APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report No.: 50-382/90-26

Docket No.: 50-382 License No.: NPF-38

Licensee: Entergy Operations, Inc.
P.O. Box B
Killona, Louisiana 70066

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

Inspection At: Taft, Louisiana

Inspection Conducted: November 14, 1990, through January 8, 1991

Inspectors: W. F. Smith, Senior Resident Inspector
Project Section A, Division of Reactor Projects

S. D. Butler, Resident Inspector
Project Section A, Division of Reactor Projects

Approved: T. F. Westerman 1-18-91
T. F. Westerman, Chief, Project Section A Date

Inspection Summary

Inspection Conducted November 14, 1990, through January 8, 1991
(Report 50-382/90-26)

Areas Inspected: Routine, unannounced inspection of onsite followup of events, monthly maintenance observation, bimonthly surveillance observation, operational safety verification, followup of previously identified items, and licensee event report followup.

Results: The inspectors reviewed the circumstances surrounding a licensee-identified series of problems with the maintenance and operation of the control room air conditioning system and the control room envelope. These safety-related systems and structures were designed to protect the operators from external toxic gas releases and the effects of radiation from postulated accidents. Weaknesses in the licensee's work control processes resulted in operation of the plant in conditions prohibited by the Technical Specifications (TS). Several apparent violations of NRC regulations are identified in paragraph 3.1 based primarily on information voluntarily provided by the licensee. The licensee will be given the opportunity to discuss these findings in terms of root causes, safety significance, and corrective actions during a future enforcement conference.

A noncited violation was identified in paragraph 6, involving failure to comply with a TS surveillance requirement to verify key-locked open the isolation

valves between the low temperature overpressurization reliefs and the reactor coolant system when required. By design, the switches in the control room only allowed removal of the keys when key-locked closed for normal power operation. The licensee took action to initiate a TS change, and reported the issue in accordance with 10 CFR Part 50.73, after the inspector questioned why the licensee considered a switch to be locked while the key was still in the lock.

Two unresolved items were identified in paragraph 4.3 and 4.4. In paragraph 4.3, there was a question raised by the inspector on the correct labeling of General Electric HFA Auxiliary Relays. In paragraph 4.4, the licensee could not explain what appeared to be an inappropriate change in sequence made between revisions of an electrical maintenance procedure for rotary relays.

During the toxic gas release by Occidental Chemical Company on December 27, 1990, the licensee responded in an appropriate and timely manner, and in accordance with their emergency plan implementing procedures. Communications with the NRC were clear and informative. The licensee's emergency planning activities continue to be a strength at Waterford 3.

DETAILS

1. PERSONS CONTACTED

1.1 Principal Licensee Employees

*J. R. McGaha, General Manager, Plant Operations
*P. V. Prasankumar, Technical Services Manager
*D. F. Packer, Operations and Maintenance Manager
*J. J. Zabritski, Assistant Quality Assurance Manager
*D. E. Baker, Director, Operations Support and Assessments
R. G. Azzarello, Director, Engineering and Construction
*T. P. Brennan, Design Engineering Manager
W. T. Labonte, Radiation Protection Superintendent
*T. H. Smith, Plant Engineering Superintendent
*G. M. Davis, Events Analysis Reporting & Response Manager
R. F. Burski, Director, Nuclear Safety
*L. W. Laughlin, Licensing Manager
J. G. Hoffpauir, Maintenance Superintendent
*R. S. Starkey, Operations Superintendent
A. G. Larsen, Assistant Maintenance Superintendent, Electrical
D. T. Dormady, Assistant Maintenance Superintendent, Mechanical
D. C. Matheny, Assistant Maintenance Superintendent, Instrumentation and Controls
L. R. Groseclose, Supervisor-Field Engineering, NOC
B. F. Thigpen, Manager, Nuclear Construction
*K. T. Walsh, Events Analysis & Reporting Supervisor

*Present at exit interview.

In addition to the above personnel, the inspectors held discussions with various operations, engineering, technical support, maintenance, and administrative members of the licensee's staff.

2. PLANT STATUS (71707)

From Novemb 14, 1990, through January 8, 1991, the plant was operated at full power, except for a few hours on November 17, 1990, and again on December 26, 1990, when power was reduced to approximately 90 percent for routine turbine valve testing. Reactor coolant system (RCS) pressure was reduced from 2250 psia to 2150 psia on December 7, 1990, to evaluate potential pressurizer code safety relief valve leakage to the quench tank. As a result, leakage to the quench tank decreased from about 0.1 gpm to about 0.05 gpm. Since the reduction in leakage was not considered by the licensee to be significant enough to justify operating at the reduced RCS saturation margin, the system was restored to normal operating pressure (2250 psia) by December 16, 1990.

3. ONSITE FOLLOWUP OF EVENTS (93702)

3.1 Loss of Function of the Control Room Air Conditioning (CRAC) System

On December 12, 1990, the licensee informed the NRC, pursuant to 10 CFR Part 50.72, and Region IV management that both trains of CRAC were determined to be outside their design basis and were, therefore, inoperable. The plant was operating at full power at the time. The licensee discovered that a fire seal had been removed from a boundary wall in the control room (CR) envelope. The fire seal was originally installed in Penetration VI A0070 around a ventilation duct leading from the computer room in the CR envelope to an adjacent air conditioning (HVAC) equipment room. The fire seal also served as an air seal which helped to maintain the isolation integrity of the CR envelope. Upon discovery, a temporary seal was installed within the hour before a plant shutdown was required by Technical Specification (TS) 3.0.3, and then the licensee declared the CRAC system operable in accordance with TS 3.7.6, based on engineering judgment that the temporary seal would hold CR pressure.

The temporary seal was retested in accordance with a surveillance test procedure on December 14, 1990. However, during the test, the recirculation damper (HVC-213A) for the A emergency filtration unit (EFU) failed in an intermediate position, thus preventing adjustment of makeup air flow to achieve pressurization of the CR envelope to 1/8 inch of water pressure as required by TS 4.7.6. Attempts to achieve the required pressurization by running either or both EFUs were unsuccessful until HVC-213A was gagged closed. With HVC-213A gagged closed, the A EFU was declared inoperable. This placed the plant in a TS action statement (3.7.6) to restore the inoperable EFU to service within 7 days or shut down the plant. Although the B EFU was then capable of meeting the TS pressurization criterion, makeup flow was excessive, indicating possible excessive leakage in the CR envelope.

The licensee initiated engineering evaluations and root cause analyses to confirm the operability of the CRAC system while emergency makeup air flow was in excess of 200 cubic feet per minute (CFM), and to examine the above problems for personnel errors, programmatic breakdowns, lessons to be learned, and possible violations of NRC regulations, so that appropriate corrective actions could be developed and implemented.

On December 17, 1990, the inspectors commenced a review of the circumstances surrounding the above events, including a review of the licensee's investigations. In addition, the licensee and Region IV management conducted telephone conferences on December 21 and 28, 1990, to ensure that both were aware of the issues involved. On January 4, 1991, the licensee discussed the preliminary results of the engineering evaluations with the inspector. The final results were scheduled to be published for NRC review by January 11, 1991. The issues are described in more detail below.

3.1.1 High Makeup Air Flow Required to Pressurize the Control Room

During the licensee's investigation of the December 12 event involving the removal of the fire seal from Penetration IV A0070, it was determined that,

starting in June 1988, more than the design limit of 200 CFM makeup flow of outside air was needed for the CRAC system to pressurize the control room to at least 1/8 inch of water pressure above atmospheric as required by TS Surveillance Requirement 4.7.6.e.3. This was determined during repeated performances of Section 8.5 of PE-05-004, "Control Room Air Conditioning System Surveillance." A condition identification report (CI 259158) was written in September 1988, but since the makeup flow was not an acceptance criterion for the test, the system was considered to be operable, and the deficiency was not corrected until December 1990.

The CRAC system was designed to meet the requirements of General Design Criteria (GDC) 19 of 10 CFR 50, Appendix A, to ensure habitability of the main control room during postulated accidents. The limit of 200 CFM control room leakage at 1/8 inch of water pressure was established to meet the requirements of Regulatory Guide 1.95, "Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release" and Regulatory Guide 1.78 "Assumptions for Evaluating the Habitability of a Nuclear Power Plant Control Room During Postulated Hazardous Chemical Releases." In addition, according to Table 6.4-2 of the Final Safety Analysis Report (FSAR) for Waterford 3, 200 CFM (maximum) makeup flow appeared to have been used for dose calculations to ensure the operators in the control room would not exceed the dose limits of GDC 19 during an accident. There was also correspondence on file (W3P85-3154, dated January 4, 1986) where the licensee acknowledged the NRC's request to include a requirement in TS 3.7.6 that emergency outside air flow not exceed 200 CFM. The licensee responded that PE-5-004 provided adequate controls to ensure that 200 CFM would not be exceeded and thus a change to the TS was not planned. The controls actually provided in the current revision of PE-5-004 did not list 200 CFM as an acceptance criterion; however, the procedure did state what action to take if the 200 CFM maximum flowrate could not be achieved, which was to "correct accordingly."

Once the makeup flow deficiency was resurfaced by the licensee on December 14, 1990, they implemented Procedure NOP-019, "Nonconformance/Indeterminate Qualification Process," to evaluate the safety significance of the deficiency and determine how it affected the operability of the CRAC. By December 19, the licensee established compensatory measures to ensure CRAC operability until further engineering evaluation of the basis for the 200 CFM makeup flow could be performed or the leaks could be repaired. The compensatory measures included assigning dedicated personnel who would seal the door to the CRAC equipment room with duct tape when directed to do so by the Shift Supervisor. It was determined during testing on December 18 that makeup flow to the CR envelope could be reduced to less than 200 CFM, when in the pressurization mode, if the door was sealed. Apparently the majority of the existing leaks were in the CRAC equipment room. While the licensee's root cause investigations and engineering evaluations continued, they were actively pursuing identification and repair of leaks in the CR envelope so that the compensatory measures would not be necessary to meet the requirement of less than 200 CFM makeup flow. This work was completed on December 21, 1990.

The licensee engaged the services of the architect-engineer to assist in determining whether or not the excessive makeup flow had rendered the CRAC

systems inoperable since June 1988. Preliminary calculations indicated that the CRAC systems were operable even though there was an extrapolated makeup rate of as much as 298 CFM. The licensee explained that the calculations were based on more realistic assumptions than were originally assumed in the FSAR, and the documentation will be provided to the inspector for review by January 11, 1991.

Failure of the licensee to control proper makeup air flow using PE-5-004 is an apparent violation of TS 6.8.1.c, which required written procedures to be established and implemented to cover surveillance and test activities of safety-related equipment. The inspectors noted that an emergency makeup flow rate of greater than 200 CFM was first identified in June 1988, a CI (with a 1 week priority) was not written until September 1988, and the work to correct the deficiency was not completed until December 1990. Failure to act promptly to identify and correct the deficiency was an apparent violation of 10 CFR Part 50, Appendix B, Criterion 16, "Corrective Action."

3.1.2 Degradation of Control Room Envelope Due to Fire Seal Replacement

Removal and upgrade of fire seals under Design Change DC 3197 began in November 1990. During preparation of the work documents and implementation planning for the design change, it was apparently not recognized by the licensee that the fire seals in the boundary walls, ceiling, and floor of the CR envelope also performed an air sealing function which ensured that the CRAC systems could operate as designed. This was recognized on December 5, 1990, by the licensee's construction personnel, and work was stopped until the affected penetrations could be identified. Work was postponed until the plant was in a condition where CRAC was not required to be operable. However, while reviewing the scope of the work being accomplished, the licensee's review failed to recognize that the fire seal from Penetration VI A0070 between the computer room (inside the CR envelope) and an adjacent HVAC equipment room (outside CR envelope) had been removed on December 5, 1990. This was identified on December 12 and, recognizing the impact on CRAC, the Shift Supervisor declared both trains of the system inoperable and complied with TS 3.0.3 until a temporary seal could be installed around the duct passing through the penetration. This event was reported to the NRC as required by 10 CFR 50.72(b)(ii)(B). Potentially Reportable Event (PR Report 90-073 was initiated to investigate the problem and document the licensee's findings and corrective action.

Two additional electrical penetration seals in the floor of the computer room were also removed between December 5 and 7. Based on engineering judgement, the licensee determined that these seals would not have made the CRAC inoperable since they had a steel backing plate which was not removed. A watch was stationed at the temporary seal at Penetration VI A0070 to ensure the plastic film and duct tape remained intact, if necessary, until the seal was returned to its original configuration and tested.

When it was discovered by plant management that the CRAC system could have been inoperable for as much as 1 week due to the fire seal removal and that the potential problem for CR envelope degradation was known prior to December 12, NRC Region IV was informed by the licensee on December 13, 1990. Failure to

implement adequate work controls over DC 3197 resulted in the plant being operated in a condition with both trains of CRAC inoperable for a period of approximately 7 days, which was an apparent violation of TS 3.7.6 requirements.

During the week of December 17, 1990, the licensee informed the inspectors that corrective actions were being taken to prevent operational problems resulting from inadequate work process controls on fire seals. Some examples were: (1) adding more information to the penetration schedule to more accurately depict the function of the penetration seals, (2) adding an item to the design change checklist to verify plant operational impact of the proposed work, (3) providing checklists and training for the work instruction planners, (4) revising DC 3197 with the appropriate precautions prior to resuming work, and (5) training nuclear operations construction personnel on control room boundaries.

In addition, the licensee was performing an analysis to determine the safety significance of plant operation during the period when the seal was not installed in Penetration VI A0070. This information had not yet been reviewed by the inspectors, but the licensee stated that it would be available by January 11, 1991.

3.1.3 Damper Failure During CRAC Testing

During the licensee's investigation and followup of the December 12, 1990, event, they performed the CR pressurization surveillance test to ensure that no other work had been done which would have degraded the CR envelope and to retest the temporary seal in Penetration VI A0070. On December 14, Section 8.5 of PE-05-004, was performed. When A train of the EFU was actuated at approximately 9 a.m. in accordance with the procedure, a slight positive pressure was obtained but efforts to modulate the recirculation damper, HVC-213A, were unsuccessful and the positive pressure required by the test and TS 4.7.6.e.3 could not be obtained. While the cause of the problems with the A train were being investigated, the surveillance on the B train was initiated. During this surveillance, with HVC-213A failed in an intermediate position (the failed damper was subsequently determined to have caused the failure of A train), both EFUs running together could not maintain the CR envelope above the 1/8 inch of water pressure required by the TS. After the problem with HVC-213A was identified, the damper was deenergized and tagged shut. The A train of CRAC was declared inoperable in accordance with TS 3.7.6. At 11 p.m. the test was repeated on B train and the unit was able to meet the TS-required pressure, but greater than 200 CFM makeup flow was required. PRE 90-074 was written to evaluate the event but, at the time, the licensee did not consider both trains of CRAC to be inoperable because they had no reason to suspect a problem existed on B train. The inspector questioned the licensee's position because it appeared that both trains were inoperable from approximately 9:30-11 p.m. on December 14, 1990, since neither train could maintain the positive pressure required by TS until HVC-213A was closed, and then B train was successfully retested at 11 p.m. From 9:30-11 p.m. the plant appeared to have been operated in a condition where neither train of CRAC was operable per TS 3.7.6 and, as such, the licensee would be required to take action per TS 3.0.3. This is an apparent violation of NRC regulations.

Since both trains of EFU were unable to pressurize the CR envelope to 1/8 inch of water during a single damper failure on A train only, the inspectors questioned the possible loss of safety function due to a single failure. The licensee assured the inspectors that, as long as the CR leak rate was less than 200 CFM, the recirculation damper (HVC-213A or B) could fail open and the redundant train would still be capable of pressurizing the CR envelope to equal or greater than 1/8 inch of water. The inspectors will review the evaluations and test data when it becomes available to confirm this under Inspector Followup Item (IFI) 382/9026-01.

3.1.4 Possible Loss of Toxic Gas Safety Function

On December 20, 1990, the licensee conducted special tests to determine CRAC system balance, flow, and control room envelope leakage. The test results indicated that the normal CR outside air intake was at 2900 CFM in lieu of the design value of 2200 CFM. Licensee personnel involved did not recognize the significance of the discrepancy until December 27, 1990. While Design Engineering was reviewing CRAC system flow and pressure data, they questioned the ability of the toxic gas isolation response times to prevent unacceptable concentrations from reaching the control room, considering the abnormally high inlet velocity. The shift supervisor was notified and the CRAC system was promptly placed in the isolation mode at 4:56 p.m. on December 27 until the inlet flow could be adjusted or an analysis performed to assure the operability of the CRAC toxic gas isolation response capability. The analysis was completed on January 4, 1991. The licensee determined that the increased flow would not have created a toxic gas response problem. Until the system was rebalanced, the CRAC system was not restored to the normal mode, which also occurred on January 4, 1991.

3.1.5 Conclusions

With regard to the CRAC system problems discussed in paragraph 3.1 above, weaknesses in the corrective action programs were apparent throughout the issues discussed above. In January 1986, the licensee assured the NRC that adequate controls existed in PE-5-004 to assure the maintenance of proper makeup air flow. This proved not to be the case when the procedure was implemented in June 1988 and, as a consequence, the CRAC systems operated in an unreviewed condition from June 1988 through December 1990.

Inadequate work controls relative to Design Change 3197 resulted in a loss of configuration control on December 5, 1990. Although construction personnel recognized the potential of degrading the CR envelope, several days of plant operation occurred in a condition contrary to the limiting condition for operation of TS 3.7.6. Once discovered and corrected, the CR envelope breach at Penetration VI A0070 was temporarily repaired.

On December 14, 1990, when performing the retest to assure control room integrity, neither CRAC train met the operability requirements of TS 4.7.6. The plant appeared to have been operated in a condition prohibited by TS 3.7.6 for approximately 1 hour and 30 minutes until one train was restored to operable status.

After testing the CRAC system on December 20, 1990, a review by the licensee on December 27, 1990, recognized the potential impact that excessive normal outside air intake flow might have had on the system's ability to protect the control room operators from toxic gas releases. The CRAC was placed in the isolation mode and an analysis performed. The analysis, which was completed on January 4, 1991, concluded that a toxic gas problem did not exist.

In view of the complexity of the issues above, the licensee will be given the opportunity to present their root cause findings, their assessment of performance, safety significance of the issues, lessons learned, and what corrective actions have or will be taken in response to the above concerns at the enforcement conference discussed in the cover letter to this inspection report.

3.2 Alert Classification due to Toxic Gas Release

At 8:43 p.m. on December 27, 1990, while the plant was operating at full power, the shift supervisor was notified via the Industrial Hotline that Occidental Chemical Company had experienced a power transformer failure at their plant with a resultant chlorine release. The Occidental plant is 0.8 miles southeast of Waterford 3, and the wind was blowing at about 10 mph from the southeast. At the time of notification, chlorine concentration in the atmosphere at the Mississippi River levee, which was near the Occidental site boundary, was reported to be 0.02 parts per million (ppm). Later during the event, chlorine concentrations at the levee were reported as high as 3 ppm. St. Charles Parish declared a Site Area Emergency in accordance with their emergency plan at 9:07 p.m., at which time the licensee entered their off-normal operating procedure, OP-901-047, Revision 3, "Toxic Chemical Release." The procedure provided instructions to mitigate the effects of the release, including placing the CRAC system in the isolation mode and implementing emergency plan implementing Procedure EP-4-010, Revision 1, "Toxic Chemical Contingency Procedure." The CRAC system had already been in the isolation mode due to a normal air intake damper balancing problem which was identified earlier that day. Without intake air, the toxic gas monitors did not receive as representative a sample as they normally would; however, slight increases were noted by the operators on the chlorine and broad range gas monitors. The alarm setpoints of 2 and 3 ppm, respectively, were not reached, so the CRAC might not have automatically shifted to isolate if it had been in the normal ventilation mode. Upon implementing EP-4-010, which is one of three stand-alone procedures written for toxic chemical emergencies, the licensee commenced sheltering site personnel and declared an Alert Classification, as required by the procedure. The appropriate notifications were made using the standard notification form except that followup notifications were not required by EP-4-010 unless a radiological problem existed on site, which was not the case during the event. The inspector reviewed the logs and notification forms that were filled in and found no problems. The licensee's communicator performed in an exemplary manner with clear and timely dialogue conducted with the appropriate agencies specified in the procedure as well as with the NRC.

At 9:25 p.m., St. Charles Parish downgraded their emergency classification from Site Area Emergency to Alert, then at 9:40 p.m. to Unusual Event, and finally

at 9:44 p.m. exited the event with an "all clear." At 9:45 p.m. the licensee secured from sheltering, about 1 minute short of the 30-minute requirement of EP-4-010 to enter a Site Area Emergency which would have required the duty plant manager to activate the support staff at a backup emergency operations facility off site. This would have been accomplished in accordance with EP-10-020, Revision 1, "Backup EOF Activation, Operation, and Deactivation During a Toxic Chemical Emergency." At 10:04 p.m. the licensee terminated the event by exiting the alert. There were no injuries at Waterford 3, and none were reported from the Occidental plant. Subsequently, the licensee informed the inspectors that a chlorine pipe had failed at Occidental when their process was interrupted. A power transformer at the river water intake structure failed causing a loss of cooling water to the process. The piping failed when the process automatically shut down and diverted the chlorine being used. Occidental was able to isolate the failure once it was identified. The licensee was in the process of critiquing the event with Occidental, local authorities, and site personnel at the end of this inspection period. An internal report will be issued by the licensee in the near future. The inspectors will review the report under Inspector Followup Item (IFI) 382/9026-02.

3.2.1 Conclusion

The licensee's response to the notification that chlorine gas was being released by Occidental Chemical Company appeared to be appropriate, timely, and consistent with plant safety. The licensee's emergency plan had a separate, stand-alone series of three emergency plan implementing procedures which appeared to be well suited for the highly industrialized area in which Waterford 3 is located. Consistent with previous good emergency response performance, the licensee's performance on this event was indicative of strengths in this area.

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 work authorizations (WAs), procedures, TS, and appropriate industry codes or standards.

4.1 WA 01068656

On November 27, 1990, the inspector observed work in progress on Dry Cooling Tower Fan 1A. The fan motor and gear box were being realigned after a design change was completed, adding structural steel to the fan support to reduce vibration. During the realignment, one of the fan blade hubs was found to be worn, allowing the blade tip to contact the shroud. A condition identification report and a WA were written to replace the blade. The inspector reviewed the WA and found it properly prepared, properly authorized, and adequate to perform the work. The inspector also reviewed a Parts Quality Level Determination (PQD 1165) written to upgrade the new fan blade retaining ring, which was purchased as commercial grade, for use in the safety-related fan. No problems were identified.

4.2 WA 01069071

On December 4, 1990, the inspector observed troubleshooting on the Channel 1 automatic actuation logic of the Plant Protection System (PPS). The logic relays for several Engineered Safety Feature Actuation Systems (ESFAS) had spuriously tripped on December 3, placing the unit in a 48-hour TS action statement requiring plant shutdown. The WA was reviewed and had general instructions to troubleshoot the problem with subsequent addition of specific instructions to check the contact status of the Channel 1 recirculation actuation system trip string relays. At one point it appeared that the problem was in the BD logic matrix but, when the relay card was replaced, it appeared that other ESFAS relays on that card were not functioning properly. The technician assumed that the replacement card was bad and continued to replace the card with other new matrix relay cards. It was subsequently determined that the voltage from the power supply for the relays was lower than normal and causing the problem. The power supply was replaced and the channel returned to service later in the day. It appeared to the inspector that bench testing of replacement cards, before they were used, might have prevented the confusion and delay during troubleshooting. This was discussed with the maintenance superintendent. No other problems were identified.

4.3 WA 01053661

On January 3, 1991, the inspector observed preventive maintenance (PM) on the 74-alarm relay for the A containment spray pump. The tag-out was reviewed and determined to be appropriate since other PM's were being performed on the pump. The inspector reviewed the WA and Electrical Maintenance Procedure ME-07-036, Revision 4, "Testing Procedure G.E. Auxiliary Relays, HFA51A and HFA51B, and found them properly authorized and appropriate for the work to be performed. When label plate data for the relay was checked against the component data sheet, a discrepancy was identified and the work stopped. The data sheet indicated that the relay should have been a Model 12HFA51B95F, but the label plate on the relay read Model 12HFA51A95F, which is the same type relay with automatic reset instead of manual reset. The licensee started investigating the discrepancy since several other 74-alarm relays for other components in the plant nad the -A95F designation when it was presumed that they were -B95F type relays. This item was not resolved as of the end of this inspection period. Until the licensee determines the correct relay labeling, this item shall be tracked as Unresolved Item 382/9026-03. The same PM was observed on the 74-alarm relay for the A high pressure safety injection pump under WA 01056804. Correct lifting of leads and installation of jumpers and independent verification of their restoration was observed as was the adjustment of the relay to meet the acceptance criteria of ME-07-036. Proper restoration of both the containment spray and high pressure injection pumps was verified by the inspector. No other problems were identified.

4.4 WA 01070530

On January 3, 1991, the inspector observed the replacement of Relay HCV-EREL-1163A, which is an electro-switch control switch isolation relay for the kitchen and conference room exhaust fan outlet damper (HVC-314). This damper

is a part of the control room envelope. The relay had failed the previous day during operation of the fan and damper. The licensee had a previous history of failures of electro-switch rotary relays and had prepared a special maintenance procedure, ME-007-050, Revision 2, "Testing Procedure Electroswitch Control/Latching Relay," to implement recommendations of an engineering review (CI250865). The WA required testing of the replacement relay in accordance with ME-007-050 as part of the work instruction. The inspector observed the operational testing of the relay on a test cart in the relay room after it had been tested through 25 cycles in the shop per Section 8.3 of ME-007-050. When questioned, the licensee stated that they were complying with Revision 2 of the procedure as they interpreted it, since the actual installation step (8.4.13) did not occur until after field cycling of the relay 10 additional times in Section 8.4. The inspector later reviewed Revision 1 of ME-007-050 which required 25 cycles of the relay in the shop, then 10 additional cycles of the relay after it had been reinstalled in its panel. It appeared that the sequence of testing had been altered and, thus, the intent of the procedure, when Revision 2 was issued. This was brought to the attention of the electrical maintenance superintendent who indicated he would investigate the reason for the change in the procedural sequence between Revision 1 and 2. Until the inspector can determine if this alteration was intentional or due to inadequate review of Revision 2, this item will remain unresolved (Unresolved Item 382/9026-04). No other problems were identified with the maintenance activity.

4.5 WA 01070580

On January 4, 1991, the inspector observed replacement and functional testing of reactor trip circuit breaker TCB 4 which had failed to reclose during protection system testing earlier in the day. The WA required reinstallation and functional and response testing in accordance with ME-004-155, Revision 8, "Reactor Trip Switchgear Breakers," and OP-903-006, Revision 3, "Reactor Trip Circuit Breaker Test." The WA was properly prepared and authorized and appeared appropriate for the work involved. No problems were identified during the maintenance activity. The reactor trip circuit breaker that failed was a General Electric Type AK-2-25 600-ampere power circuit breaker. The licensee inspected the breaker and determined that a mechanical stop for the trip latch was bent, allowing it to overtravel and prevent the breaker from reclosing even when the undervoltage and shunt trip coils were reset. It did not appear that the failure could have prevented the breaker from tripping. The licensee planned to send the breaker to General Electric to be repaired and refurbished.

4.6 Conclusions

No violations or deviations were identified. The performance of corrective maintenance has continued to improve.

5. MONTHLY 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 TS. The applicable procedures were reviewed for adequacy,

test instrumentation was verified to be in calibration, and test data was reviewed for accuracy and completeness. The inspectors ascertained that any deficiencies identified were properly reviewed and resolved.

5.1 Procedure MI-003-372, Revision 6, "Control Room Outside Air Intake Isolation Radiation Monitor Functional Test"

On November 29, 1990, the inspector observed portions of the high alarm/isolation signal check, and circuit failure/power loss test of Radiation Monitor ARM-IR-0200.2. The technicians followed the procedure without any problems. The instrument performed as expected. The inspector noted that the procedure had not had the biennial review required by TS 6.8.2 since April 22, 1988. The licensee's procedures upgrade program, initiated in early 1989, was behind a new schedule for completion on March 31, 1991, but with an improving trend. As of December 1990, only 312 of 431 instrument and control maintenance procedures were upgraded. The licensee has discussed the poor schedule performance on this project with the resident inspectors and Region IV staff in the past, and it was agreed that quality upgrades were more important than rushing the reviews to meet schedules. The licensee is still projecting to finish the project and have all procedures in compliance with the biennial review cycle by March 31, 1991. No other problems were identified.

5.2 Procedure MI-003-101, Revision 4, "NI Linear Power Channel Calibration Safety Channel A, B, C, or D"

On January 7, 1991, the inspector observed portions of the quarterly calibration of excore nuclear instrument Channel D. Satisfactory results were obtained, and the technicians followed this procedure verbatim. The procedure had been upgraded on April 30, 1990, and accomplished the calibration in a logical, step-by-step manner. No problems were identified.

5.3 Conclusions

No violations or deviations were identified. The inspectors noted continued excellent performance of surveillance tests by well-trained personnel in the instrument and controls area.

6. 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, to ensure that the licensee's management controls were effectively discharging the licensee's responsibilities for continued safe operation, to assure that selected activities of the licensee's radiological protection programs were implemented in conformance with plant policies and procedures and in compliance with regulatory requirements, and to inspect the licensee's compliance with the approved physical security plan.

The inspectors conducted control room observations and plant inspection tours and reviewed logs and licensee documentation of equipment problems. Through

in-plant observations and attendance of the licensee's plan-of-the-day meetings, the inspectors maintained cognizance over plant status and TS action statements in effect.

During routine tours between December 17 and 21, 1990, the inspector verified that the licensee was prepared to implement their freeze protection measures in accordance with System Operating Procedure OP-2-007, Revision 5, "Freeze Protection and Temperature Maintenance." Weather predictions for the following week forecasted freezing temperatures. During the brief freeze, on or about December 25, 1990, no problems occurred.

On December 21, 1990, the licensee informed the NRC that unseasonably cold weather was predicted for all of the Entergy Services, Inc., area and, as such, system generation capability could become limited due to the effects of cold weather on fossil burning plants associated with the system. The load dispatcher requested that Waterford 3 avoid activities that could increase the probability of a plant shutdown. The licensee noted that TS Surveillance Requirements 4.3.4.2.a and -b were planned for that timeframe and would become overdue on December 25, 1990, because the 31-day test was last performed on November 17, 1990. The tests involved a 10 percent reduction in power and cycling of the main turbine throttle, governor, and reheat stop valves. After discussing the possibility of requesting a temporary waiver of compliance to delay the test for up to 72 hours with Region IV management, the licensee formally requested the waiver on December 24, 1990. The waiver was verbally granted by NRC Region IV on the basis of an evaluation of the licensee's written request, justification, and safety evaluation. The NRC approval was documented and transmitted by a letter dated December 26, 1990. The surveillance was satisfactorily completed at 12:25 p.m. on December 26, 1990.

On October 11, 1990, while the plant was shut down and cooled down for replacement of the pressurizer code safety relief valves, the inspector noted that the isolation valves between the reactor coolant system and the low temperature, over-pressurization relief valves were locked open at the main control room safeguards systems panel, but the keys were still in the lock switches. TS 4.4.8.3.1 required, in short, that each relief valve be demonstrated operable by verifying that each of the above isolation valves were "key-locked" open in the control room at least once per 12 hours. The licensee has historically been in compliance with this TS, except the keys could not be removed due to the switch design. By design, these valves were locked closed during power operation, at which time the keys were removed and placed in a cabinet in the control room. After the inspector questioned the licensee's practice of considering a switch locked while the key was still in the lock, the licensee initiated a TS change request. While processing the change request, the licensee determined that failure to remove the keys when the isolation valves were to be "key-locked" open was in violation of TS 4.4.8.3.1 and as such was reportable to the NRC in accordance with 10 CFR Part 50.73(a)(2)(i)(B). Licensee Event Report 382/90-018 was issued by the licensee on January 7, 1991, which discussed the licensee's corrective actions. In view of the licensee's 12-hour verifications and the fact that the key switches were on a heavily supervised control panel in the control room, the

safety significance of this issue appeared minimal. This violation is not being cited because the criteria specified in Section V.A of the NRC's Enforcement Policy were satisfied.

During a Safety System Functional Inspection (SSFI) performed by the licensee on their emergency diesel generator, they determined that a possible design margin discrepancy existed with the vital batteries. Due to battery design margin and load requirements, the batteries would not have sufficient capacity if the electrolyte temperature was below 77°F. This was with the assumption that the batteries were at the end of their design life, which they were not. The licensee generated PRE-064, since actual pilot cell temperatures have been recorded as low as 64°F. To ensure that problems with battery capacity do not exist as the batteries age, the licensee changed their administrative controls to ensure battery room temperature and thus electrolyte temperature remained above 77°F. Procedure OI-004-000, Revision 13, "Watch Station and Shift Logs," was changed so that auxiliary operators would verify battery room temperature remained above 77°F. The inspectors were informed that maintenance procedure ME-003-200, Revision F, "Station Battery Bank and Charger (Weekly)" was also to be changed to ensure electrolyte temperatures were kept above 77°F until the issue was resolved. The licensee indicated that they may replace the batteries at a future date with higher capacity batteries so that the electrolyte temperature will no longer be an issue.

6.1 Conclusions

The licensee's management controls continued to effectively discharge the licensee's responsibilities for continued safe operation. Housekeeping and cold weather protection appeared to measure up favorably to the circumstances. Minor problems in these areas have been promptly attended to after identification during licensee management or NRC inspector tours.

The licensee's failure to recognize that a "key-locked" switch should not have been considered in a locked condition while the key was still installed may have been indicative of a lack of attention to detail. However, it appeared very unlikely that the operators and control room shift supervision would permit the isolation valves to be mispositioned. Once identified, the problem was addressed by the licensee and reported to the NRC, and appropriate corrective action was taken. Therefore the violation was not cited.

7. FOLLOWUP OF PREVIOUSLY IDENTIFIED ITEMS (92701, 92702)

7.1 (Closed) Violation 382/8909-01, Enforcement Action (EA) No. 89-69

This violation involved plant operations with an inoperable emergency core cooling subsystem. When the B high pressure safety injection pump became inoperable due to unacceptable recirculation flow during inservice testing on November 22, 1988, the plant was not subsequently shut down as required by TS 3.5.2. This problem was identified by the NRC staff during the maintenance team inspection (NRC Inspection Report 50-382/89-01) and followed up by a special inspection (NRC Inspection Report 50-382/89-09). Consequently, following an enforcement conference on May 8, 1989, an order imposing a civil

monetary penalty was issued on February 2, 1990. On February 22, 1990, payment was made in the amount of $50,000. On May 4, 1989, the licensee issued a standing instruction establishing required flow acceptance criteria. Subsequently, the appropriate surveillance test procedures were revised. The inspector verified that changes were implemented. The licensee reported the incident in LER 382/[illegible] as required by 10 CFR Part 50.73. The LER was closed in NRC Inspection Report 50-382/90-01. The licensee has been testing safety-related pumps in accordance with the revised procedures over the past year, and no problems were identified. This violation is closed.

7.2 (Closed) Inspector Followup Item 382/8917-01

This item was opened to followup on the licensee's action regarding repeated failures of the Auxiliary Component Cooling Water (ACCW) pumps. The failures were due to the thrust assembly retaining nut backing off and rubbing against an end plate and causing the pump bearing to overheat. With the concurrence of the vendor, the licensee revised the technical manual for the ACCW pump to require "staking" of the retaining nut set screw to prevent it from backing out. This corrective action was developed from a root cause evaluation performed by the licensee. This followup item is closed.

7.3 (Closed) Violation 382/8922-03

This Notice of Violation was written when the licensee failed to take adequate corrective action to prevent repetition of a condition adverse to quality. In September 1988, the licensee found seismic supports missing in the core protection calculator cabinets in the control room. After they were installed, an inspection of other cabinets was performed to identify other missing supports. On two subsequent occasions, seismic supports were again found missing or not properly installed. The inspector reviewed the licensee's response to the notice of violation, dated September 11, 1989, which included additional training for maintenance personnel and a thorough root cause investigation of the problem as corrective action. The root cause investigation report (RCI 90-001) was reviewed, including the specific recommended and completed corrective action, and the inspector considered it adequate. This violation is closed.

7.4 (Open) Inspector Followup Item 382/8923-01

On August 19, 1989, a reactor trip occurred due to problems with control element assembly alignment combined with excessive negative axial shape index (ASI) while the operators were attempting to quickly reduce power, late in core life. The transient was caused by several problems and errors, from which there were valuable lessons learned. This IFI was initiated to follow up on final corrective actions taken as a result of lessons learned. The licensee performed a comprehensive evaluation and reported the incident in LER 382/89-017. The LER was closed in NRC Inspection Report 50-382/90-01, on the basis that the incident was properly reported and that the corrective actions listed appeared to address all of the causes associated with the incident. Subsequently, the inspector reviewed each of the actions for completion with satisfactory results, except that the licensee had not completed the evaluation of TS 3.1.3.1.d for

possible changes in order to allow for more manageable control late in core life. Since the plant was approaching the same core life status in the next fuel cycle, the inspector discussed the status of this issue with the licensee. The licensee explained that there have been communications with Combustion Engineering, but the evaluation is not yet completed. The licensee committed to keep the inspector appraised of progress. Should the operators be confronted with a similar situation as the refueling outage in March 1991 approaches, the other training and corrective actions should suffice to prevent similar complications. This item shall remain open.

7.5 (Closed) Inspector Followup Item 382/8923-04

The purpose of this item was to track the licensee's commitment to remove a note from Procedure NOCP-207, Revision 1, "Erecting Scaffold," which inappropriately allowed short-term scaffold to be attached to safety-related, seismic-qualified, equipment for up to 8 hours without an engineering evaluation. The note was removed by Revision 2. On September 1, 1989, the licensee indicated that the procedure was under consideration for plant operations review committee (PORC) review and plant manager approval, though it is not specifically required by the plant TS. Revision 3.1, dated October 22, 1990, was not reviewed by the PORC but was reviewed by Design Engineering and concurred with by Nuclear Quality Assurance, which is adequate for the application. This item is closed.

7.6 (Closed) Violation 382/8926-01

This violation was issued for an inadequate surveillance procedure in that OP-903-030, "Safety Injection Pump Operability Verification," did not include the ASME Code requirement to ensure that the pumps had run for at least 5 minutes prior to taking required data. The inspector reviewed the licensee's response dated November 20, 1989, and their corrective action, which included revising OP-903-030 and reviewing and revising other pump inservice testing procedures to ensure applicable requirements were included. The inspector verified that the affected procedures were revised. The licensee had administrative controls to ensure that subsequent changes to these procedures would be evaluated to prevent inadvertent deletion of any applicable ASME Code requirements. The licensee also performed a comprehensive review of their inservice testing program, comparing it to ASME Code Section XI requirements. This review resulted in Revision 7 to their program which had been approved by PORC but not implemented yet, pending review by the NRC. Additionally, the review resulted in LER 382/90-10 being issued due to discrepancies that were identified by the licensee during the review. This violation is closed.

7.7 (Closed) Violation 382/8935-01

This violation involved failure to follow Radiation Work Permit requirements in that an operator was observed climbing in a contaminated area without the proper protective clothing. The inspector reviewed the licensee's response to the notice of violation dated December 4, 1989, and their corrective action which included retraining for the operator involved and discussion of the

violation with the Operations Department. Documentation of the completed corrective action was reviewed. The inspector considers the corrective actions adequate. This violation is closed.

7.8 (Closed) Inspector Followup Item 382/8941-01

This item was opened to follow up on the corrective action taken as a result of a December 23, 1989, reactor trip attributed to the cold weather. The licensee subsequently issued LER 382/89-024 which described the event in detail and specified the licensee's corrective actions. Since the LER was reviewed, evaluated, and formally closed in paragraph 9.1 of this inspection report, this open item is no longer necessary. This item is closed.

7.9 (Closed) Violation 382/9004-02

This violation involved a procedure inadequacy, where the licensee's administrative controls failed to ensure that changes to the component database (CDB) were reflected in the maintenance database (MDB). As a result, inappropriate quality controls were implemented on a repetitive tack WA pertaining to safety-related dry cooling tower (DCT) Fan 8B, because the CDB designated the fan as safety related but the MDB did not. The licensee performed a review of the databases and found approximately 50 disparities, in addition to the DCT fans. These were corrected and proper controls were implemented to prevent disparities in the future. Procedure NOEP-103, "Component Data Base Safety/Q-Level Component Determination," was revised on June 14, 1990. Administrative Procedure UNT-005-012, "Repetitive Tack Identification," was also revised on June 14, 1990. The appropriate administrative controls to ensure consistency between the MDB and CDB appeared to be in place and were reviewed by the inspector with satisfactory results. This violation is closed.

7.10 (Closed) Inspector Followup Item 382/9005-04

This item was opened to followup on corrective action for a self-identified procedural violation. The violation prevented successful completion of a surveillance test of the plant protection system. As a result of the procedural violation, the licensee initiated Quality Notice QA-90-081. As corrective action, the operations superintendent issued a letter to his personnel stressing attention to detail and strict procedural compliance. In addition, since the root cause of the problem included an unclear procedural step, OP-903-094, Revision 6, "ESFAS Subgroup Relay Test-Operating," was changed to clarify wording of the step in question. The corrective action was considered adequate and this item is closed.

8. LICENSEE EVENT REPORT (LER) REVIEW (90712)

The following LER was reviewed. The inspectors verified that reporting requirements had been met, causes had been identified, corrective actions appeared appropriate, generic applicability had been considered, and the LER forms were complete. The inspectors confirmed that unreviewed safety questions and violations of TS, license conditions, or other regulatory requirements had been adequately described. The NRC tracking status is indicated below.

8.1 (Closed) LER 382/90-011, "ESF Control Room Ventilation Actuations Due to Equipment Malfunction"

9. ONSITE LER FOLLOWUP (92700)

The following LERs were selected for onsite followup inspection to determine whether the licensee has taken the corrective actions as stated in the LER and whether responses to the events were adequate and met regulatory requirements, licensee conditions, and commitments. The NRC tracking status is indicated below:

9.1 (Closed) LER 382/89-024, "Reactor Trip Due to Loss of Feedwater Flow to Steam Generator No. 1"

This LER described a reactor trip that occurred December 23, 1989, when feedwater flow to the No. 1 steam generator was not sufficient to maintain level in the generator and operators manually tripped the reactor. The malfunction of the No. 1 main feed regulating valve (MFRV) had been attributed to the affect of the extreme cold weather on the valve positioner. The valve is located on the roof of the reactor auxiliary building. The proposed corrective actions specified in the LER were reviewed and considered adequate. Implementation of corrective action was reviewed by the inspector.

The licensee added requirements to their cold weather preparation procedure to provide, when necessary, enclosures and heaters for the MFRVs, and other control valves located outside, that could be affected by extremely cold weather. The licensee's previously appointed Instrument Air (IA) task force (formed in conjunction with Generic Letter 88-14) reviewed the event, and operating practices for the IA system, and concluded that there was no evidence that moisture in the system could have caused the malfunction. The licensee utilized the vendor during a subsequent outage to inspect and test the valve positioners. This was done to substantiate their conclusion that the extreme cold in conjunction with possible aging of the rubber and other soft components in the valve positioner was the most likely cause of the MFRV malfunction. The positioners were replaced and shelf life information obtained from the vendor. The licensee is considering establishing a repetitive task to periodically replace the components that are subject to aging. The vendor is performing additional shop testing under simulated conditions to try to further verify their conclusions. Any new information of generic interest will be submitted in a supplemental LER. Finally, additional training was added to the operator initial and requalification training program to provide additional guidance to operators on operation of the feedwater control system and precautions when the system is operated in manual. The inspector considers the implementation of the corrective action complete and the LER closed.

9.2 (Closed) LER 382/88-003A, "Spurious ESF Control Room Ventilation Actuation Due to Equipment Malfunctions"

LER 382/88-003B, under the same title as above, was closed in NRC Inspection Report 50-382/88-26. The LER was only partially closed at that time because the corrective actions had not yet been implemented for the first, second, and

fourth of the four actuations reported. By October 9, 1990, the licensee had completed Design Change 3078, which installed more durable beta shields on the control room outside air intake radiation monitor detectors. The above actions have since significantly reduced the spurious actuations. This LER is closed.

10. EXIT INTERVIEW

The inspection scope and findings were summarized on January 8, 1991, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspectors' findings. The licensee did not identify as proprietary any of the material provided to, or reviewed by, the inspectors during this inspection.