APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-382/94-08

License: NPF-38

Licensee: Entergy Operations, Inc.
P.O. Box B
Killona, Louisiana

Facility Name: Waterford Steam Electric Station, Unit 3, (Waterford 3)

Inspection At: Waterford 3

Inspection Conducted: March 6 through April 16, 1994

Inspectors: E. J. Ford, Senior Resident Inspector

S. J. Campbell, Resident Inspector, Arkansas Nuclear One

J. L. Dixon-Herrity, Resident Inspector

Approved: Thomas F. Stetka — 6/1/94
Thomas F. Stetka, Chief, Project Branch D — Date

Inspection Summary

Areas Inspected: Routine, unannounced inspection of plant status, onsite response to events, operational safety verification, maintenance and surveillance observations, and review of licensee event reports.

Results:

Plant Operations

Plant operations performance was mixed during this period. Plant management appeared committed to safe working operations as evidenced by their conservative actions in response to a nearby toxic gas release. During containment tours at the end of the refueling outage, the inspectors observed the plant to be clean and in good physical condition. However, the inspectors identified lifting slings, which the licensee had stored on top of the pressurizer cubicle, without first requesting engineering to perform an evaluation. The inspectors observed instances of poor work practices, e.g., the use of an electric conduit to hold up hose and the use of instrument tubing supports to store a folded ladder.

The operations staff exhibited an alert and appropriate attentiveness and conservatism in noting a reactor vessel level change anomaly and securing the draindown (Sections 2.3, 3.1.2, 3.1.4, and 3.3).

Maintenance

Inspector observations of outage maintenance and surveillance activities on safety-related equipment showed good adherence to procedural requirements and a willingness to stop ongoing activities when technical difficulties were experienced. Good communications were in evidence for all observed activities, and personnel displayed a good technical knowledge. Maintenance management presence in the plant and at different maintenance activities was noted on numerous occasions (Sections 4 and 5).

The inspectors observed an isolated instance of a poor work practice, when a worker reached down from the refueling bridge to retrieve a floating pole without benefit of a safety belt (Section 3.1.2).

Engineering

Engineering performance was good during this period. The engineering organization's direct hands-on involvement in outage activities was found to be a commendable effort to more closely align engineering with the day-to-day activities of the plant (Section 3.6).

Plant Support

Most of the inspection effort in the plant support area focused on radiation protection during this period. Licensee performance was mixed. Activities scheduled by plant management reflected a proactive approach to achieving as low as reasonably achievable (ALARA) goals. This was demonstrated by the licensee's successful efforts to decontaminate the containment building (Section 3.1.1).

A health physics technician identified a worker not properly dressed in a contamination zone. The worker failed to review and to follow the applicable RWP. Health physics personnel missed opportunities to review the RWP requirements and to assure that the worker complied with these requirements. This was considered to be a violation of Technical Specification 6.8.1 (Section 3.1.3).

The licensee had a positive and creative approach in reducing outage exposure and industrial accidents (Section 3.5).

Summary of Inspection Findings:

- Violation 382/9408-01 was opened (Section 3.1.3).
- Inspection Followup Item 382/9408-02 was opened (Section 3.1.4).
- Licensee Event Report 93-001 was closed (Section 6.1).

Attachments:

- Persons Contacted and Exit Meeting

DETAILS

1 PLANT STATUS

The plant commenced a scheduled 46 day outage, the plant's sixth refueling outage, at the beginning of the report period. Among those items on or near critical path were: reactor refueling, moisture separator tube bundle replacement, turbine generator and steam generator inspections, emergency diesel generator and safety bus outages, and MDR relay replacements. The plant remained in the outage at the end of this inspection period.

2 ONSITE RESPONSE TO EVENTS (93702)

2.1 Medical Treatment of Containment Building Workers

Between March 5 and 6, 1994, after shutting the reactor down for Refueling Outage 6, but prior to starting the temporary containment cooling system, 4 out of approximately 100 workers involved in the preliminary decontamination of the containment suffered from apparent heat stress. The four individuals had not exceeded their stay times in containment and the required ice vests they were wearing were still frozen. One individual had minor symptoms and did not require treatment. The other individuals were required to be transported to offsite medical facilities for tests and treatment. The inspector's discussions with the site doctor revealed that two of the three individuals transported offsite had low blood sugar levels, apparently due to poor eating habits. The third developed cramping, apparently due to the thermal shock of exiting the containment building to a cooler environment. There was no contamination involved in any of the cases and those taken offsite were released shortly after tests were performed.

2.2 Refuel Machine Hoistbox Failure

On March 9, 1994, the refueling machine's control element assembly (CEA) handling mast hoistbox, although still connected to the mast, dropped and struck the fuel transfer machine while the licensee was performing inspections of the refueling equipment in the drained fuel transfer canal inside containment. A contract employee was struck by the hoistbox and received a minor injury. The hoistbox had been recently reinstalled after refurbishment, and it had been raised and lowered without problems prior to the incident. The plant was in Mode 5 (cold shutdown) preparing for fuel movement and the reactor head was still bolted in place. Licensee investigations disclosed that a retainer plate in the drive mechanism had failed, resulting in a loss of braking capability for the hoistbox and grapple.

The Waterford 3 refueling machine is unique in that it has two masts, a fuel handling mast, and a CEA handling mast. The fuel handling mast was unaffected and its drive and braking mechanism were configured differently. The licensee modified their fuel movement plan to allow the CEA mast to be secured for the duration of fuel movement. Further details regarding this incident are documented in NRC Inspection Report 50-328/94-03.

2.3 Toxic Gas Release

On March 19, 1994, the licensee informed the senior resident inspector that Waterford 3 had declared an alert, as required by their procedures, due to a toxic gas (chlorine) release within 2 miles of the plant. The source of the release was a downwind chemical plant which had reportedly suffered a small pump explosion. Plant personnel became aware of the problem when the control room received phone calls inquiring about the explosion. This prompted a call to the St. Charles industrial hot line where the plant staff received the information and were informed that St. Charles Parish had declared an emergency. The area and road where the chemical plant was located was blocked off by law enforcement officials.

Wind conditions were such that the plant was not threatened; however, as a conservative measure, the licensee required the approximately 1,000 people on site to be sheltered and fuel movements were suspended and made safe during the alert. The control room ventilation system was coincidentally in the recirculation mode due to electrical bus outages in connection with the ongoing refueling outage. The release was terminated at 1:58 a.m., and the plant exited the alert at 2:15 a.m.

2.4 Conclusions

The cases of heat stress in the containment building were not due to improper environmental conditions but, rather, due to individuals who had not eaten properly or had not complied with the requirements addressed by site training. The licensee reacted conservatively to a nearby toxic gas release by sheltering approximately 1,000 on-site workers and suspending fuel movement for the duration of the alert, even though wind conditions were such that the plant was not threatened.

3 OPERATIONAL SAFETY VERIFICATION (71707)

The objectives of this inspection were to ensure that this facility was being operated safely and in conformance with regulatory requirements and that the licensee's management controls were effectively discharging the licensee's responsibilities for continued safe operation.

3.1 Plant Tours

3.1.1 Containment Decontamination

On March 16, 1994, the inspectors made a tour of the +21-foot level of containment with a health physics supervisor to observe general work in progress, health physics activities, and general conditions. The licensee had been conducting decontamination work with the intent of making as much of containment accessible in street clothes as possible. As of that date, the entire +21-foot level and a small portion of the +46-foot level had been successfully decontaminated. This was evidenced by the fact that the cloth shoe covers worn by the inspectors during their extensive tour of the

containment remained free of contamination. The supervisor expressed an intent to have a majority of all elevations in the containment accessible in this manner by the end of the next refueling outage. The inspector noted that this reflected a proactive health physics effort and a progressive management philosophy which will have the additional effect of removing barriers to management and supervisory oversight of activities within the containment.

3.1.2 General Tour of Containment

On March 31, 1994, the inspectors toured containment. Housekeeping was acceptable, but the outer walkways were cluttered. Two poor practices were noted at the -4-foot level. To the east of the personnel hatch, the inspectors noted a hose that lay across the walkway. One end of the hose was being held up off the walkway on electrical conduit. Also, a ladder was found folded and stored on the instrument tubing supports for the Reactor Coolant Loop 2 Hot Leg Pressure Transmitter RC-IPT-0106B and Steam Generator 2 Differential Pressure Shear Shaft Transmitter RC-IDPT-9126 SMB. The inspectors informed shift supervision of these observations. In each case the problem was corrected, and an evaluation showed no negative impact on equipment.

While observing activities on the refueling bridge, the inspectors noted that a worker had dropped a pole into the refueling cavity pool in an area away from the reactor. The pole floated and the worker reached down from the bridge to retrieve it without the benefit of a safety belt and, as a result, almost fell into the pool. Safety belts were not required while working on the bridge because safety rails were installed. However, in this case, the use of one would have been a good practice. Shift supervision was informed of the incident and the individual was counselled on the use of safety belts.

3.1.3 Failure to Follow RWP Requirements

Prior to the inspector entering the containment building on April 12, 1994, a health physics technician noted a containment airlock door operator not wearing rubber gloves while in a contaminated area. The operator was wearing street pants, plastic booties, and a modesty shirt. The health physics technician directed the individual to exit the contaminated area and don rubber gloves prior to continuing work activities in the contaminated area. The individual reentered the contaminated area with only plastic booties and rubber gloves as protective clothing.

The inspector asked the operator how many times the airlock door had been operated without wearing rubber gloves. The operator stated that the area had not been previously posted as a contaminated area during the outage and, therefore, he was not required to wear protective clothing.

After exiting the containment building, the inspector reviewed the applicable RWP (1994-6037) sign-in sheet and verified that the individual's last RWP sign in, prior to April 12, occurred on April 1. The inspector observed that the airlock door operator had only donned rubber gloves and asked health physics

personnel why the individual remained in the containment area without the minimum essential protective clothing as required by the RWP. According to the health physics personnel, they had not bothered to check whether the airlock door operator had satisfied the RWP requirements, because they assumed that the matter had been resolved when the field health physics technician had first directed the airlock door operator to don rubber gloves. After the inspector brought the RWP requirements to the attention of the health physics personnel, they immediately removed the individual from the area, counselled the individual, and initiated Condition Report 94-366.

The inspector reviewed the shift health physics survey record and noted that the area survey was less than 100 decades per minute/100 cm^2 beta-gamma. This was less than the 1000 decades per minute/100 cm^2 beta-gamma limit established by the licensee to define a contaminated area. Therefore, actual contamination of the operator was unlikely.

Procedure HP-001-110, Revision 13, "Radiation Work Permits," Step 4.7, required that individuals working under an RWP review the RWP and familiarize themselves with the radiological conditions in the work area. The airlock door operator's failure to review and follow the RWP as required by Procedure HP-001-110 was a violation of Technical Specification 6.8.1.a (Violation 382/9408-01).

3.1.4 Tour of Containment Building Following Refueling Outage Completion

On April 12, 1994, the inspector toured the containment building while the plant was in Mode 5 and preparing for plant startup from the refueling outage. The containment building was generally free of debris and in good condition. Most large pieces of equipment were appropriately secured, with the exception of some equipment associated with final ongoing work, which was required to be completed prior to entry into other operational modes. The licensee indicated that the scaffolding erected around Safety Injection Tank 2A would be removed prior to entry into Mode 3 (hot standby).

The inspector noted that green power indicator lights were illuminated on containment purge radiation monitors located on Elevation +46-foot but were not illuminated on containment purge radiation monitors on the remaining lower elevations. The licensee stated that the burned-out light bulbs did not impact the operability of the radiation monitors. The inspector verified on Control Display Monitor RM-11 that all the monitors were properly operating. Surveillance Procedure MI-03-0352, Revision 6, "Purge Isolation Area Radiation Monitor Safety Channel Calibration," did not require that the power indicating light be verified. The licensee stated that other radiation monitor surveillances required this verification. The licensee stated that a change to the procedure to incorporate verification of the containment purge radiation monitor power indicating lights would be performed in order to maintain consistency. The licensee replaced the burned-out power indicator lights.

The inspector noted that Containment Purge Radiation Monitor ARMI5024 indicated 1000 mr/hr. The radiation monitor was not alarming and the accompanying health physics technician survey instrumentation indicated a dose rate of less than 5 mr/hr. The Control Display Monitor RM-11 indicated a 2.16 mr/hr dose rate with a high alarm setpoint of 4.00 mr/hr. The inspector reviewed surveillance records and confirmed that the panel meter was checked on March 10, 1994. The licensee assumed that the meter malfunctioned between March 10 and April 12, 1994. The licensee initiated Condition Identification 290790 to correct the erroneous local reading and replaced the meter under Work Authorization (WA) 01122849 on April 12.

The inspector verified that the airlock door was in operation and that all equipment hatch bolts were installed and tightened. The inspector noted that the containment purge supply and exhaust valves were open with the purge fans operating. The applicable Technical Specification did not require these valves be closed while the plant was in Mode 5. The inspector reviewed Operating Procedure OP-002-010, Revision 9, "Reactor Building HVAC and Containment Purge," and verified that the valve manual stops were installed as required on April 11, 1994. The inspector also verified that the purge valve times to stroke close were within the minimum acceptance criteria as required by Procedure OP-903-118, Revision 0, "Primary Auxiliaries Quarterly IST Valve Tests." The licensee completed this surveillance on April 11, 1994.

The inspector identified the presence of oil under Reactor Coolant Pump 2A and questioned the licensee regarding leaks from that pump. The licensee stated that the method of sampling the oil tended to cause oil to spill onto the floor. Reactor Coolant Pump 2A was last sampled under WA 01120718 on March 5, 1994. The licensee stated that the oil was usually cleaned from under all the pumps prior to final closure of the personnel airlock. The licensee is evaluating methods for improving the sampling methodology.

The inspector questioned whether an engineering evaluation was performed to store lifting slings on top of the pressurizer cubicle. The slings were used during the outage to lift the electrical maintenance structure. The licensee removed, stored, and secured the slings in another location. Condition Report 94-378 was initiated because an engineering evaluation had not been performed. The condition report concluded that the slings would not have moved if the plant was subjected to a design basis earthquake. The report concluded that the placement of the slings posed no potential for adversely impacting equipment or components in the containment building while the unit was in Mode 5. The inspector noted the low probability of the lifting lug damaging nearby safety equipment, even at power, but considered that the licensee's evaluation should be reviewed. Inspection Followup Item 382/9408-02 was opened pending the inspector's review of Condition Report 94-378.

The inspector verified that the safety injection sump screens were intact and had no holes and that the trisodium phosphate baskets were full. A visual inspection indicated that there was no debris inside the sump.

3.2 Ammunition Found Onsite

On March 4, 1994, while conducting a routine industrial safety tour, the licensee found 26 rounds of 0.223 caliber and 2 rounds of 0.38 caliber ammunition in a file cabinet within the plant protected area. Shift security supervision was notified and the ammunition was confiscated and locked in the site security armory. Operations shift supervision was informed and a 1 hour notification was made to the NRC. Details of this event will be addressed in NRC Inspection Report 50-382/94-09.

3.3 Unexplained Level Change During Drain Down of Reactor Coolant System

On March 9, 1994, the operations staff noted a small, but unexpected level fluctuation on reactor vessel level indicators while draining to the 19-foot level (approximately reactor vessel flange level). Drain down was secured at 22.2 feet; however, the level then rose until it stabilized at 23.7 feet. The level remained stable at 23.7 feet while the licensee investigated the cause of the anomaly. An engineering evaluation determined that the cause of the level fluctuation was the use of a drain down rate that exceeded vent path capabilities. The maximum drain down rate with the available vent path was determined, and drain down was recommenced later the same day with a required hold at 22 feet to observe indications. No further problems were experienced. The planned corrective action was to incorporate maximum drain down rates for each possible vent path in System Operations Procedure OP-001-003, "Reactor Coolant System Drain Down." The operations staff exhibited alert and appropriate attentiveness and conservatism in noting the level change anomaly and securing the drain down.

3.4 Steam Generator Plug Failure

On March 23, 1994, the licensee stated that a previously plugged steam generator tube had a plug failure in Steam Generator 1. The licensee's contractor had completed eddy current testing of the generator and was performing a closeout inspection when it was determined that secondary side water was leaking by the plugged tube at Row 121, Line 45. Investigation determined that the tube had been plugged in April 1988 due to a 41 percent throughwall indication. Based upon NRC Bulletin 89-01, which identified concerns with a particular lot of Inconel 600 plugs, the licensee replaced the affected plugs with Inconel 690 material in early 1991. The plug that was found to be leaking was one of these Inconel 690 plugs. Additional details of this occurrence were documented in NRC Inspection Report 50-328/94-06.

3.5 Safety and ALARA Incentive Program

Safety scratch-off tickets were given to individuals as rewards for wearing their protective equipment, pointing out safety concerns, and commendable work practices. ALARA tickets were also given out to workers observed to be practicing ALARA concepts. During this outage, an additional safety awareness prize was a new pickup truck. Outage data reviewed by the inspector reflected a decrease in accidents and medical incidents. The licensee attributed this,

in part, to its incentive program. The inspector noted this to be a positive and creative approach by plant management in reducing plant exposure and industrial accidents.

3.6 Engineering Outage Support

Discussions with the licensee, while engaged in observing containment activities, revealed that the Waterford 3 design engineering organization had detailed 21 individuals (of a total of 104) to a number of groups that directly supported the outage.

Engineering anticipated a number of benefits from this arrangement. One was actual field experience in an area where design engineering has a programmatic responsibility. Another was allowing individuals to gain experience in areas that were closely related to their normal responsibilities. The licensee also expected to create a long-term benefit by enhancing the teamwork between the groups. Similar benefits were expected from the assignment of design engineering personnel to other groups, including construction and maintenance engineering. Engineering considered that the practical hands-on experience would foster improved future designs and/or work processes and a smoother design change implementation process.

The inspector considered this program to be a commendable effort to more closely align engineering with the day-to-day activities of the plant.

3.7 Conclusions

The operation's staff was alert and appropriately attentive in noting the level change anomaly and was conservative in securing the drain down. Containment decontamination efforts reflected a proactive health physics attitude and a progressive management philosophy which will have the additional effect of removing barriers to containment entry for management and supervisory oversight. Two poor practices were noted on the 4-foot level of containment involving the use of electrical conduit to hold up hose and the use of instrument tubing supports to store a folded ladder. A poor practice was noted when a worker was observed reaching down from the refueling bridge to retrieve a floating pole without benefit of a safety belt. A tour of containment during start up showed it to be in good condition.

An inspection followup item was opened pending the inspector's review of Condition Report 94-378 for storing a lifting sling on top of the pressurizer cubicle. A health physics technician admonished a worker not properly dressed in a contamination zone; however, the lack of a questioning attitude and missed opportunities by health physics personnel to properly correct the problem was a weakness. A violation was identified for the failure to follow RWP requirements. Through the use of new safety and ALARA incentive programs, the licensee showed a positive and creative approach in reducing outage exposure and industrial accidents.

The inspector considered the engineering organization's direct hands-on involvement in outage activities to be a commendable effort to more closely align engineering with the day-to-day activities of the plant.

4 MONTHLY MAINTENANCE OBSERVATION (62703)

The station maintenance activities affecting safety-related systems and components listed below were observed and documentation reviewed to ascertain that the activities were conducted in accordance with approved WAs, procedures, Technical Specifications, and applicable industry codes or standards.

4.1 Eddy Current Testing of the Letdown Heat Exchanger

On March 29, 1994, the inspectors observed the licensee's eddy current testing of the letdown heat exchanger. The licensee performed the testing as a result of suspected heat exchanger degradation and indications of a leaking tube. Previously, degradation had led to the plugging of two tubes in July 1993 as reported in NRC Inspection Report 50-328/93-23. The inspector reviewed WA 01113418 and determined that it was complete. The test was conducted by mechanical maintenance and a contractor brought onsite for the test. The inspectors verified that the personnel conducting the test were knowledgeable of eddy current testing and were maintaining an accurate status of which tubes had been tested. Evaluation of the data collected revealed that no tubes had through-wall damage greater than the acceptance criteria of 60 percent and that no tubes were required to be plugged. The worst case identified had 29 percent through-wall damage. The work evolution was found to be well conducted in an orderly manner.

4.2 VOTES Testing of Safety Injection Recirculating Header A to Refueling Water Storage Pool Upstream Isolation Valve

On March 30, 1994, the inspectors observed motor-operated valve VOTES diagnostic testing on safety injection recirculating Header A to refueling water storage pool upstream isolation Valve SI-120A. The work was performed in accordance with WA 01116816 and Electrical Maintenance Procedure ME-007-047, Revision 1, "VOTES Testing of Motor Operated Valves." Electrical maintenance personnel performing the task were familiar with the procedural requirements and the VOTES software program. All equipment being used was properly calibrated. Good communications were maintained with the control room. In compliance with the procedure, an engineer from the mechanical maintenance engineering department was contacted after the technicians experienced minor difficulties in calibrating the valve transmitter to the parameters required by the procedure. The engineer came to the job site and assisted in calibrating the transmitter. No other problems were encountered and satisfactory results were obtained. The maintenance activity was conducted in a satisfactory manner.

4.3 Valve Actuator Maintenance

On April 6, 1994, the inspectors observed portions of ongoing maintenance activities while touring the reactor containment building +21- and +35-foot levels. The work involved disassembly of the actuator, o-ring and diaphragm replacement, valve repacking, and actuator reassembly for Safety Injection Tank 2B leakage drain Valve SI-304. The inspectors noted that the work was performed by a knowledgeable contract worker exercising the proper regard for contaminated area work requirements. The required management controls and quality assurance hold points were being observed and WA 01096572 was in use at the work site. This routine work activity was properly conducted.

4.4 Conclusions

Several routine observations of outage work activities on safety-related equipment showed good adherence to procedural requirements and a willingness to stop ongoing activities when technical difficulties were experienced. Good communications were in evidence for all observed activities and personnel, when questioned, displayed a good technical knowledge.

5 BIMONTHLY SURVEILLANCE OBSERVATION (61726)

The inspectors observed the surveillance testing of safety-related systems and components listed below to verify that the activities were being performed in accordance with the licensee's programs and the Technical Specifications.

5.1 Complex Surveillance of Diesel Generator A

On March 15, 1994, with the plant in Mode 5, the inspector observed the shift briefings and several portions of Procedure OP-903-116, "Train B Integrated Emergency Diesel Generator/Engineered Safety Features Test." This test was used to satisfy the 18-month requirements of Technical Specifications 4.8.1.1.2.d and 4.3.2.3. The latter requirement performed response time testing of the 4.16 kV emergency bus under- and degraded-voltage functions; while the former tested the autostart of the diesel with and without loss of offsite power on a safety injection actuation signal, load rejection capability, load shedding, diesel lockout verification, and various other functions. The inspector verified by main control board and plant inspection that the safety injection, emergency feedwater, containment spray, and component cooling water systems were aligned as required by the procedural prerequisites. During testing, and subsequent to test completion, the inspector verified by document review and interviews that other systems were properly aligned for the test and restored upon test completion.

The inspector noted that the Diesel B Sequencer Relays S0X, S1X, and S2X were adjusted in accordance with Modification Package 3408 on March 14, 1994.

A sampling of required test equipment showed that the equipment was within the calibration dates. The inspector observed the briefing conducted by a licensee senior line manager, as required, and noted that the necessary attributes were

addressed, as well as a review of past lessons learned from the conduct of the test. The inspector noted that, prior to test commencement, required personnel were in place in the control room as well as in the diesel room with communications established. The test coordinator was observed to conduct the test in a very methodical and deliberate manner, frequently stopping and double-checking prior to proceeding with the procedural steps. The inspector noted during the loss-of-offsite-power portion of testing that control room lighting was properly augmented by emergency lighting and expected annunciators were received, noted, and acknowledged. The inspector considered the test to have been conducted in an exemplary and cautious manner with careful consideration given to all aspects of the test.

5.2 Engineered Safety Features (ESF) Matrix Test

On April 14, 1994, the inspectors observed operations personnel performing an ESF matrix test on the AC matrix. The task was performed in accordance with the ESF matrix test section of Surveillance Procedure OP-903-107, Revision 11, "Plant Protection System Channel C Functional Test." The test proceeded without a problem until Primary Isolation Valve EFW-228A for emergency feedwater to Steam Generator 1 was closed in accordance with the procedure following the test of the Emergency Feedwater Actuation Signal 1 portion of the matrix. Closed indication was not received on the control room indication for the valve. The position of the valve was verified closed in the plant. The operators narrowed the problem down to the valve's closed limit switch, which was used only for valve position indication. The licensee's electrical maintenance group determined that an out of adjustment limit switch could have been responsible for the errant valve position indication. The control room staff wrote a condition identification on Valve EFW-228A, and electrical maintenance technicians corrected the deficiency. The remainder of the test was performed without incident. The operators were knowledgeable on both the procedure and the system. Good communications were maintained with the control room staff throughout the test.

5.3 Conclusions

A complex surveillance on the emergency diesel generator was conducted in an exemplary manner. The test was preceded by a thorough pre-evolution briefing covering the technical and procedural requirements and considerations from previous lessons learned. The test was carefully conducted with repeat-back communications and double-checking of procedural step requirements before proceeding.

6 ONSITE REVIEW OF LICENSEE EVENT REPORTS (92700)

6.1 (Closed) Licensee Event Report 93-001: Reactor Trip Caused by Age-Related Loss of Inverter and Protection System Power Supply

On March 4, 1993, a reactor trip from 100 percent power occurred as a result of two nearly simultaneous power supply failures. The failures deenergized elements of two channels of the plant protection system, satisfying the

coincidence logic. The licensee determined that the first failure, the loss of Static Uninterruptable Power Supply C, occurred because of a frequency detection card failure. Analysis of the card indicated that the failure was the result of age-related capacitor degradation. The second failure, the loss of the Plant Protection System Power Supply 8, was determined to be caused by excessive current leakage from a capacitor, which increased the current drawn by the power supply and caused the feeder breaker to trip on overcurrent.

The licensee replaced the frequency detection cards in three of the static uninterruptable power supplies. The fourth had recently been replaced because of failure at an earlier date. As part of the licensee's corrective actions, the cards were also scheduled for future replacement on a 7-year periodicity. Power Supply 8 was replaced with an updated power supply. The three remaining power supplies similar to Power Supply 8 were checked for evidence of voltage variation in the output signal. Power Supply 4 showed excessive voltage variation and was replaced. A repetitive task was created to check for excessive voltage variation on all plant protection system power supplies quarterly. The inspectors reviewed the corrective actions taken and determined that they appeared adequate to prevent recurrence of this event.

ATTACHMENT

1 PERSONS CONTACTED

1.1 Licensee Personnel

*R. G. Azzarello, Director, Design Engineering
*R. F. Burski, Director, Nuclear Safety
T. J. Gaudet, Operational Licensing Supervisor
*P. A. Gropp, Systems Engineering Supervisor
*A. D. Haase, Security Supervisor
*J. B. Houghtaling, Technical Services Manager
*D. Landeche, Health Physics Supervisor
*L. W. Laughlin, Licensing Manager
*A. S. Lockhart, Quality Assurance Manager
*D. F. Packer, General Manager, Plant Operations
*W. H. Pendergrass, Shift Supervisor, Licensing
*J. A. Ridgel, Radiation Protection Superintendent
*R. S. Starkey, Operations and Maintenance Manager
D. W. Vinci, Operations Superintendent

*Denotes personnel that attended the exit meeting. In addition to the above personnel, the inspectors contacted other personnel during this inspection period.

2 EXIT MEETING

An exit meeting was conducted on April 21, 1994. During this meeting, the inspectors reviewed the scope and findings of the report. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.