

FACILITY NAME (1) **Prairie Island Nuclear Generating Plant Unit 1** DOCKET NUMBER (2) **05000 282** PAGE (3) **1 OF 6**

TITLE (4) **Fire Area 32 Appendix R Safe Shutdown Analysis Issues**

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
08	27	98	98	-- 14	-- 0	09	25	98	Prairie Island Unit 2	05000 306
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING **1** THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

OPERATING	POWER	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
	100	20.2203(a)(1)	20.2203(a)(3)(i)	<input checked="" type="checkbox"/>	50.73(a)(2)(ii)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)		50.73(a)(2)(iii)
		20.2203(a)(2)(ii)	20.2203(a)(4)		50.73(a)(2)(iv)
		20.2203(a)(2)(iii)	50.36(c)(1)	<input checked="" type="checkbox"/>	50.73(a)(2)(v)
		20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)

OTHER Specify in Abstract below or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME **Jeff Kivi** TELEPHONE NUMBER (Include Area Code) **651-388-1121**

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE). NO

EXPECTED MONTH DAY YEAR

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

On August 27, with both Units at 100% power, it was determined the control cable for motor operated valve MV-32335 (Condensate Storage Tank to No. 12 Motor Driven Auxiliary Feedwater Pump) in Fire Area 32 in the turbine building was not protected (as required by an exemption to 10CFR50 Appendix R).

Appropriate compensatory measures will be maintained in the Fire Area 32 until the fire barrier for the control cable is replaced.

9809300313 980925
PDR ADOCK 05000282
S PDR

LICENSEE EVENT REPORT (LER)

TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Prairie Island Nuclear Generating Plant Unit 1	05000 282	98	-- 14 --	00	2 OF 6

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

EVENT DESCRIPTION

On August 27, 1998, Prairie Island Nuclear Generating Plant (PINGP) it was determined some cables¹ in Fire Area 32 (and possibly in Fire Area 31) in the turbine building (695' elevation) were not protected (as required by an exemption to 10CFR50 Appendix R for these areas). This issue was assessed by NCR 19982049. In particular, the assessment of NCR 19982049 determined that (in Fire Area 32) a control cable for motor-operated valve² (MOV) MV-32335, Condensate Storage Tank³ to No. 12 Motor Driven Auxiliary Feedwater Pump⁴, should have a one-hour fire barrier installed in Fire Area 32, but that the barrier had been removed.

As part of the 1987 safe shutdown analysis (SSA), power and control cables for MV-32335 were protected with a one-hour barrier within Fire Area 32 in accordance with the approved exemption for the area. MV-32335 is normally open and is required to remain open for safe shutdown. The current SSA (1997 revision) credited this valve as being open and credited manual action to de-energize the source motor control center⁵ (MCC) and reopen the valve locally in the event of spurious closure of the MOV. Guidance for these manual actions was provided in PINGP Safety Procedure F5, Appendix D. Based on this analysis the one-hour barrier was removed from these cables in April of 1998.

During this event both units were operating at 100% power.

CAUSE OF THE EVENT

The PINGP Appendix R SSA was completely reconstituted (finished in 1997) due to:

- Addition of two new safety-related diesel generators for Station Blackout (SBO).
- Installation of and relocation of new 480 volt electrical switchgear and new Unit 2 4kV electrical switchgear as part of the Electrical System Upgrade (ESU) modification.
- Resolution of issues associated with Thermo-Lag under GL 92-08.

As part of this reconstitution effort, each fire area was re-evaluated and several changes were made to the original compliance strategy of the previous SSA. These changes were based on the new plant electrical configuration, the revised cable routing philosophy implemented in the SBO/ESU modifications and additional review of new regulatory guidance documents.

¹ (EIS Component Identifier: CBL)

² (EIS Component Identifier: V)

³ (EIS Component Identifier: TK)

⁴ (EIS Component Identifier: P)

⁵ (EIS Component Identifier: MCC)

LICENSEE EVENT REPORT (LER)

TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Prairie Island Nuclear Generating Plant Unit 1	05000 282	98	-- 14 --	00	3 OF 6

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

The cause of the non-compliance with the exemption to 10CFR50, Appendix R was crediting local manual action in lieu of remote (control room) operation for compliance. Crediting is allowed under the guidance of Generic Letter 86-10 in some cases, but the exemptions for the areas claimed credit for remote operation. In addition, there is an open door⁶ between the two fire areas (with a fusible link to shut the door in case of fire). A fire in Fire Area 32 could have hampered local manual operation of MV-32335 (in Fire Area 31) because the door between the fire areas probably would remain open for some time while smoke infiltrated Fire Area 31 from Fire Area 32.

ANALYSIS OF THE EVENT

The current SSA analysis of Fire Area 32 noted that the power cable for MV-32335 did not need to be protected because the cable was run entirely in rigid conduit⁷, thus, a three phase hot short could not occur to cause a spurious operation. The current SSA therefore concluded that wrapping this cable would neither offer any protection for the operation of MV-32335 nor reduce the combustible loading within Fire Area 32. In addition, because the MCC is also located within this area, the current SSA concluded that the control cable for valve MV-32335 did not need to be wrapped.

The current SSA further concluded that securing power to the MCC would mitigate spurious MOV closure concerns and negate the need to re-enter the area to open the breaker⁸ if manual operation of the valve were required. If MV-32335 were to spuriously close prior to power being secured, it could be manually opened because it is in another Fire Area (separated from Fire Area 32 by a 3-hour barrier). The current SSA assumed (but did not specifically state) in the analysis of Fire Area 32 that, if the suction valve did spuriously close, 12 Motor Driven Auxiliary Feed Pump would subsequently trip on low suction pressure (the ensuing implicit assumption is that the operator would recognize the low suction pressure trip and take appropriate corrective action.) The one-hour barrier installed on conduits for MV-32335 power and control cables was removed in April of 1998 as part of Modification 94L483.

As part of the Fire Protection Functional Inspection (FPFI), a review of Fire Area 32 noted that the existing exemption for Fire Area 32 requires all Division B safe shutdown conduits to be protected by a one-hour barrier in that Fire Area. This resulted in the issuance of PINGP NCR 19982049. The assessment of NCR 19982049 concluded that the removal of wrap from the power cable was insignificant because fire induced damage to the power cable could not cause a spurious operation of the MOV. However, NCR 19982049 concluded that the removal of the wrap from the control cable is

⁶ (EIS Component Identifier: DR)

⁷ (EIS Component Identifier: CND)

⁸ (EIS Component Identifier: BRK)

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
Prairie Island Nuclear Generating Plant Unit 1	05000 282	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 6	
		98	-- 14 --	00		

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

improper because MV-32335 was not adequately protected from spurious closure due to fire induced damage to the control cable.

Spurious closure of MV-32335 would cause the 12 Motor Driven Auxiliary Feedwater Pump to trip on low suction pressure, thus, the pump would not be free from fire damage as required. Further, operator actions in Fire Area 31 could be hampered by a fire in Fire Area 32 because the sliding door connecting the two fire areas has normally been open (with a fusible link that is expected to close the door in case of fire). The fusible link would not be expected to close the door before smoke from a fire in Fire Area 32 infiltrated Fire Area 31.

A. Deterministic Evaluation of the Safety Significance of the Non-compliance

An evaluation of the sequence that could have occurred if a fire in Fire Area 32 had affected these cables is being performed. The purpose of the evaluation is to determine the safety significance of the non-compliance which could have caused the AF pump to trip.

This evaluation will be provided in an supplement to this LER by October 26, 1998.

B. Risk Significance Evaluation

The IPEEE Fire PRA, Rev. 2, considered the impact of a fire in Fire Area 32 causing spurious closure of MV-32335 prior to failure of MCC 1A2, such that the valve could not be repositioned from the control room. The Fire IPEEE conservatively did not credit the potential for operators to locally open a suction valve (either from the CST or from the cooling water system) and restart the pump to restore AFW flow from the 12 AF pump. In the final quantification of this area, only the conditional probability of spurious actuation given exposure of the control cable itself to fire was considered (no credit for operator response was given). The results of this conservative treatment demonstrate that the spurious actuation of the valve itself is not a significant contributor to plant risk.

Only large instrument air compressor fires with failure of suppression were found to lead to damage of the MV-32335 cabling. The total frequency of these fires with suppression failure and spurious actuation of the valve (and all other valves susceptible to spurious actuation in this fire area) is 3.2E-7/rx-yr. With credit for local operator action in response to MV-32335 closure, the core damage frequency from this specific sequence drops to less than 1E-8/rx-yr. In addition, a fire watch was established in this area throughout the period of potential non-compliance that provides further assurance that the risk due to fires in this fire area is very low.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Prairie Island Nuclear Generating Plant Unit 1	05000 282	98	-- 14 --	00	5 OF 6

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

C. Compensatory Measures Established

As part of the resolution program for Thermo-Lag issues, Special Order SC-236, was put in effect in 1992 and has continued to be in effect during implementation of Modification 94L483, Part A. Modification 94L483 implemented the changes to the fire barrier wrapping and implemented the cable re-routes and/or component re-locations in response to the development of the current SSA. Special Order SO-236 maintains the roving hourly fire watches and will remain in effect until resolution of all the fire protection issues for which it has been posted. Therefore, the one-hour fire barrier protection that was removed in April 1998 was compensated for by the presence of the roving hourly fire watch. In addition, NCR 19981794 (IN 92-18 MOV Hot Shorts -- submitted to NRC as LER 1-98-10) also has compensatory measures in place for this area (and specifically for this valve) which consists of the roving fire watch under SO-236. The adequacy of the hourly fire watch was evaluated and justified as part of the assessment of NCR 19981794.

A control cable for MV-32335 that should be protected by a one-hour fire barrier per an existing exemption to 10CFR50, Appendix R, for Fire Area 32 is not protected. That barrier was removed based on a SSA that credited local manual actions to mitigate spurious closure of MV-32335. This crediting of local manual actions is inconsistent with the approved exemption for this area. In addition, since local manual action could have been hampered, the ability to shut down the reactor and maintain the reactor in a safe shutdown condition could conceivably have been affected. Therefore this condition is reportable per 10CFR50.73(a)(2)(v) as affecting the safe shutdown capability and per 10CFR50.73(a)(2)(ii)(B) as being outside of the PINGP design basis for 10CFR50, Appendix R.

CORRECTIVE ACTION

- 1. Compensatory actions that have been established in Fire Area 32 shall remain in effect until all corrective actions have been implemented or the issue has been otherwise resolved.** The following specific corrective actions for this event are as follows:
- 2. Install a one-hour fire rated barrier to protect the Train B control cable to MV-32335 (including Terminal Box 1263) to return to compliance with the approved exemption in Fire Area 32.**
- 3. Review compliance with exemptions to 10CFR50 Appendix R for all Fire Areas. See LER 1-98-12 for additional information.**

LICENSEE EVENT REPORT (LER)

TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
Prairie Island Nuclear Generating Plant Unit 1	05000 282	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	6	OF 6
		98	-- 14 --	00		

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

FAILED COMPONENT IDENTIFICATION

None.

PREVIOUS SIMILAR EVENTS

Cases of missing Appendix R Fire Barriers have been identified previously. Refer to Unit 2 Licensee Event Report (LER) 98-03 and Unit 1 LER's 98-12 and 98-15. Unit 1 LER 98-10 addresses the related issue of MOV hot shorts and spurious operation.