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Waterford 3

W3F1-2000-0139
A4.05
PR

October 18, 2000

U.S. Nuclear Regulatory Commission
Attn: 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 (LER) 00-009-00 for the Waterford Steam Electric Station Unit 3. This report provides details of the discovery of two fire areas wherein potential exists for an Appendix R fire, within either of those areas (RAB 2 or RAB 39), to result in the loss of equipment (Essential Chillers or Charging Pumps, respectively) required for safe shutdown. These conditions are being reported as being outside the design basis of the fire protection program pursuant to 10CFR50.73(a)(2)(ii)(B).

The commitments contained in this submittal are identified on the attached Commitment Identification/Voluntary Enhancement Form.

Very truly yours,

Everett P. Perkins Jr.

E.P. Perkins, Jr.
Director,
Nuclear Safety Assurance

EPP/OPP/rtk
Attachments

IE22

cc: E.W. Merschoff, (NRC Region IV),
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NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50.0 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Waterford Steam Electric Station, Unit 3	05000-382	1 of 5

TITLE (4)
Potential For Loss of Safe Shutdown Equipment by a Fire In Either of Two Separate Fire Areas

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 NAME	DOCKET NUMBER
									N/A	N/A
09	18	00	00	009	00	10	18	00	FACILITY NAME N/A	DOCKET NUMBER N/A

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)							
POWER LEVEL (10)	100		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
			20.2203(a)(2)(i)		20.2203(a)(3)(i)	X	50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.405(a)(1)(ii)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Name / Title Oscar P. Pipkins / Senior Licensing Engineer	(504) 739-6707

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i. e., approximately 15 single-spaced typewritten lines) (16)

On September 18, 2000, with the plant operating in Mode 1, at approximately 100% reactor power, it was determined that a condition existed wherein an Appendix R fire in Fire Area RAB 2 could conceivably render safe shutdown equipment (Essential Chillers / RAB HVAC AH-13 / E-41 Fans) inoperable. During review of the Waterford 3 safe shutdown analysis, it was observed that six designated, essential cables were not listed as requiring one hour fire wrap and were not wrapped in the field. Later, while reviewing for other similar cases, it was discovered that cables associated with other equipment (Charging Pumps) required for cold shutdown were also not properly provided with one-hour wrap in fire area RAB 39. The conditions have primarily existed since initial construction (1984 time frame) and resulted from original design inadequacies in Waterford 3's safe shutdown analysis. In one case, the condition was caused by an inadequate design change (1992 time frame). The conditions are being reported as being outside the design basis of the fire protection program. The cables and conduits were immediately identified as impaired and compensatory actions were established (hourly fire watches). The condition was entered into the plant corrective action program (CR-WF3-2000-1088 and -1169). There was no actual fire involved. The condition did not compromise the health and safety of the general public. This condition is not considered a Safety System Functional Failure (SSFF).

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Waterford Steam Electric Station, Unit 3	05000-382	00	09	00	2 OF 5

TEXT *(If more space is required, use additional copies of NRC Form 366A) (17)*

REPORTABLE OCCURRENCE

On September 18, 2000, it was determined that a condition existed wherein an Appendix R fire in a fire area (RAB 2) could adversely impact the ability to achieve safe shutdown. Further investigation, on October 5, 2000 identified a similar condition in another fire area (RAB 39). The design basis of the fire protection systems, features and program is to ensure capability to achieve and maintain safe shutdown of the plant. The conditions identified were determined to be outside the design basis and were reported within one hour via calls to the NRC Operations Center (Event Numbers 37341 and 37413 respectively) in accordance with 10CFR50.72(b)(1)(ii)(B). The conditions are being reported herein, within 30 days, per the requirements of 10CFR50.73(a)(2)(ii)(B). The conditions are being reported in one LER based on the similarity of the conditions and since they were both identified during the 30 day reporting period.

INITIAL CONDITIONS

At the time of the determination of reportability, on September 18, 2000 and October 5, 2000, the plant was operating in Mode 1 at approximately 100% reactor power. No major systems, structures or components were out of service specific to the reported conditions.

EVENT DESCRIPTION

On September 18, 2000, while gathering information for the NRC Staff in preparation for a baseline fire protection and safe shutdown inspection (conducted September 25 – 29, 2000), it was discovered that six essential power and control cables in the plant (Fire Area RAB 2), designated in the Waterford 3 safe shutdown analysis to be protected with one hour fire wrap were not wrapped. This was determined to be a violation of Appendix R separation requirements. The six cables were immediately identified as impaired and compensatory actions (one hour fire watches) were established. The cables involved were:

- 31065N-SAB - Paralleled power cable for Essential Chiller [KM] Compressor Control Module,
- 31068E-SAB - Essential Chiller Water Pump control,
- 31069C-SAB - Essential Chilled Water flow transmitter (CHS-IFT-5030C),
- 31117C-SA - RAB HVAC [VF] Equipment Room Supply Fan AH-13 (3A-SA) Dampers,
- 31121A-SA - RAB HVAC Exhaust Fan E-41 (3A-SA), and
- 31121D-SA - RAB HVAC Exhaust Fan E-41 (3A-SA).

The above condition has existed since original construction (1984 time frame), with the exception of cable 31065N-SAB, which was installed via a design change (DC-3341) in the summer of 1992. Cable 31069C-SAB's essential function was deleted by DC-3468 in 1996. The safe shutdown analysis had not been updated to reflect this.

On October 5, 2000, while reviewing the above condition for generic implications, six other designated essential power and control cables were discovered without fire wrap. This latter condition was located in Fire Area RAB 39. The cables involved were:

- 31000A - Charging Pump 3A-S [CB-P] Cooler AH-18 power,
- 31000C - Charging Pump 3A-S Control Cable from Local Station,
- 30365J - Control Cable for Charging Pump 3A-S Trip Circuit,
- 30366B - Power for the Motor Space Heater,
- 30366C - Control Cable for Charging Pump 3A-S, and
- 30365A - Charging Pump 3A-S Motor Power.

This latter condition has also existed since initial construction.

CAUSAL FACTORS

The root cause was determined to be:

1. Original design inadequate - The Waterford 3 safe shutdown analysis identified cables 31068E-SAB, 31069C-SAB, 31117C-SA, 31121A-SA, 31121D-SA, 31000A, 31000C, 30365J, 30366B, 30366C, and 30365A as essential circuits, but failed to identify that separation (fire wrap) was required for the cables.

2. Inadequate design change - Design Change 3341 (summer of 1992) installed cable 31065N-SAB. The package failed to provide the cable with proper separation (one hour fire wrap).

CORRECTIVE ACTIONS

Immediate Actions:

1. Hourly fire watches were established in Fire Areas RAB 2 and RAB 39 as a compensatory measure in accordance with Waterford 3's Technical Requirements Manual (TRM) LCO 3.7.11 action statement.

2. Hourly fire watches were established shortly thereafter in other selected areas of the plant (as a conservative measure) in association with initial efforts to establish an Appendix R action plan mentioned below.

Intermediate Actions:

Conduct a short term Appendix R Action Plan, intended as an interim measure, to identify any other Appendix R separation discrepancies that might be readily detectable. Provide compensatory measures in areas identified by the plan pending correction of the condition where applicable.

Long Term Actions:

Complete revalidation of the Waterford 3 safe shutdown analysis (in progress).

SAFETY SIGNIFICANCE

+46 RAB Chiller Area (Fire Area RAB 2):

Considering a realistic fire scenario for Fire Area RAB 2, at least one train of essential equipment would be available. The area is provided with early warning fire detection and an automatic sprinkler system. Also, since the majority of the floor area is occupied by large noncombustible equipment, there is little opportunity to have the significant accumulation of combustibles necessary to result in a fire capable of challenging multiple safe shutdown trains. The greatest hazard in the area consists of charcoal located in the charcoal filter units. However, a decay heat monitoring system that would alert the Control Room Staff in the event of a fire in the unit mitigates this hazard. In addition each unit has a manually actuated water spray deluge fire protection system. The area has high ceiling heights such that any potential hot gas and smoke layer would occur above essential unprotected cables. In addition these ceiling heights would mitigate a rapid rise in room temperature. The combination of manual response capability, early warning fire detection, automatic sprinkler protection, partial height radiant energy barriers and low area combustibles indicates that a realistic fire in the area would not prevent the operation of at least one train of essential equipment.

-35 RAB Charging Pumps (Fire Area RAB 39):

All redundant and exposed cables/components in the area are provided with sprinkler protection and early warning fire detection. In addition, the areas are open for manual fire fighting activities and are accessible from multiple directions. Ceiling heights are high such that the potential hot gas and smoke layer would occur above essential unprotected cables. In addition, these ceiling heights would mitigate a rapid rise in room temperatures. Thus the area features, manual fire fighting capability, early warning fire detection and automatic sprinkler protection, would mitigate the impact of a fire anywhere in the fire area and maintain at least one train of charging available.

Risk Significance:

+46 RAB Chiller Area

If a fire in the +46 RAB Chiller Area were to cause two Chillers to fail, the third Chiller would have to fail independently for there to be no chilled water and, consequently, no room cooling in the RAB switchgear rooms and in the various pump rooms. The risk impact of the condition of missing fire wrap on the AB chiller cables was conservatively estimated by assuming that a fire in the +46 RAB Chiller Area would fail all three chillers and that the motor-driven EFW pumps would be failed by loss of HVAC in their equipment rooms. Switchgear room cooling calculations using the GOTHIC code have shown

that electrical power would not realistically be affected by loss of all three chillers, and the control systems and valves associated with the EFW, AFW, and MFW systems would continue to be available. Since the turbine-driven AB EFW pump, AFW pump, and MFW pumps are not dependent on local room cooling, these pumps would be expected to be available for decay heat removal following a fire in the Chiller area.

Using the frequency of a large fire in this room from the fire IPEEE, the core damage risk impact was estimated to be about 1E-9 per year, which is negligible.

-35 RAB Charging Pumps

The potentially risk-significant function of the charging pumps during a fire-induced transient is to provide long-term emergency boration in the extremely unlikely event of a failure to scram. The risk impact of the condition of missing fire wrap on the charging pumps was conservatively estimated by assuming that a fire in the -35 RAB area would fail all three charging pumps. This is conservative since it neglects the fact that the third charging pump would have to fail independently. The anticipated transient without scram (ATWS) event tree in the IPE was used to represent the scenario of a fire with failure of reactor scram. The initiating event frequency was adjusted down from the anticipated transient frequency to the fire IPEEE frequency, and the emergency boration function was assumed to be failed. The resulting conservative core damage frequency was 1E-7, which is non-risk-significant.

This event is not considered a Safety System Functional Failure (SSFF).

SIMILAR EVENTS

Within the last two years, another condition involving Appendix R separation violations resulting in the potential for a single fire event impacting multiple trains of redundant equipment required for safe shutdown was reported in LER 99-009-00 dated August 26, 1999. The causal factor reported for that condition was design analysis deficiency. The generic implications of that condition were evaluated and are currently being addressed by the safe shutdown analysis re-validation effort currently in progress. It is believed that this re-validation effort would have identified the discrepancies that are currently being reported herein.

ADDITIONAL INFORMATION

Energy Industry Identification System (EIIS) codes are identified in the text within brackets [ ].

COMMITMENT IDENTIFICATION/VOLUNTARY ENHANCEMENT FORM

Attachment 2 to W3F1-2000-0139
Reporting of Licensee Event Report
October 18, 2000

COMMITMENT(S)	ONE-TIME ACTION*	CONTINUING COMPLIANCE*	SCHEDULED COMPLETION DATE (IF REQUIRED)	ASSOCIATED CR OR ER
1. Conduct a short term Appendix R Action Plan. Provide compensatory measures in areas identified by the plan pending correction.	X			CR-2000-1088 CR-2000-1169
2. Complete revalidation of Waterford 3 safe shutdown analysis.	X			CR-2000-1088 CR-2000-1169

*Check one only

VOLUNTARY ENHANCEMENT(S)	ASSOCIATED CR OR ER