

**ENCLOSURE**

**U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV**

**Docket No.:** 50-382  
**License No.:** NPF-38  
**Report No.:** 50-382/99-23  
**Licensee:** Entergy Operations, Inc.  
**Facility:** Waterford Steam Electric Station, Unit 3  
**Location:** Hwy. 18  
Killona, Louisiana  
**Dates:** September 26 through November 6, 1999  
**Inspectors:** T. R. Farnholtz, Senior Resident Inspector  
J. M. Keeton, Resident Inspector  
**Approved By:** P. H. Harrell, Chief, Project Branch D

**ATTACHMENT:** Supplemental Information

## EXECUTIVE SUMMARY

### Waterford Steam Electric Station, Unit 3 NRC Inspection Report 50-382/99-23

This routine, announced inspection included aspects of operations, maintenance, engineering, and plant support activities. The report covers a 6-week period of resident inspection.

#### Operations

- Ineffective communications among control room operators during plant startup resulted in two Technical Specification violations. These Severity Level IV violations are being treated as a noncited violation consistent with Appendix C of the NRC Enforcement Policy. These violations are in the licensee's corrective action program as Condition Report 99-1022 (Section O4.1).

#### Maintenance

- Planned maintenance to change the hydraulic oil in the accumulators and in the reservoir of Feedwater Isolation Valve A was conducted effectively and efficiently. The prejob briefing and the teamwork demonstrated by the individuals involved was very good. An out-of-position instrument air supply valve was discovered during preparations to conduct the same maintenance on Feedwater Isolation Valve B. The feedwater isolation valve was determined to remain operable (Section M2.2).
- In December 1997, the licensee discovered that they had not been testing Mechanical Snubber MSSR-226A as required by Technical Specifications (Licensee Event Report 50-382/97-034). The failure to perform a surveillance on Mechanical Snubber MSSR-226A, at the required time interval, is a violation of Technical Specification 4.7.8.e.3. This Severity Level IV violation is being treated as a noncited violation consistent with Appendix C of the NRC Enforcement Policy. The corrective actions have been completed per the licensee event report (Section M8.1).

#### Engineering

- Licensee engineers had appropriately addressed all issues related to using a mechanical freeze seal to repair a check valve that was unisolable from the reactor coolant system (Section E1.1).
- System engineers responded appropriately to the discovery of loose inlet air manifold bolts on Emergency Diesel Generator B (Section M2.1).

#### Plant Support

- During routine plant tours, the inspectors observed that radiation measurements had been posted in accordance with NRC requirements and licensee's procedures. The inspectors observed that appropriate postings had been made in areas of elevated radiation. ALARA (as low as is reasonably achievable) postings were considered to be effective. Plant workers were observed complying with all postings (Section R1).

- **The inspectors toured the perimeter of the protected area during evening and weekend periods. The inspectors determined that the lighting was adequate to sufficiently illuminate the isolation zones and areas within the protected area. The inspectors observed security officers maintaining cognizance of security cameras, monitors, and alarm systems inside the central alarm station. Officers were found to be alert to conditions and alarms (Section S2).**

## Report Details

### Summary of Plant Status

At the beginning of this inspection period, the plant was shut down in Mode 5. The plant had been shut down on September 10 to repair Reactor Coolant Pump 2B. Following completion of repairs to Reactor Coolant Pump 2B and high pressure safety injection Check Valve SI-512B, the plant was restarted on September 29, 1999, and 100 percent power was achieved on September 30. Reactor power remained at essentially 100 percent power until the end of this inspection period.

### I. Operations

#### **O1 Conduct of Operations**

##### **O1.1 General Comments (71707)**

The inspectors performed frequent reviews of ongoing plant operations, control room panel walkdowns, and plant tours. Observed activities were performed in a manner consistent with safe operation of the facility. The inspectors also observed several shift turnovers and daily routine shift activities. The shift turnovers were conducted in an effective and thorough manner. The inspectors observed operators using self-checking and peer-checking techniques when manipulating equipment. Three-way communication was routinely observed to be used by operators in the control room and in external communications with equipment operators and maintenance personnel. However, ineffective communications occurred in isolated cases as discussed later in this inspection report.

##### **O1.2 Plant Startup**

###### **a. Inspection Scope (71707)**

The inspectors conducted observations of control room operators during plant startup. Procedures and surveillance tests required to be completed for plant startup were reviewed.

###### **b. Observations and Findings**

After problems had been encountered during the initial heatup on September 27, as discussed in Section O4.1, the inspectors verified that operators had established the required conditions for changing plant modes and that required surveillance tests and inspections were completed. On September 29, operators performed a plant startup in accordance with Procedure OP-010-003, "Plant Startup," Revision 0. Control room access was strictly controlled during the approach to criticality. Three-way communication techniques were strictly enforced by the control room supervisor and shift superintendent. Operations management was present in the control room during all phases of the startup.

c. Conclusions

In general, operators performed well during the plant startup. The use of procedures and procedure adherence were good. Operations management provided the appropriate oversight during the plant startup and power ascension.

**O4 Operator Knowledge and Performance**

**O4.1 Ineffective Communications During Plant Heatup**

a. Inspection Scope (71707, 92901)

The inspectors reviewed the condition report (CR) and procedures associated with the ineffective plant communications demonstrated during plant heatup. The inspectors also interviewed operators involved in the event and reviewed the licensee's preliminary root cause analysis.

b. Observations and Findings

On September 27, 1999, the operators were in the process of performing a plant heatup in preparation for reactor startup in accordance with Procedure OP-010-003, "Plant Startup." The control room supervisor had directed the primary plant operator to increase reactor coolant system (RCS) pressure. The shift superintendent had not heard the control room supervisor direct the RCS pressure increase, but noticed that RCS pressure had increased to greater than 400 psia, and he knew he had not declared Containment Spray Train B operable. Both containment spray trains are required by Technical Specification (TS) 3.6.2.1 to be operable prior to exceeding 400 psia in the RCS. The shift superintendent directed his shift to reduce RCS pressure to below 400 psia.

A crew briefing was held to make the operators aware of the reason RCS pressure was being reduced. During the briefing, the crew also determined that the safety injection tanks (SIT) were still isolated. TS 3.5.1 requires that at least three SITs be operable prior to exceeding 392 psia. TS 3.0.3 was entered upon discovery that the SITs were not operable and the RCS pressure reduction was continued. When RCS pressure was less than 392 psia, TS 3.0.3 was exited. The RCS pressure was determined to have been greater than 392 psia for 46 minutes.

The safety significance of the event was evaluated by the licensee. The licensee found that Containment Spray Train B was fully functional and would have responded automatically, even though it had not been declared operable by the shift superintendent. All four of the SIT tanks had been appropriately filled and pressurized with their isolation valves closed and the breakers energized. If an event had occurred, the isolation valves would have opened automatically in response to an actuation signal. Therefore, the inspectors considered the event to have negligible safety consequences,

but the personnel errors had resulted in compliance issues in that several barriers had been missed by the operators because of ineffective communications.

The inspectors observed that the remedial actions taken by the licensee had been appropriate. These actions included relieving the shift crew from duty the following day in order to perform a panel debrief. The shift crew had been directed to develop an action plan to improve their communications techniques prior to their next shift. The crew had been allowed to return to shift duties on September 29 with the operations manager present to monitor the crews' communications techniques and crew briefings and provide feedback on areas that required additional improvement.

The inspectors noted that Procedure OP-010-003 contained specific cautions stating that TS required SITs to be operable with isolation valves open prior to exceeding 392 psia and that both containment spray trains be declared operable prior to exceeding 400 psia. Also, a startup activities flow chart posted in the shift superintendent's office contained check blocks stating the same precautions. These barriers had been overlooked by the control room supervisor prior to directing the pressure increase.

The failure to have the SITs fully operable prior to exceeding 392 psia in the RCS is a violation of TS 3.5.1. The failure to have both containment spray trains operable prior to exceeding 400 psia is a violation of TS 3.6.2.1. The inspectors considered that ineffective communications among control room operators resulted in these two TS violations. These Severity Level IV violations are being treated as a noncited violation consistent with Appendix C of the NRC Enforcement Policy (50-382/9923-01). These violations are in the licensee's corrective action program as CR 99-1022.

c. Conclusions

Ineffective communications among control room operators during plant startup resulted in two TS violations. These Severity Level IV violations are being treated as a noncited violation consistent with Appendix C of the NRC Enforcement Policy. These violations are in the licensee's corrective action program as Condition Report 99-1022.

**O8 Miscellaneous Operations Issues (92901)**

**O8.1 (Closed) Violation (VIO) 50-382/9724-01: Inadequate instructions provided in work authorization.**

The corrective actions required to close this violation were completed in accordance with corresponding Licensee Event Report (LER) 50-382/97-025. The actions had been completed and the LER had been closed in NRC Inspection Report 50-382/9724.

**O8.2 (Closed) VIO 50-382/9727-01: Failure to initiate a CR.**

This violation was for a failure to initiate a CR in a timely fashion. The corrective actions included additional training on examples of CR initiation threshold. The corrective actions were considered to be appropriate.

**II. Maintenance**

**M1 Conduct of Maintenance (61726, 62707)**

The inspectors observed all or portions of the following maintenance and surveillance activities, as specified by the referenced maintenance action items and surveillance procedures:

- OP-903-068 Emergency Diesel Generator B Surveillance Run
- OP-903-068 Emergency Diesel Generator A Surveillance Run
- OP-903-046 Emergency Feed Pump Operability Check
- 410683 Change Oil in Feedwater Isolation Valve A Accumulators and Reservoir

In general, the work activities were performed in an acceptable and effective manner. The technicians were knowledgeable and conducted the work as required by applicable procedures. Appropriate support personnel were at the work site when required.

**M2 Maintenance and Material Condition of Facilities and Equipment**

**M2.1 Loose Bolts Found on Emergency Diesel Generator (EDG) B**

**a. Inspection Scope (61726)**

Inspectors performed a walkdown of the EDG during a routine surveillance and reviewed followup corrective actions.

**b. Observations and Findings**

On September 30, 1999, a monthly surveillance was being performed on EDG B in accordance with Procedure OP-903-068, "Emergency Diesel Generator and Subgroup Relay Operability Verification," Revision 12. The inspectors discovered a bolt that had completely backed out on the combustion air inlet manifold at Cylinder 1R. The inspectors immediately notified the system engineer who was present in the room. The other bolts (4 per cylinder) were checked and another bolt on that cylinder was also loose. Two more bolts on Cylinder 8L were also found loose. The system engineer wrote CR 99-1038 to enter the EDG into the corrective action program.

Design engineering performed an operability evaluation for the loose bolts. They concluded that the as-found condition had not impacted the operability of EDG B. The inspectors agreed with the operability determination. The engineers did recommend that the bolts be reinstalled and torqued in accordance with the design specifications. Corrective actions also included checking EDG A for loose bolts and retorquing of all bolts to original specification.

c. Conclusions

System engineers responded appropriately to discovery of loose inlet air manifold bolts on Emergency Diesel Generator B.

M2.2 Feedwater Isolation Valve (FWIV) Accumulators and Reservoir Oil Change

a. Inspection Scope (62707)

The inspectors attended the prejob briefing and observed the maintenance task to change the oil in the accumulators and reservoir of FWIV A. This was a scheduled and planned maintenance activity.

b. Observations and Findings

On October 19, 1999, the licensee conducted planned maintenance on FWIV A to change the hydraulic oil in the accumulators and the reservoir. The inspectors attended a prejob briefing conducted by the shift superintendent with all involved personnel. This valve was rendered inoperable to perform the maintenance, and the required actions of TS 3.6.3 (Containment Isolation Valves) were entered. This allowed a time frame of 4 hours to complete the maintenance and restore the valve to operable status. Given these restrictions, the shift superintendent stressed the importance of procedural compliance and understanding to ensure that the maintenance was completed correctly and on time. The order in which the maintenance steps were to be performed was discussed in detail. In addition, personnel safety was stressed. The inspectors considered the prejob briefing to be very good.

The inspectors observed the maintenance activity in progress. Present at the job site were a supervisor, maintenance technicians, operations personnel, and the system engineer. The applicable maintenance procedure was in use and the steps were tracked and signed off as completed by the supervisor. The system engineer was involved in the ongoing maintenance and provided assistance, as required. Plant operators supported the maintenance when needed to ensure timely completion of operations steps. The inspectors considered this maintenance to be effective and efficient. The individuals involved demonstrated very good communications techniques and worked together well to successfully complete the maintenance in a timely manner with no problems. The valve was returned to operable status well within the 4-hour time frame.

The following day, the licensee planned to perform the same maintenance on FWIV B. During preparations for this job, the licensee discovered that the instrument air supply valve for FWIV B was closed. This valve should have been open to supply air to the air accumulators and the pump used to pressurize the oil accumulators. The air supply valve was opened and the licensee conducted an in-depth investigation. The licensee was not able to determine when the air supply valve had been closed, but did determine that the FWIV remained operable prior to discovery based on annunciator alarms in the control room, which did not indicate a low air or oil pressure condition. The inspectors agreed with this conclusion. However, the inspectors were concerned that a thorough investigation failed to determine when the valve was closed or who closed it. The planned maintenance was successfully completed with no further problems.

c. Conclusions

Planned maintenance to change the hydraulic oil in the accumulators and in the reservoir of FWIV A was conducted effectively and efficiently. The prejob briefing and the teamwork demonstrated by the individuals involved were very good. An out-of-position instrument air supply valve was discovered during preparations to conduct the same maintenance on FWIV B. The FWIV was determined to remain operable.

**M8 Miscellaneous Maintenance Issues (92902)**

**M8.1 (Closed) LER 50-382/97-034: Missed Mechanical Snubber Surveillance**

On September 30, 1992, Mechanical Snubber MSSR-226A had failed a functional test and had been replaced with a like-for-like PSA-100 snubber. The replacement snubber had been required to be tested during the subsequent refueling outage in accordance with TS 4.7.8.e.3. The snubber had not been tested until the missed surveillance was identified on December 17, 1997. The snubber was replaced by a like-for-like PSA-100 snubber on December 18, 1997. The removed snubber was tested on January 7, 1998, and found to be functional.

Failure to perform the surveillance at the required interval is a violation of TS 4.7.8.e.3. This Severity Level IV violation is being treated as a noncited violation consistent with Appendix C of the NRC Enforcement Policy (50-382/9923-02). The corrective actions have been completed per the LER.

### **III. Engineering**

#### **E1 Conduct of Engineering (37551)**

##### **E1.1 Freeze Seal and Repair of Unisolable Safety Injection Check Valve**

###### **a. Inspection Scope (37551)**

The inspectors reviewed the engineering activities associated with providing technical support to the maintenance group in preparation and execution of the freeze seal and valve repair activities.

###### **b. Observations and Findings**

The licensee engineers performed a detailed review of the freeze seal requirements for working on safety injection Check Valve SI-512B. Because Valve SI-512B was unisolable from the RCS, a freeze seal was required on the piping between the RCS and the valve. The physical height of the freeze seal location also required the engineers to develop a special procedure to ensure that the piping was filled with water to establish the freeze seal without voids forming. The engineering reviews were documented in Engineering Requests W3-99-0948-00-00, "Freeze Seal Required to Rework SI MVAAA512B Valve," and W3-99-0951-00-00, "SI-512B Seating Surfaces." Maintenance Procedure MM-006-010, "Freeze Seal Application," Revision 9, was used for performance of the job.

The inspectors reviewed the engineering packages for conformance to the NRC Inspection Manual, Part 9900, "Technical Guidance, Mechanical-Freeze Plugs," and the documentation of work performance. All issues involving the freeze seal had been appropriately addressed by the engineers.

###### **c. Conclusions**

Licensee engineers had appropriately addressed all issues related to using a mechanical freeze seal to repair a check valve that was unisolable from the RCS.

#### **E8 Miscellaneous Engineering Issues (92903)**

##### **E8.1 (Closed) VIO 50-382/9724-05: Vortexing calculation not adequate.**

The inspectors had determined that vortexing calculations for several tanks had not included consideration for recirculation flow returning to the tank. Licensee engineers made the appropriate revisions to the calculations and performed testing as outlined in their corrective action plan. All corrective actions were completed in April 1998.

#### **IV. Plant Support**

##### **R1 Radiological Protection and Chemistry Controls (71750)**

During routine plant tours, the inspectors observed that radiation measurements had been posted in accordance with NRC requirements and licensee's procedures. The inspectors observed that appropriate postings had been made in areas of elevated radiation. ALARA (as low as is reasonably achievable) postings were considered to be effective. Plant workers were observed complying with all postings.

##### **S2 Status of Security Facilities and Equipment (71550)**

The inspectors toured the perimeter of the protected area during evening and weekend periods. The inspectors determined that the lighting was adequate to sufficiently illuminate the isolation zones and areas within the protected area. The inspectors observed security officers maintaining cognizance of security cameras, monitors, and alarm systems inside the central alarm station. Officers were found to be alert to conditions and alarms.

#### **V. Management Meetings**

##### **X1 Exit Meeting Summary**

The inspectors presented the inspection results to members of licensee management on November 15, 1999. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. F. Burski, Director Site Support  
J. R. Douet, Manager Plant Maintenance  
C. M. Dugger, Vice-President, Operations  
E. C. Ewing, Director, Nuclear Safety & Regulatory Affairs  
R. M. Fili, Manager, Quality Assurance  
C. Fugate, Operations Superintendent  
J. G. Hoffpauir, Manager, Operations  
J. D. Hunsaker, Manager, Site Support  
T. R. Leonard, General Manager, Plant Operations  
T. P. Lett, Superintendent, Radiation Protection  
J. M. O'Hern, Manager, Training and Emergency Planning  
E. Perkins, Jr., Manager, Licensing  
L. N. Rushing, Manager, Mechanical and Civil Engineering  
B. Thigpen, Director, Planning and Scheduling  
A. J. Wrape, Director, Design Engineering

INSPECTION PROCEDURES USED

37551	Onsite Engineering
61726	Surveillance Observations
62707	Maintenance Observations
71707	Plant Operations
71750	Plant Support Activities
92700	Onsite LER Review
92901	Followup-Plant Operations
92902	Followup-Maintenance
92903	Followup-Engineering
92904	Followup-Plant Support

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-382/9923-01	NCV	Failure to Meet TS Requirements During Plant Heatup (Section O4.1).
50-382/9923-02	NCV	Missed Mechanical Snubber Surveillance (Section M8.1)

Closed

50-382/9923-01	NCV	Failure to Meet TS Requirements During Plant Heatup (Section O4.1).
50-382/9923-02	NCV	Missed Mechanical Snubber Surveillance (Section M8.1).
50-382/9724-01	VIO	Inadequate instructions provided in work authorization (Section O8.1).
50-382/9727-01	VIO	Failure to initiate a CR (Section O8.2).
50-382/97-034	LER	Missed Mechanical Snubber Surveillance (Section M8.1).
50-382/9724-05	VIO	Vortexing calculation not adequate (Section E8.1).

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
CR	condition report
EDG	emergency diesel generator
FWIV	feedwater isolation valve
LER	licensee event report
NCV	noncited violation
NRC	Nuclear Regulatory Commission
PDR	Public Document Room
psia	pounds per square inch absolute
RCS	reactor coolant system
SIT	safety injection tank
TS	Technical Specification
VIO	violation