



Entergy Nuclear South  
Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70057  
Tel 504 739 6440  
Fax 504 739-6698  
[bhousto@entergy.com](mailto:bhousto@entergy.com)

**Bradford Houston**  
Director, Nuclear Safety Assurance  
Waterford 3

W3F1-2004-0040

May 12, 2004

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555-0001

Subject: Reply to Notice of Violation, EA-03-230, NRC Inspection Report No.  
50-382/03-007  
Waterford Steam Electric Station, Unit 3 (Waterford 3)  
Docket No. 50-382  
License No. NPF-38

Dear Sir or Madam:

Pursuant to the provisions of 10 CFR 2.201, Entergy Operations, Incorporated hereby submits to the U.S. Nuclear Regulatory Commission the reply to the Notice of Violation for the Train A Emergency Diesel Generator fuel oil tubing failure on September 29, 2003. The reply is provided in Attachment 1 to this letter. The reply addresses (1) the reason for the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Entergy Operations is not contesting the violation.

Entergy Operations appreciates the opportunity to present our perspectives at the Regulatory Conference on March 8, 2004. We also appreciate the ongoing communications with NRC staff personnel particularly the NRC Senior Reactor Analyst and the NRC Senior Resident. We believe these communications provided for a thorough and efficient understanding of the facts, circumstances, and judgments on this matter.

IEOI

This submittal contains new commitments that are identified in Attachment 2.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 12, 2004.

Sincerely,

A handwritten signature in cursive script, appearing to read "Bradford L. Houston".

B.L. Houston  
Director, Nuclear Safety Assurance

BLH/RJM/ssf

Attachment(s)

cc: Mr. Bruce S. Mallett  
Regional Administrator  
U. S. Nuclear Regulatory Commission  
Region IV  
611 Ryan Plaza Drive, Suite 400  
Arlington, TX 76011-8064

NRC Senior Resident Inspector  
Waterford Steam Electric Station Unit 3  
P.O. Box 822  
Killona, LA 70066-0751

U. S. Nuclear Regulatory Commission  
Attn: Mr. N. Kalyanam  
Mail Stop O-07D1  
Washington, DC 20555-0001

Wise, Carter, Child & Caraway  
ATTN: J. Smith  
P.O. Box 651  
Jackson, MS 39205

Winston & Strawn LLP  
ATTN: N.S. Reynolds  
1400 L Street, NW  
Washington, DC 20005-3502

**Attachment 1 to**

**W3F1-2004-0040**

**Reply to Notice of Violation, EA-03-230, NRC Inspection Report No. 50-382/03-007**

### **Restatement of Violation**

During an NRC inspection completed January 5, 2004, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violation is listed below:

10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, and drawings.

Contrary to this requirement, during the overhaul of Train A emergency diesel generator in May 2003, the licensee failed to establish adequate instructions to ensure proper installation of the fuel supply line of Train A emergency diesel generator. This failure resulted in uneven and excessive scoring of the tubing that ultimately lead to a complete 360 degree failure of the supply line on September 29, 2003, during a monthly surveillance test.

This violation is associated with a white significant determination process finding.

### **Reason for Violation**

On September 29, 2003 at approximately 1020 hrs with the plant in Mode 1 and at approximately 90% power coasting down for Refuel 12, Emergency Diesel Generator (EDG) 'A' was started to perform the monthly surveillance test in accordance with station operating procedures. At approximately 1309 hrs with EDG 'A' operating loaded, the left/right bank cross connect fuel oil tubing failed. This event rendered EDG 'A' inoperable.

This event did not affect the health and safety of the public. EDG 'A' was promptly secured, and there was no fire or any other plant degradation that resulted from the event. The fuel oil spill was contained within the EDG 'A' room and sump for EDG 'A' in Reactor Auxiliary Building. The spill was promptly cleaned, and the EDG 'A' was restored to operable status after inspections and walk downs on September 30, 2003 at approximately 1533.

The root cause was that maintenance was performed incorrectly. The failure mechanism was embedded during the replacement installation of the tubing in May 2003. The tube bends and fit-up were not precise. This impreciseness caused an uneven swage and scoring of the tube wall when the fitting was installed. The scoring and induced stress riser combined with the normal vibration of the tubing resulted in a crack that propagated until the tubing eventually failed. The tubing that failed was cut circumferentially along the tube wall approximately 15% on one side and approximately 25% on the opposite side. Waterford 3 installed compression fittings on mockup tubing installations. The results indicated that for a typical compression fitting, the ferrule should cut into the tubing about 8%.

### **The Corrective Steps That Have Been Taken and the Results Achieved**

A Root Cause Analysis Team was convened. The Root Cause Analysis Team identified immediate corrective actions and long term actions to prevent recurrence which were implemented under the Waterford 3 Corrective Action Program.

The immediate actions taken were the following: (1) the fuel oil spill in EDG 'A' room was promptly cleaned, (2) the EDG 'A' tubing was replaced, and the EDG 'A' was restored to operable status, (3) the event and consequences were discussed with mechanical and instrument control technicians, and (4) a vibration analysis was performed on the EDG 'A' and 'B' left/right fuel oil cross connect tubing, and it was confirmed there was no abnormal vibration.

The Root Cause Analysis determined the extent of condition was limited to the EDG 'A' fuel oil tubing failure. The Root Cause Analysis concluded that the combinations of elements necessary to induce similar failures in systems other than the EDG are not present.

EDG 'A' was returned to operable status on September 30, 2003 at approximately 1533.

Operating Experience Report OE17137 was submitted on the Nuclear NETWORK on October 22, 2003.

Waterford 3 Licensee Event Report 2003-002-00 was submitted to the NRC on November 26, 2003.

### **The Corrective Steps that Will Be Taken To Avoid Further Violations**

#### Actions Taken

The tubing installed on EDG 'A' after the event on September 29, 2003 was replaced on November 10, 2003 with an alternate design. The alternate cross connect design is assembled with 1-1/2" pipe and flexible hose. The alternate design eliminates compression fittings and includes flexible hose which provides vibration damping. The alternate configuration is equivalent in fit and function to the original.

The tubing installed on EDG 'B' was the tubing originally installed by the manufacturer. Nonetheless, to ensure a robust design, the tubing installed on EDG 'B' was replaced on January 5, 2004 with the same design as the EDG 'A'.

A work standard for compression fitting installations was included in the work management system. The work standard includes cautions and considerations, disassembly and inspection, installation of compression fittings and sub-components, and remaking of existing fittings. The work standard discusses and references Condition Report CR-WF3-2003-2759, EDG 'A' tubing failure. The work standard also discusses ensuring there are no axial or lateral loading and provides instruction for proper tightening.

The work standard has been added to the list of work standards in PASSPORT, a work planning and scheduling configuration system. Work planning personnel have been instructed to use the work standard on corrective maintenance work packages.

The design adequacy for fire protection of single wall tubing used in critical applications on the EDGs at Waterford 3 was reviewed. The review concluded that single wall tubing on the EDGs at Waterford 3 is acceptable for low pressure tubing applications (35 psi). There were no requirements found for double wall tubing for low pressure fuel oil applications, nor were there any identified concerns found at other Entergy Nuclear South plants, specifically, ANO Units 1 and 2, Grand Gulf, and River Bend.

Waterford 3 Training Lesson Plan WLP-GMAD-0000 was revised to reference the material in Swagelok Tube Fitter's Manual and to include operating experience in OE17357, CR-WF3-2003-2759, and CR-IP3-2003-5575.

#### Actions to Be Taken

Mechanical Maintenance personnel will complete training on Waterford 3 Training Lesson Plan WLP-GMAD-0000 plan by June 30, 2004.

#### **The Date When Full Compliance Will Be Achieved**

Waterford 3 plans to achieve full compliance on June 30, 2004 when the scheduled training for Mechanical Maintenance personnel on Waterford 3 Training Lesson Plan WLP-GMAD-0000 is completed.

**Attachment 2 to  
W3F1-2004-0040  
List of Regulatory Commitments**

List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check One)		SCHEDULED COMPLETION DATE (If Required)
	ONE- TIME ACTION	CONTINUING COMPLIANCE	
Mechanical Maintenance personnel will complete training on Waterford 3 Training Lesson Plan WLP-GMAD-0000 plan by June 30, 2004.	✓		June 30, 2004
Waterford 3 plans to achieve full compliance on June 30, 2004 when the scheduled training for maintenance personnel on Waterford 3 Training Lesson Plan WLP-GMAD-0000 is completed.	✓		June 30, 2004