Entergy Operations

Entergy Operations, Inc.
P.O. Box B
Killona, LA 70066
Tel 504-739-6660

Ref: 10CFR50.73(a)(2)(i)

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January 11, 1991

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555

Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Reporting of Licensee Event Report

Gentlemen:

Attached is Licensee Event Report Number LER-90-019-00 for Waterford Steam Electric Station Unit 3. This Licensee Event Report is submitted pursuant to 10CFR50.73(a)(2)(i).

Very truly yours,

J.R. McGaha
General Manager - Plant Operations

JRM/LDC/rk
Attachment

cc: Messrs. R.D. Martin
G.L. Florreich
J.T. Wheelock - INPO Records Center
E.L. Blake
D.L. Wigginton
NRC Resident Inspectors Office

IE22
1/1

NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Waterford Steam Electric Station Unit 3	0 5 0 0 0 3 8 2	1 OF 0 8

TITLE (4): Both Trains of Control Room Air Conditioning Inoperable due to Breach in the Control Room Envelope

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)
											N/A	0 5 0 0 0
1 2	1 2	9 0	9 0	-	0 1 9	-	0 0	0 1	1 1	9 1	N/A	0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more of the following) (11)			
1	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10): 1 0 0	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
R.G. Azzarello, Director, Engineering and Construction	5 0 4 7 3 9 - 6 6 8 0

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)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		1 0	2 8	9 1

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

At 1045 hours on December 12, 1990, with Waterford Steam Electric Station Unit 3 at 100% power, Technical Specification (TS) Limiting Condition for Operation (LCO) 3.0.3 was entered when both trains of the Control Room Heating Ventilation and Air Conditioning System were declared inoperable due to a breach in the Control Room envelope. The breach in the Control Room envelope existed since December 5, 1990, when a penetration fire seal was removed from ventilation fire damper FD-45 in accordance with an approved Design Change. The plant operated in TS LCO 3.0.3 for a period of 8 days, therefore this event is reportable as operation prohibited by plant TS. A temporary seal was installed and the Control Room Air Conditioning System was declared operable at 1141 hours on December 12, 1990.

The root cause of this event is lack of sufficient documentation and details of the Control Room envelope boundary seals. Calculations have shown that with the breached fire barrier, the habitability of the Control Room would not have been threatened, during a high radiation or toxic chemical scenario; therefore, this event did not threaten the health and safety of the general public or plant personnel.

On December 12, 1990, engineers discovered fire seal (EIIS Identifier-SEAL) VIA0070 had been removed from around Fire Damper (FD)-45 (EIIS Identifier-DMP) in accordance with Design Change (DC)-3197 and as a result, a breach in the Control Room (EIIS Identifier-NA) envelope existed. At 1045 hours on December 12, 1990, Technical Specification (TS) 3.0.3 was entered based on engineering judgement that the Control Room envelope would not maintain a 0.125" water gage (w.g.) differential pressure with the outside air in accordance with Surveillance Test Procedure PE-5-004, "Control Room Air Conditioning System Surveillance." In addition, the consequences of a high radiation or toxic chemical scenario were unknown in the condition of fire seal VIA0070 being removed. This event 3.0.3 is reportable as operation prohibited by plant TS.

DC-3197 was approved for construction on September 24, 1990. The scope of this DC addressed a problem in which fire dampers were found to be inoperable due to the absence of an expansion space between the fire damper and the surrounding wall. This expansion space is required to allow for thermal expansion of the damper assembly under fire conditions. The fire seal around FD-45 (penetration seal number VIA0070) was removed on December 5, 1990. DC-3197 failed to identify certain fire seals as being an air pressure barrier for the Control Room envelope and the Reactor Auxiliary Building (RAB) (EIIS Identifier-NF).

The Control Room envelope is designed to maintain a positive pressure of 0.125" w.g. or greater with respect to the outside air, with a make up rate of 200 cubic feet per minute (cfm) or less, during the high radiation mode of operation. The pressure and airflow limits are also used to test the leak tightness of the Control Room envelope for the toxic gas mode of operation, during which the system is in full recirculation with no outside air make up. The requirements are specified in the Final Safety Analysis Report (FSAR) and Regulatory Guides (RG) 1.78 and 1.95.

LER 88-025 reported fire barrier discrepancies due to procedural inadequacy, and committed to the corrective action of inspecting all fire barriers in accordance with Procedure ME-003-009, "Fire Walls, Floors, and Ceilings" and Procedure ME-003-006, "Fire Barrier Penetration Seals." The inspection of the fire dampers was initiated in November 1988 and revealed that some fire dampers had not been installed per the manufacturer's requirements and fire test configurations. The concern is that the dampers were not provided with adequate annular space between the fire damper and surrounding wall to allow for thermal expansion of the damper and seal material. This problem has existed since initial construction and could have resulted in the dampers not functioning properly in a fire condition due to binding.

A Station Modification Request (SMR) FP-011 was initiated to correct penetration (EIIS Identifier-PEN) seal, fire barrier, and fire damper design deficiencies identified during the 100% penetration seal inspection. The SMR was approved on February 12, 1990, and was later approved as DC-3197 on September 18, 1990. DC 3197 provides for the field installation or modification of approximately 228 seals, 25 dampers, and one fire barrier.

Fire seal VIA0070 was identified for modification in DC-3197. The penetration found FD-45 had been sealed with silicone foam during initial construction. Fire seal VIA0070 was evaluated in Condition Identification (CI) 260111 on November 8, 1989, as having no requirement for fire protection and subsequently, the damper was declared inoperable until the seal material around the damper could be removed and replaced with an air seal.

On December 5, 1990, the following work was performed on seal VIA0070 in accordance with DC:

- the retaining closure angles from one side of the seal were removed to facilitate removal of the seal.
- the seal material was removed from around the damper.

At this point, the plant was operating with a breach in the Control Room envelope. There was approximately a 1/4" gap on the top and sides, and a 1/2" gap on the bottom, between the ventilation duct (EIIS Identifier-DUCT) and the surrounding barrier wall.

At approximately 1600 hours on December 5, 1990, a routine walkdown by an engineer noted that work in progress on two other seals (penetration seal numbers VIA0255 and VIA0256), also part of DC-3197, could possibly breach the Control Room envelope. A discussion was held with several other engineers and after further evaluation, the engineers determined that the Control Room envelope had not been breached. The basis of this conclusion is that sheet metal had been installed during initial construction to facilitate installation of the seals and had provided a Control Room envelope pressure boundary.

On December 6, 1990, Nuclear Operations Construction (NOC) personnel were informed of the potential problem discovered with seals VIA0255 and VIA0256. A decision was made that each fire seal being removed should be carefully evaluated to determine if removal would cause a breach in the Control Room envelope. NOC personnel conducted a review of the fire seals that were currently being worked. No work was being done on fire seal VIA0070 during the review; therefore, seal VIA0070 was not identified as a potential problem. Engineering personel were directed to evaluate the method and consequences of removing fire seals under DC-3197, with emphasis on the pressure boundary configuration for the Control Room envelope.

On December 10, 1990, Design Engineering (DE) personnel were informed of the potential problems with DC-3197. On December 11, 1990, DE personnel developed a list of 9 seals that were to be worked under DC-3197 which could possibly breach the Control Room envelope. On this list, 5 seals were identified as being currently worked. These seals were VIA0039, VIA0046, VIA0255, VIA0256, and VIA0070. A cursory inspection was made of the five seals and the Control Room envelope appeared not to be breached. The retaining angle had already been replaced on seal VIA0070 which masked the fact that the penetration was breached, from a pressure boundary standpoint.

On December 12, 1990, another inspection was performed on the five seals and a determination was made that seal VIA0070 was breached because air flow past the retaining angle was observed. TS 3.0.3 was entered because of engineering judgement, based on the size of the breach and its affect on both Control Room Heating Ventilation and Air Conditioning (HVAC) System trains (EIIS Identifier VI) with respect to the operability requirements of TS 3.7.6. A temporary seal was installed per Nonconformance Condition Identification (NCI) 272811. The seal was determined to be operable based on engineering judgement. The HVAC system was observed to be capable of maintaining 0.125" w.g. positive pressure, per Control Room indications, under normal operation without regard to the amount of make up air being used. No visible signs of leakage were noted around the seal. Administrative controls were implemented to maintain the pressure boundary integrity at the seal. TS 3.0.3 was exited at 1141 hours on December 12, 1990.

The root cause of this event is inadequate documentation and details of the Control Room envelope boundary seals. There is no single document that identifies any penetration seals as being a part of the pressure boundary for the Control Room envelope or as being associated with a TS requirement.

The other problems that contributed to this event were:

- DC 3197 inadequacies. Existing documentation was not thoroughly researched in the development of DC-3197.

- The HVAC system engineer was not included as part of the review process for DC 3197 in accordance with Nuclear Operation and Engineering Construction procedures.

- Timely corrective action was not taken by plant personnel upon initial discovery of the potential problems with the Control Room envelope.

- No specific methods exist to track or control work being performed on the Control Room envelope to ensure that the integrity of the Control Room envelope is maintained in modes for which it is required.

Immediate corrective action was taken on December 12, 1990, to restore the integrity of the Control Room envelope. All seal work affecting the Control Room envelope has been stopped until air seal details can be developed and removal/installation methods better defined. On December 15, 1990, seal VIA0070 was re-sealed with silicone foam in an air seal configuration. Leakage paths identified in the Control Room envelope were reworked. Surveillance Test PE-5-004 results were satisfactory with 0.125" w.g. differential pressure being achieved with less than 200 cfm make up airflow on December 21, 1990.

The following actions to prevent recurrence have been initiated. The Nuclear Penetration List (NPL) will be revised by July 7, 1991, such that all seals, which provide an air pressure seal with the Control Room envelope or Controlled Ventilation Area Section (CVAS) (EIIS Identifier VF), are properly identified. The NPL will also be revised by March 1, 1992 to ensure that all seals, which are addressed by TS or are designed as an air pressure boundary, are properly identified. Design, construction and maintenance work controls will be evaluated by March 15, 1991, to ensure that any work on penetration seals, pressure boundaries, and HVAC equipment, addresses TS requirements. Permanent repairs will be made to the leakage paths that were identified in the Control Room envelope by April 1, 1991.

Waterford 3 personnel will be trained on this event by March 1, 1991. DC-3197 will be revised to address the fire seals that affect the integrity of the Control Room envelope or CVAS boundary by March 1, 1991. Existing DCs will be reviewed by March 1, 1991, to determine if revision is necessary, to ensure that pressure boundaries are adequately addressed.

To summarize, the removal of fire seal VIA0070 created a breach in the Control Room envelope from December 5, 1990, until repair of the seal on December 12, 1990. The breach in the Control Room envelope could have prevented achieving the TS required 0.125" w.g. differential pressure; therefore, the plant operated in a condition prohibited by TS for a period of 8 days. Several other issues are being evaluated which are tied to this event. These issues involve Control Room ventilation testing and control room air flow rates. An update to this report will be submitted by February 28, 1991, to describe these issues and their relationship to the overall sequence of events.

Calculations show that the removal of seal VIA0070 would have resulted in a Control Room envelope leakage rate of approximately 888 cfm and the habitability of the Control Room, during and after a toxic chemical or high radiation accident, would have been maintained; therefore, this event did not threaten the health and safety of the general public or plant personnel.

SIMILAR EVENTS

None

PLANT CONTACT

R.G. Azzarello, Director, Engineering and Construction, (504) 739-6680.