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Nuclear Regulatory Commission
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DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT -
LICENSEE EVENT REPORT 89-013 - INADEQUATE SEPARATION BETWEEN CIRCUITS FOR REDUNDANT SAFETY EQUIPMENT

Licensee Event Report (LER) 89-013 - (Inadequate Separation Between Circuits for Redundant Safety Equipment) is attached. This is submitted as a voluntary LER.

Brian D Johnson
Staff Licensing Engineer

CC Administrator, Region III, USNRC
NRC Resident Inspector - Palisades

Attachment

OC0789-0006-NL02

IE22
1/1

NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
PALISADES NUCLEAR PLANT	0 5 0 0 0 2 5 5	1 OF 0 5

TITLE (4)
INADEQUATE SEPARATION BETWEEN CIRCUITS FOR REDUNDANT SAFETY EQUIPMENT

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)
0 6	0 1	8 9	8 9	0 1 3	0 0	0 7	1 7	8 9	N/A	0 5 0 0 0
									N/A	0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 8 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		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)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	Voluntary
		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	
C S Kozup, Technical Engineer, Palisades	6 1 6	7 6 4 - 8 9 1 3

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
	F A	C B L		No					

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 fifteen single-space typewritten lines) (16)

Palisades is refining its a review of associated ircuits in order to confirm the Plant's compliance with respect to fire protection circuit separation requirements contained in 10CFR50 Appendix R. During this review, at 1156 hours on June 1, 1989, it was discovered that right channel control circuitry [FA;CBL] for charging pumps P-55A and B and service water pump P-7A passed through the 1C Switchgear Room, which is normally associated only with left channel equipment. This means that the 1C Switchgear Room contains both right and left channel circuitry for the charging pumps and the service water pumps. With this configuration, it could be postulated that with multiple events and failures, a fire in the 1C Switchgear Room could damage circuitry to all three service water pumps and to all three charging pumps and render these pumps inoperable. The reactor was critical with the Plant operating at 80 percent of rated power when this condition was identified.

The corrective action being taken by the Plant is to reroute or wrap with a fire rated material the subject control cables so that they are not affected by a fire in the 1C Switchgear Room. This work will be performed during an upcoming maintenance outage. In the interim, as a compensatory measure, hourly fire tours of the 1C Switchgear Room are being performed in accordance with the Technical Specifications.

LER-NP01

Description

Palisades is refining its a review of associated circuits in order to confirm the Plant's compliance with respect to fire protection circuit separation requirements contained in 10CFR50 Appendix R. During this review, at 1156 hours on June 1, 1989, it was discovered that right channel control circuitry [FA;CBL] for charging pumps P-55A and B [CB;P] and service water pump P-7A [BI;P] passed through the 1C Switchgear Room, which is normally associated only with left channel equipment. This means that the 1C Switchgear Room contains both right and left channel circuitry for the charging pumps and the service water pumps. With this configuration, it could be postulated that with multiple events and failures, a fire in the 1C Switchgear Room could damage circuitry to all three service water pumps and to all three charging pumps and render these pumps inoperable. The reactor was critical with the Plant operating at 80 percent of rated power when this condition was identified.

Appendix R of 10CFR50 requires, in part, that Plants provide fire protection features, such as physical separation of redundant trains of equipment and associated circuits, so that a fire in any particular area of the Plant would leave at least one train of safety-related equipment operable to allow a safe shutdown of the Plant.

At Palisades, right channel equipment is fed from the 1D switchgear and left channel equipment is powered from the 1C switchgear. The A and B charging pumps are considered right channel equipment while the C charging pump is left channel. Similarly, the A and C service water pumps are considered right channel equipment while the B Service water pump is left channel.

During this review of associated circuits, it was discussed that control circuitry for the A and B charging pumps and the A service water pump (right channel) passed through the 1C Switchgear Room (left channel) The circuits specifically consisted of lube oil low pressure, low suction pressure, and transmission oil very high temperature trips for the A charging pump, low suction pressure and low lube oil pressure trips for the B charging pump, and a low discharge pressure start for the A service water pump.

This condition is being voluntarily reported because an area of the Plant was identified in which a fire could potentially adversely affect the safe operation of the Plant if multiple events and failures were to occur.

Cause Of The Event

In the late 1970's, one of the actions taken by the Plant to assess compliance with Appendix R circuit separation criteria was to review the circuits passing through the 1C Switchgear Room. As a result of this review, the power cable for the A service water was wrapped with a fire

rated material and the power cable for the B charging pump was rerouted so that a 1C Switchgear Room fire would not affect either of these cables. Recent reviews of the modification package for this work and associated documentation did not reveal any documented justification that explains why the control cables associated with these pumps were not also wrapped or rerouted. Considering the lack of documented evidence that this particular control circuitry was ever reviewed, it is surmised that this condition exists due to a personnel error made during the initial review of circuitry passing through the 1C Switchgear Room.

Corrective Action

The corrective action being taken by the Plant is to reroute or wrap with a fire rated material the subject control cables so that they are not affected by a fire in the 1C Switchgear Room. Every effort is being made to perform this work during the upcoming Fall 1989 Maintenance Outage. However, the lead time required for procuring materials may delay this work until the March 1990 Maintenance Outage. In the interim, as a compensatory measure, hourly fire tours of the 1C Switchgear Room are being performed in accordance with the TS until the cables are rerouted or wrapped. Also in the interim, Operating Procedures are being revised to inform the operators of the potential consequences of a fire in the 1C Switchgear Room and of appropriate actions to take in the event that one does occur.

Completion of the ongoing associated circuit review provides assurance that all other cases of inadequate separation between redundant circuitry will be identified and dispositioned properly.

The probability of an incident in which a fire in the 1C Switchgear Room adversely affecting safe operation of the Plant is sufficiently low to allow the Plant to operate in the present condition until the upcoming Maintenance Outage. See the "Analysis Of The Event" section for details.

Analysis Of The Event

With circuitry from both trains of charging pumps and service water pumps passing through the 1C Switchgear Room, it is remotely possible that a fire in 1C switchgear could disable all the charging and/or service water pumps. At least one charging pump is required after a reactor trip to maintain primary coolant system subcooling and inventory, and at least one service water pump is needed to provide cooling to the 1-2 diesel generator, which feeds the 1D switchgear. However, the probability of a fire in this room disabling these pumps is extremely low and action could be taken to mitigate the adverse effects of this event on the Plant.

The probability of a fire of any consequence occurring in the 1C Switchgear Room is very low. The room is equipped with smoke detection and automatic suppression. Also, portable extinguishers and hose stations are available about 40 feet from the room's east door and immediately outside the west door in the Turbine Building. In place combustibles include electrical wiring insulation. Transient combustibles are minimal, strictly controlled and consist mainly of Class A materials. Moreover, hourly fire tours are being conducted in the room in accordance with the TS, until the subject circuitry is rerouted or wrapped.

If a fire somehow occurred in the 1C Switchgear Room, it is unlikely that the fire could damage the circuitry for all three charging pumps and/or all three service water pumps in such a way that the pumps are disabled.

However, if the fire did manage to disable the charging and/or the service water pumps, action could be taken to restart these pumps. Charging pumps B and C have an alternate feed from bus 13, which is fed from the 1E bus. Power from the 1E bus would be available as long as station or offsite power is available.

Service water pump A could be started via local tending of the breaker using an existing maintenance procedure. The breaker is located in the Cable Spreading Room and would not be affected by a 1C Switchgear Room fire.

If offsite power were not available after a Plant trip, service water pump A could be started as discussed above and powered from the 1-2 diesel generator via the 1D switchgear.

Charging pumps A or B could be operated via the 1D switchgear by pulling the control power fuses to the breakers and manually closing the breaker.

Operating Procedures are being revised to include guidance on these methods of restoring a service water pump and a charging pump in the interim until the subject circuitry in the 1C Switchgear Room is either rerouted or wrapped.

A worst case scenario would be a situation in which a fire occurred in the 1C Switchgear Room, the charging and service pumps were rendered inoperable, and all station power was lost. This event is bounded by the station blackout issue which currently is being addressed at Palisades.

In summary, the probability of a fire occurring in the 1C Switchgear Room that disables all three charging pumps and/or all three service water pumps is considered to be extremely low. However, if this occurred, action could be taken to start a charging and a service water pump. Scenarios in which offsite and emergency power are lost concurrent with such a fire are considered to be even more remote, but the Plant could still safely achieve

shutdown conditions. Therefore, this condition is not considered to adversely affect safe operation of the Plant.

Additional Information

There are no similar events documented in a Licensee Event Report that may be referenced.