

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Waterford Steam Electric Station Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 3 0 2	PAGE (3) 1 OF 6
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TITLE (4)  
Inadequate Qualification of Instrument Air Tubing During Initial Construction

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)																
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)														
1	2	1	8	8	4	8	9	0	0	0	2	0	1	1	1	1	3	8	9	N/A	0	5	0	0	0
												N/A	0	5	0	0	0								

OPERATING MODE (9) 6

POWER LEVEL (10) 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

20.402(b)	20.405(e)	50.73(a)(2)(v)	73.71(b)
20.405(a)(1)(i)	50.36(e)(1)	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.36(e)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	50.73(a)(2)(iii)	50.73(a)(2)(viii)(A)	
20.405(a)(1)(iv)	X 50.73(a)(2)(iii)	50.73(a)(2)(viii)(B)	
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME T.P. Brennan, Design Engineering Manager	TELEPHONE NUMBER 5 0 4 4 6 4 - 3 3 0 0
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At 1954 hours on January 25, 1989, Waterford Steam Electric Station Unit 3 was operating at 82% power when Design Engineering (DE) personnel discovered a discrepancy with the safety classification of Instrument Air (IA) tubing that supplies the actuators of Safety Injection Sump Outlet Isolation Valves SI-602A&B. Tubing supports were installed seismically qualified, but the tubing as shown in design documents was installed as non-nuclear safety (NNS) during initial construction. Because SI 602A&B are required to open after a LOCA coincident with a Safe Shutdown Earthquake (SSE), this event is reportable as a condition outside the plant's design basis.

The root cause of this event was the insufficient documentation of code interpretations during initial construction. An investigation revealed that safety class tubing and weld filler material were used. The tubing welds passed penetrant tests, and records were reviewed to ensure the welders were qualified to perform safety related welding. The tubing is considered to be classified as safety class 3 and would perform its design function. Thus, this event did not threaten the health or safety of the public or plant personnel.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

At 1954 hours on January 25, 1989, Waterford Steam Electric Station Unit 3 was operating at 82% power when Design Engineering (DE) personnel discovered a discrepancy with the safety classification of instrument air (EIIS Identifier LD) tubing that supplies the actuators of Safety Injection (SI) Valves SI 602A&B (EIIS Identifier BF-V). The discrepancy was documented in nonconformance condition identification (NCI) 261147. The tubing in question runs from the volume tank (EIIS Identifier LD-TK) to the valve actuator. The tubing was installed as non-nuclear safety (NNS); however, tubing supports and tube tracks were installed as seismic category one. NNS tubing is not considered to be operable following a seismic event, but seismic supports and tube tracks would prevent it from damaging other safety-related equipment.

SI 602A&B are the SI Sump Outlet Isolation Valves. The valves are closed during normal operation and open upon receipt of a Recirculation Actuation Signal (RAS). The RAS is generated upon receipt of two out of four Refueling Water Storage Pool (RWSP) (EIIS Identifier BP-TK) low level alarms with a Safety Injection Actuation Signal (SIAS) present. This causes the valves to open when RWSP level lowers to 10%. The purpose of the RAS is to maintain adequate suction to the Containment Spray Pumps (EIIS Identifier BE-P) and the High Pressure Safety Injection (HPSI) Pumps (EIIS Identifier BQ-P) during a Loss of Coolant Accident (LOCA).

General Design Criterion 2 as stated in Final Safety Analysis Report (FSAR) section 3.1.2 requires components that are vital to the mitigation and control of accident conditions be designed to withstand the effects of a LOCA coincident with the effects of a Safe Shutdown Earthquake (SSE). Because automatic operation of SI 602A&B requires that instrument air be available to the valve actuator, the instrument air tubing should be classified as safety class 3. Credit is not taken for manual operation of these valves because radiation levels in their vicinity during the design large break LOCA would be too high to allow normal access to the valves. Design and installation drawings show that this tubing was installed as NNS, so this event is reportable as a condition outside the design basis of the plant. The condition has existed since issuance of the operating license on December 18, 1984.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

The root cause of this event was insufficient documentation of code interpretations by the Architect Engineer (AE) during initial construction. ANSI N18.2 Section 2.3.1.3 states that the portions of compressed gas systems required to support control or operation of safety systems should be qualified safety class 3. However, the rules of ASME Section III are not intended to be applicable to valve operators, controllers, and position indicators under Article NA-1130, 1971 edition through 1973 addenda, because the valve topworks are not considered part of the pressure retaining boundary. The AE interpreted Article NA-1130 to include instrument air tubing connected to the valve. Thus, design and installation drawings show the tubing was installed as NNS, seismically supported. Based on information from the AE, the installation of the tubing per ANSI B31.1, seismically supported, is adequate to assure the tubing would perform its design function and meet safety class 3 requirements.

Actions were also taken to confirm that the subject tubing classification meets safety class 3 requirements. On January 26, 1989, maintenance personnel performed a walkdown of the tubing and welds. Construction documentation associated with the tubing was reviewed. Letter LW3-386-82 from Ebasco Services, Inc., to Louisiana Power and Light (LP&L), dated March 17, 1982, revealed that ANSI B31.1 instrument tubing and fittings used at Waterford 3 were drawn from the same qualified stock as those used for ASME Section III installation. During construction, welding electrodes and filler material were procured in accordance with ASME Section III as code class material. The walkdown of the tubing identified tubing heat numbers and welder identification numbers. The tubing heat numbers corresponded to ASME Section III Code Class 2. The welder identification numbers were checked to verify that the welders were qualified to weld code class tubing. Welders are qualified to ASME Section IX for both ANSI B31.1 welding and ASME Section III welding. The welds satisfactorily passed dye penetrant tests. Thus, this tubing classification is considered to be classified as safety class 3, and the tubing would perform its design function.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

DE personnel reviewed Instrument Installation Detailed Drawing, LOU-1564-B430, to identify any valves with similar problems. The review identified an additional 24 valves that have volume tanks to supply instrument air to the valve actuators in the event of a loss of instrument air. Additionally, a review of the safety related portion of the nitrogen system (EIS Identifier LK) that provides a backup to instrument air identified 34 safety related valves with nitrogen accumulators (EIS Identifier LK-ACC). Nitrogen accumulators are used in some safety related applications as a backup to the instrument air system. ASME Section III class 3 tubing was installed from these nitrogen accumulators to the last isolation valve prior to connecting to the instrument air tubing associated with the valve topworks. At this point a class break was established from the nitrogen tubing to the instrument air tubing. That portion of the instrument air tubing from the class break to the valve topworks was installed per ANSI B31.1, seismically supported.

A walkdown and review of the above 58 valves has determined that their associated instrument air tubing was installed per the same standards as that of SI 602 A&B. The component walkdowns, documentation reviews, engineering analysis (performed by Gilbert/Commonwealth, Inc.), and safety assessment have established ANSI B31.1, Seismic Category 1, as the design criteria for pneumatic valve topworks for safety related valves at Waterford 3. DE personnel will revise design drawings to show this tubing to be safety class 3. This action is expected to be complete by September 30, 1990. The component walkdowns identified several other valve topworks related deficiencies which are summarized below:

Unqualified Check Valves In IA Tubing

- CC-641      CCW to RCPs header isolation valve
- CC-710      CCW to RCPs inside containment isolation valve
- CC-713      CCW to RCPs outside containment isolation valve

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

- SI-106A,B      Galvanized "Tee" Connection in IA Tubing to Accumulator  
Refueling Water Storage Pool header isolation valves
  
- CVR-101,201    IA tube track not supported/missing  
Containment Vacuum Relief butterfly valves
- MS-116A        Atmospheric Dump Valve
  
- CC-710         IA Tubing Not Seismically Supported  
CCW to RCPs inside containment isolation valve
  
- CS-125A,B     Questionable Seismic Qualification of Components in IA tubing  
Containment Spray Header Isolation Valve (air regulator and needle valve)
- CC-114A,B     CCW pump suction cross-connect header isolation valve (air filter)
- CC-115A,B     CCW pump suction cross-connect header isolation valve (air filter)
- CC-126A,B     CCW pump discharge cross-connect header isolation valve (air filter)
- CC-127A,B     CCW pump discharge cross-connect header isolation valve (air filter)
- CC-200A,B     CCW supply isolation valve (non-nuclear safety train A,B) (air filter)
- CC-563        CCW return isolation valve (non-nuclear safety train B) (air filter)
- CC-727        CCW return header isolation valve (non-nuclear safety train A)  
(air filter)
- MS-116A,B     Atmospheric dump valves (3-way ball valves, hose and volume boosters)

NOTE:            CCW = Component Cooling Water System (EIIS Identifier - CC)  
                   CVR = Containment Vacuum Relief System (EIIS Identifier - BF)  
                   RCP = Reactor Coolant Pump (EIIS Identifier AB - P)  
                   MS = Main Steam System (EIIS Identifier - SB)  
                   CS = Containment Spray System (EIIS Identifier - BE)

These deficiencies will be resolved prior to entering the mode in which the equipment is required to be operable during the third refueling outage (September - November 1989).

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

A review of past LERs revealed one similar event. On November 28, 1988, LER 88-026 was submitted describing the lack of seismic qualification for Boric Acid Makeup Tank (BAMT) level indicator (EIIS Identifier CB-TK-LI) tubing and supports. The tubing and supports were installed as non-seismic during construction. An evaluation conducted after the installation determined this was acceptable because a break in both tubing runs and subsequent loss of fluid would not affect plant shutdown capability. However, on January 8, 1987, a Technical Specification (TS) change was issued to lower the required boron concentration of the BAMTs. This TS change made the qualification of the BAMT level indicator tubing unsatisfactory.

The BAMT event is described in LER 88-026 and recounts an unidentified safety class break in instrument tubing. LER 89-002-01 addresses a seismic qualification issue, which is unrelated to the class interface discrepancy reported in LER 88-026.

The classification discrepancy for SI 602A&B tubing was discovered by DE personnel as a result of a Safety System Functional Inspection (SSFI) initiated by Waterford 3 management. This report was issued due to the lack of qualification documentation for the tubing. However, the walkdown, dye penetrant testing, and document reviews for SI 602A&B have confirmed that this tubing can be classified as safety class 3 and would perform its design function. The other 58 valves' instrument air tubing was installed in accordance with the same standards as that of SI 602A&B instrument air tubing. Thus, this event did not adversely affect the health or safety of the public or plant personnel.

SIMILAR EVENTS

LER 88-026

PLANT CONTACT

T.P. Brennan, Design Engineering Manager, 504/464-3300.