	C. S. Marschall, Chief, Project Branch C Division of Reactor Projects
Attachment:	Supplemental Information

EXECUTIVE SUMMARY

River Bend Station
NRC Inspection Report 50-458/98-18

Operations

- The conduct of operations was generally professional and safety-conscious (Section O1.1).

- Nuclear equipment operators demonstrated poor attention to detail during the Division I diesel generator 24-hour run in that they failed to properly monitor governor oil level during the surveillance. Subsequently, unacceptable power swings were observed when oil level dropped below that required for proper governor operation. Planned corrective measures to address the oil leak and nuclear equipment operator performance were acceptable (Section O4.1).

Maintenance

- The performance of maintenance and surveillances, in a majority of instances, was thorough and professional (Section M1.1).

- Plant material condition was generally good, but some material condition challenges existed. Material condition concerns included: (1) two minor fuel element failures; and (2) an erratic emergency response information system computer. Conversely, small portions of the emergency core cooling systems and reactor core isolation cooling pump rooms were painted this period.

Engineering

- Initially, Engineering and Operations personnel did not take effective action to compensate for long-standing emergency diesel generator control air design problems. Additionally, management oversight of the activities was ineffective. As a result: (1) the number of compressed air cylinders (for temporary air) were not appropriately controlled; (2) engineers inappropriately assumed that local industries were formally committed to provide additional backup air in an emergency; however, inspectors found that no such agreement existed; and (3) plant staff did not perform appropriate testing until the NRC questioned the adequacy of the temporary air supplies. As a result of the testing, the licensee found that three out of four air regulators did not perform as expected. Subsequent testing demonstrated that the three regulators would have provided minimum requirements for operability. Management provided effective oversight, and plant performance improved following the implementation of a Significant Event Response Team (Section E1.1).

Plant Support

- Housekeeping was considered very good but one problem was identified. In the radwaste building a spill of few gallons of oil and water from a contamination area into the surrounding uncontaminated area was observed (Section O2.1).

- Protected area illumination levels were appropriate, maintenance of the isolation zones around protective area barriers was good, and security personnel were consistently observed to be alert at their duty stations (Section S2.1).

- Emergency preparedness facilities and the on-shift staffing levels were properly maintained in accordance with the River Bend Emergency Plan (Section P2.1).

- The inadvertent use of a contaminated hose when draining an uncontaminated heat exchanger to a clean sump was considered an example of poor contamination controls. Low levels of contamination identified on the hose, dilution with the draining fluids, and the effect of the sewage treatment process resulted in greatly reducing the concentration of radioactive materials leaving the site sewage treatment system. As a result, no discharges to the environment occurred in excess of NRC requirements. The planned corrective measures, including the establishment of a hose control program, were acceptable (Section R1.1).

Report Details

Summary of Plant Status

The plant was in Operational Mode 1 at 100 percent reactor power for most of the inspection period. Plant power was reduced to 65 percent on September 23 to support testing, in an attempt to locate a fuel assembly with a minor fuel cladding leak. Power was returned to 100 percent on September 26. Similarly, on October 30 power was reduced to approximately 65 percent while attempting to identify a second fuel cladding leak, where it remained for the rest of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

The inspectors used Inspection Procedure 71707 to conduct frequent reviews of ongoing plant operations. The conduct of operations was generally professional and safety-conscious.

O2 Operational Status of Facilities and Equipment

O2.1 Engineered Safety Feature System Walkdowns (71707, 71750)

The inspectors walked down accessible portions of the following safety-related systems:

- High Pressure Core Spray (HPCS)
- Divisions I and II and HPCS Diesel Generators (DGs)
- Residual Heat Removal, Trains A, B and C
- Reactor Core Isolation Cooling
- Divisions I, II, and III Switchgear and Battery Rooms
- Standby Gas Treatment System Trains A and B
- Standby Service Water System Trains A and B

Most systems were found to be properly aligned for the plant conditions and generally in good material condition. However, the inspectors identified that two valves in the HPCS DG air start system were not properly locked. While the valves were in the required positions, and did not impact safety, the chains and locks were not securely installed to prevent valve manipulation. Shutting either valve would remove one air start train from service. In response to the concern, the licensee properly locked the valves and captured the concern in Condition Report 98-1279. The inspectors noted that, although the improperly locked valves demonstrated a lack of attention to detail, they did not constitute a safety issue or failure to meet a regulatory or procedural requirement.

Clearance Orders: The inspectors observed or inspected the following safety-related clearance orders and found no problems:

- RB-98-0791, HVK-CHL1D Isolation
- RB-98-1091, EGA-PNL3A Electrical Isolation

Housekeeping: During plant tours, housekeeping was considered very good, but one problem was identified. In the radwaste building, the inspector identified a spill of few gallons of oil and water draining from a posted contamination area into the surrounding uncontaminated area. The inspector informed health physics personnel of the spill and the area was promptly cleaned and decontaminated.

04 Operator Knowledge and Performance

04.1 Nuclear Equipment Operator (NEO) Performance During a 24-Hour DG Surveillance

a. Inspection Scope (71707)

On October 20, 1998, the Division I DG failed the 24-hour run surveillance due to excessive power oscillations. The inspector observed the licensee's response to the event and performed an independent evaluation of the causes.

b. Observations and Findings

During the 24-hour DG run, power oscillations began at approximately 6 p.m. and continued for approximately 4 hours while the licensee attempted to troubleshoot the condition. Power varied by approximately 400 kW and failed to remain within the acceptance criteria (3030 to 3130 kW) specified by Technical Specification Surveillance Requirement 3.8.1.13.a. At approximately 10 p.m. the NEO observed that governor oil level was below the bottom of the sight glass and was not detectable. The DG was shut down to permit further investigation and was declared inoperable.

The licensee determined that governor oil had slowly leaked through the governor booster and into the control air system. Oil leakage continued until operation of the governor was affected by the low oil level, which resulted in power swings. A thin film on the inside of the sight glass had deceived operators into believing that oil level was in acceptable range when it was not. The booster was replaced, the dirty sight glass was cleaned, the 24-hour run was repeated satisfactorily, and the licensee planned to perform a failure analysis of the leaky booster seals. The booster had been rebuilt in September 1997.

The inspector additionally identified that the NEOs had not properly inspected the governor oil sight glass during operation of the DG. While the NEOs had checked the sight glass periodically during the DG run, they did so from a distance and did not pay attention to important details. Some operators stated that they observed the sight glass from several feet away and did not closely check the sight glass. Operators had been

trained to inspect sight glasses from a close proximity with the aid of a flashlight and to check important level indicators, such as the location of the meniscus and the refraction of light through the liquid.

The inspector was concerned with the NEO's performance because the operators would have likely checked the oil level in the same manner during an actual event, which may have resulted in an unnecessary challenge to the DG. Had the operators properly checked the oil level and identified at an early stage that it was decreasing, workers could have taken appropriate corrective action to preclude degraded diesel performance. The licensee planned to discuss the inspectors' findings during routine operator retraining. The inspectors considered the licensee's corrective measures acceptable.

c. Conclusions

NEOs demonstrated poor performance during the Division I DG 24-hour run in that they failed to properly monitor governor oil level during the surveillance. Subsequently, unacceptable power swings were observed when oil level dropped below that required for proper governor operation. Planned corrective measures to address the oil leak and NEO performance were acceptable.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (61726, 62707)

The inspectors observed portions of the following maintenance and surveillance activities.

- TP-98-0008, DG Starting Air Bottle Connection Test
- MAI 317955, DG Emergency Switch P3 Replacement
- MAI 319800, DG Air Start System Desiccant Dryer 1B Gage Installation
- MAI 319837, Division I, DG Air Compressor Belt Replacement
- TP-98-0010, Divisions I and II DG 24-Hour Runs on Backup Air

b. Observations and Findings

The performance of maintenance and surveillances, in a majority of instances, was thorough and professional. Problems with the Division I DG 24-hour run are discussed in Section O4.1 and difficulties with the DG starting air bottle connection test are discussed in Section E1.1.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Review of Material Condition During Plant Tours

a. Inspection Scope (62707)

During this inspection period, the inspectors conducted interviews and routine plant tours to evaluate plant material condition.

b. Observations and Findings

The following material condition concerns were identified:

- **Fuel Element Failure:** On September 17, the licensee identified a minor fuel element failure and took actions to locate and suppress power surrounding the leaking assembly (see NRC Inspection Report 50-458/98-17 for details). On October 18, operators again observed a small increase in off-gas pretreatment activity. A second minor fuel leak was identified and suppressed on October 31. Throughout, the off-gas pretreatment activity levels remained less than one percent of the Technical Specification limit of 290 mci/sec.

  The off-gas system posttreatment release rate was less than detectable but, as a result of minor steam leaks in the turbine building, the plant effluent release rate reached approximately 40 μci/sec. This release rate was a small fraction of the regulatory limits specified in 10 CFR Part 50, Appendix I (the most limiting requirement).

- **Emergency Response Information System (ERIS):** The ERIS "Real Time Analysis and Display" computer continued to be problematic this inspection period and was out of service several times. A replacement computer was onsite and is scheduled to be installed later this year.

Material condition improvements included:

- **Emergency Core Cooling Systems and Reactor Core Isolation Cooling Pump Rooms:** During this inspection period, small portions of the pump rooms were painted. In previous inspection reports, the inspectors reported that the systems and rooms were in need of painting and surface corrosion was evident on most piping runs.

c. Conclusions

Plant material condition was generally good, with some material condition challenges. Material condition concerns included: (1) two minor fuel element failures; and (2) an erratic ERIS real time computer. Conversely, small portions of the emergency core cooling systems and reactor core isolation cooling pump rooms were painted this period.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) EA 96-329, 50-458/01013, 01023, 01033, 01043, 01053 and 01063 (NRC Inspection Report 50-458/96-26): escalated enforcement to address six licensee identified instances where Technical Specification surveillances were not performed as required. The inspectors had performed a preliminary review of this problem, as documented in NRC Inspection Report 50-458/98-15, when addressing more recent instances of missed surveillances. During that investigation, the inspectors determined that the more recent problems were sufficiently different than those addressed by EA 96-329 so that no clear tie between the performance trends could be drawn. Further, the corrective measures taken to address EA 96-329 were reasonable and generally effective at addressing the root causes. During the current inspection period, the inspectors verified that the licensee did not experience a significant recurrence of surveillance problems similar to EA 96-329 related issues. These items are closed.

III. Engineering

E1 Conduct of Engineering

E1.1 Actions to Address DG Control Air Deficiencies

a Scope (37551, 71707)

As documented in NRC Inspection Report 50-458/98-13, in June 1998, NRC inspectors had identified design concerns with the DG control air system. The inspectors observed the licensee's short-term corrective measures to address this problem.

b Observations and Findings

Background: During the previous inspection, NRC inspectors identified that the licensee inappropriately relied on operator action and nonsafety-related compressed air bottles to maintain the Divisions I and II DGs operable for design basis accidents. The DG start system air receivers were the pressurized air source for the control air system, an instrument and controls system that provided additional controls for tripping the DGs and bypass of nonessential trips in response to an emergency start signal. Additionally, the nonsafety-related starting system air compressors were powered from nonsafety electrical buses and would not have functioned during a loss of offsite power. Under

those conditions, the starting system air receivers would gradually lose pressure through leakage, reducing the pressure available to the control air system. This would have created two problems:

- At 120 psig the nonessential DG trips would no longer be bypassed
- At approximately 45 psig, the DG would shutdown.

Recent NRC Observations: The inspectors observed that initial Engineering and Operations response to the immediate safety issues associated with the control air design deficiencies was not timely or thorough. Management oversight of the initial response was not effective. For example:

- While the design problems were brought to the licensee's attention on approximately June 25, 1998, the licensee did not establish effective administrative controls to ensure that sufficient air was onsite until prompted by the NRC approximately 2 months later.
- Engineers inappropriately assumed that River Bend had entered into a formal written agreement with other nearby industries to promptly provide additional air to the River Bend facility. Upon further investigation, inspectors found that this agreement did not exist.
- Over 3 months after the design concerns were raised to the licensee, testing to address NRC questions identified that the temporary air supplies would not have worked as expected. Three of the four staged regulators did not have sufficient capacity to maintain the DG air receivers at the specified pressure of 170 psig. The regulators were purchased for this application but, due to inadequate communication and the lack of engineering involvement, inappropriate regulators were ordered. Appropriate regulators were subsequently obtained and tested.

  The deficient regulators were later tested and would have likely provided sufficient air pressure to maintain starting air pressure slightly above 120 psig, the nonessential DG trip bypass setpoint. As a result, the DGs remained capable of performing their safety functions despite the deficient regulators.

On October 15, 1998, the licensee assembled a Significant Event Response Team to investigate the design-related issues and to provide additional oversight for the remaining activities. Since that time, management has provided effective oversight of corrective measures. The licensee has expedited several of the longer term corrective measures, such as installing safety-related power to at least one air compressor on each division.

c. Conclusions

Initially, Engineering and Operations personnel did not take effective action to compensate for long-standing emergency diesel generator control air design problems.

Additionally, management oversight of the activities was ineffective. As a result: (1) the number of compressed air cylinders (for temporary air) were not appropriately controlled; (2) engineers inappropriately assumed that local industries were formally committed to provide additional backup air in an emergency; however, inspectors found that no such agreement existed; and (3) plant staff did not perform appropriate testing until the NRC questioned the adequacy of the temporary air supplies. As a result of the testing, the licensee found that three of four air regulators did not perform as expected. Subsequent testing demonstrated that the three regulators would have provided minimum requirements for operability. Management provided effective oversight and plant performance improved following the implementation of a Significant Event Response Team.

IV. Plant Support

S2 Status of Security Facilities and Equipment

S2.1 General Comments (71750)

During routine tours the inspector observed protected area illumination levels, maintenance of the isolation zones around protective area barriers, and observed security personnel on duty. No problems were observed.

P2 Status of Emergency Preparedness Facilities, Equipment, and Resources

P2.1 General Comments (71750)

During routine plant tours, the inspectors verified that emergency preparedness facilities were properly maintained and, during off-normal hours, periodically verified that the licensee maintained at least the minimum staffing requirements specified in the River Bend Emergency Plan. No problems were identified.

R1 Radiological Protection and Chemistry Controls

R1.1 Poor Contamination Controls

a. Inspection Scope

The inspector observed the licensee's response to inadvertent use of a contaminated hose for flushing clean water to a uncontaminated sump. The sump discharged to the radiological clean onsite sewer system.

b. Observation and Findings

On October 12, 1998, the licensee identified that workers inadvertently used a contaminated hose to drain a radiologically uncontaminated turbine building closed cooling water heat exchanger to a clean sump. A pump transferred the sump contents

to the site sewage treatment plant. The problem was identified following evaluation of a sample taken from the process stream during the draining. By the time workers had evaluated the sample, however, workers had completed draining the heat exchanger. The evaluation revealed that barely detectable amounts of contamination had been transferred from the hose into the sump water. No contamination was found at the heat exchanger drain.

The licensee concluded that the release of contaminated fluids to the sewer system did not result in discharges to the environment in excess of NRC limits. The inspectors verified through interview of the system operator that the hold-up time for the sewer system was estimated to be at least 20 days and particulate materials would likely have remained in the sludge. Any residual contamination would have been diluted to substantially below allowable concentrations. Additionally, the sewage discharge stream was monitored and operators would have received an alarm if elevated radiation levels had been detected. The operators did not note any alarms during the transfer, indicating that the release was monitored.

Although the consequences of this occurrence were low, poor control of contaminated hoses could result in more significant releases. The subject hose had not been marked as contaminated and was stored with clean hoses. No controls existed to preclude the use of contaminated hoses in clean applications. Therefore, no violation of the licensee's contamination control procedures was identified. Management had expected operators, health physics technicians, and maintenance craftsmen to ensure that potentially contaminated hoses were either disposed of as radwaste or to ensure that surveys verified a lack of contamination prior to returning used hoses to storage with other clean hoses.

As corrective measures, the licensee took positive control of all hoses in the plant. Plant personnel were briefed that all stored hoses should be considered contaminated until actual status could be determined. Clean hoses were required to be obtained from the tool room until further notice. As a long-term corrective measure, the licensee planned to implement a hose control program. The inspectors considered the licensee's short-term and planned corrective measures acceptable.

c. Conclusions

The inadvertent use of a contaminated hose when draining an uncontaminated heat exchanger to a clean sump was considered an example of poor contamination controls. Low levels of contamination identified on the hose, dilution with the draining fluids, and the effect of the sewage treatment process resulted in greatly reducing the concentration of radioactive materials leaving the site sewage treatment system. As a result, no discharges to the environment occurred in excess of NRC requirements. The planned corrective measures, including the establishment of a hose control program, were acceptable.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on November 13, 1998. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Edington, Vice President-Operations
B. Biggs, Licensing Engineer
P. Chapman, Superintendent, Chemistry
D. Dormady, Manager, Plant Engineering
J. Fowler, Acting Director, Quality Programs
T. Hildebrandt, Manager, Maintenance
H. Hutchens, Superintendent, Plant Security
R. King, Director, Nuclear Safety and Regulatory Affairs
D. Lorfing, Supervisor, Licensing
D. Mims, General Manager, Plant Operations
W. O'Malley, Manager, Operations
D. Pace, Director, Design Engineering
A. Wells, Superintendent, Radiation Control

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations
IP 71750:	Plant Support
IP 92902:	Followup, Maintenance

ITEM CLOSED

Closed

50-458/9626-EA 96-329, 50-458/01013, 01023, 01033, 01043, 01053 and 01063	Escalated enforcement to address six instances where Technical Specification surveillances were not performed as required

LIST OF ACRONYMS USED

DG	diesel generator
ERIS	emergency response information system
HPCS	high pressure core spray
MAI	maintenance action item
mci/sec	millicurie per second
NEO	nuclear equipment operator
NRC	U.S. Nuclear Regulatory Commission
psig	pounds per square inch, gage
TP	temporary procedure
μci/sec	microcurie per second