

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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)

Waterford Steam Electric Station, Unit 3

DOCKET NUMBER (2)

05000-382

PAGE (3)

1 of 5

TITLE (4)

An Appendix R Non-Compliance Outside Design Basis Condition Involving An Inoperable Sprinkler System

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
10	06	99	99	016	00	11	08	99	N/A	N/A
									N/A	N/A

OPERATING MODE (9) 1

POWER LEVEL (10) 100

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

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: **O. P. Pipkins, Senior Licensing Engineer**

TELEPHONE NUMBER (Include Area Code): **(504) 739-6707**

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).	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
------------------------------------------------------------	----------	-----------	--------------------------------------	-------	-----	------

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

On October 6, 1999, with the plant in Mode 1 at 100% reactor power, it was determined, during reviews of sprinkler system hydraulic calculations, that a fire protection sprinkler system (FPM-4B) was inoperable due to being unable to meet design density (gal/sq ft) as required by the code of record (NFPA-13-1976) for a small section of the area. A three hour rated fire barrier wall between the 'A' and 'B' diesel generator rooms provides adequate Appendix R separation between the diesel generators. However a fire barrier with less than a three hour fire rating, located between the corridor and the 'B' diesel generator room has 'A' train diesel generator cables in close proximity. Therefore, the sprinkler deficiency resulted in the potential for a fire in the 'B' diesel generator room to affect both trains of diesel generators. This constituted a condition outside the design basis of the plant with respect to Appendix R. Compensatory measures (continuous fire watches) were established immediately. The EDGs were determined to be operable in light of the compensatory measures. No actual fire event had occurred. The condition was determined to be due to an inadequate original design configuration. Corrective measures are being implemented under the plant corrective action program. The condition did not compromise the health and safety of the general public.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Waterford Steam Electric Station, Unit 3	05000-382	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 5
		99	016	00	

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

REPORTABLE OCCURRENCE

On October 6, 1999, during reviews of sprinkler system hydraulic calculations, it was determined that the sprinkler system in the room containing Emergency Diesel Generator (EDG) 'B' did not meet NFPA-13 requirements. A panel wall in the south wall of that room has a fire rating less than required (an NRC approved deviation). Cables associated with the 'A' EDG are routed in the corridor just south of the panel wall. The sprinkler system design deficiency in conjunction with the configuration described above resulted in a condition that was outside the design basis of the fire protection system since a fire in the subject room could potentially have adversely affected both trains of EDG ('A' and 'B'). The condition could have adversely impacted the ability to achieve safe shutdown. The condition was reported to the NRC Operations Center via ENS within one hour of the determination of reportability in accordance with the requirements of 10CFR50.72(b)(1)(ii)(B). The condition is hereby being reported within 30 days of discovery under the requirements of 10CFR50.73(a)(2)(ii)(B) as a condition outside the design basis of the plant.

INITIAL CONDITIONS

At the time of discovery on October 6, 1999, the plant was operating in Mode 1 at approximately 100% reactor power. No major systems, structures or components were out of service specific to this condition.

EVENT DESCRIPTION

On October 6, 1999, an Appendix R fire suppression system noncompliance condition was discovered during evaluations associated with a design bases reconstitution effort for plant sprinkler systems and revision of sprinkler system calculations. During reviews of sprinkler system hydraulic calculations, it was determined that fire protection sprinkler system FPM-4B [KP] could not provide water spray density as required by the code of record (NFPA-13-1976) for a small section of the area. Relocating one sprinkler improved the system hydraulic characteristics, thus allowing the system to meet the required design density. The condition originated during initial installation of sprinkler system FPM-4B. The affected sprinkler system is

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Waterford Steam Electric Station, Unit 3	05000-382	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 5
		99	016	00	

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

located in the 'B' EDG room in the Reactor Auxiliary Building (RAB). The sprinkler system was declared inoperable and a continuous fire watch was established in the area (compensatory action). EDG 'B' is operable based on implementation of the compensatory measures. It was later determined that cables from the 'A' EDG are routed along the outside of the south wall of the 'B' EDG Room. That wall has an acoustical, removable, panel assembly that has a fire rating (90 minutes in the direction of the room to the corridor) that is less than the required (Appendix R) three hour rating. The panel fire ratings constitute a NRC approved deviation from the Appendix R requirements. However, the sprinkler design deficiency in the 'B' EDG Room introduced the potential for a fire in that room to result in the damage of both trains of EDG.

CAUSAL FACTORS

The root cause of the condition was determined to be design configuration and analysis: Original design inadequate. Hydraulic calculations provide the basis for sprinkler system piping layout and design. A review of plant historical documentation indicates that the original hydraulic calculations were prepared to the 1976 edition of NFPA 13, "Automatic Sprinkler Systems". Sprinkler system design specifications specified the required design density (amount of water per square ft.) for each sprinkler system. Each sprinkler system was designed as a hydraulically designed system with supporting hydraulic calculations. The calculations were prepared in the mid 1970s, prior to the personal computer, and as such were prepared by hand. Current ongoing reviews of these calculations identified the error.

A contributing cause included design configuration and analysis: Inadequate review of design. It is believed that the reviews performed may have consisted of checking the calculation math (by hand) and possibly not scrutinizing the calculation methodology.

CORRECTIVE ACTIONS

Immediate actions involved establishing a continuous fire watch in the EDG 'B' room as a compensatory action. The concern of inadequate hydraulic calculations is common to all sprinkler systems calculated by the applicable vendor (Viking Sprinkler Company). The overall corrective action

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Waterford Steam Electric Station, Unit 3	05000-382	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 5
		99	016	00	

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

plan is addressing all of these sprinkler systems as the reviews in progress identify problems. The specific corrective measure for the case in point (EDG 'B' room) involves relocating an existing sprinkler to provide the appropriate area of coverage, thus lowering the sprinkler system demand on the water supply system.

SAFETY SIGNIFICANCE

The condition has the potential to adversely affect both trains of EDGs assuming a fire starts in the 'B' EDG room and burns through the acoustical, removable, panel assembly in the South wall of that room and damages the 'A' EDG cables that are routed nearby, outside that wall. The acoustical panel provides a 90 minute fire barrier from the diesel generator room side and a 45 minute fire barrier from the other (hall) side of the wall. The combustible loading in the diesel generator room is 84 minutes exclusive of transient combustibles. The fire panel wall was found to be acceptable to the NRC through the deviation process due to the existence of fire detection and fire suppression on both sides of the wall. 'A' train EDG cables are located in the hall approximately 10 to 15 feet from the panel wall.

The sprinkler systems installed at Waterford 3 are classified as non-safety, quality related. The systems are a component of the defense in depth concept of fire protection. The other components include fire detection systems, fire barriers and manual fire response.

Based on the level of fire loading in the EDG 'B' room, the existence of automatic fire detection, fire barriers, and a trained fire brigade, there is a reasonable level of assurance that a fire would not have impacted the post fire safe shutdown of the plant. This condition will be corrected by relocating one sprinkler. The condition was not safety significant.

SIMILAR EVENTS

A similar event was identified in LER 99-009-00. This condition was another case where design configuration and analysis deficiencies resulted in not being able to provide adequate sprinkler coverage for the entire fire area.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Waterford Steam Electric Station, Unit 3	05000-382	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	5 OF 5
		99	016	00	

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

ADDITIONAL INFORMATION

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