

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Palisades Plant	DOCKET NUMBER (2) 0 5 0 0 0 2 5 5	PAGE (3) 1 OF 0 5
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TITLE (4) **POTENTIAL INABILITY TO MAINTAIN DIESEL GENERATOR ROOM TEMPERATURE QUALIFICATION DUE TO NON 1E QUALIFIED COOLING FAN**

EVENT DATE (5)			LER NUMBER (8)			REPORT DATE (8)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		
0	3	1	9	2	0	0	2	8	N/A		
0	3	1	9	2	0	0	2	8	N/A		

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

OPERATING MODE (9) N	20.402(b)	20.406(c)	60.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 0	20.406(a)(1)(i)	60.38(c)(1)	60.73(a)(2)(v)	73.71(c)
	20.406(a)(1)(ii)	60.38(c)(2)	60.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 386A)
	20.406(a)(1)(iii)	60.73(a)(2)(i)	60.73(a)(2)(viii)(A)	
	20.406(a)(1)(iv)	X 60.73(a)(2)(ii)	60.73(a)(2)(viii)(B)	
	20.406(a)(1)(v)	60.73(a)(2)(iii)	60.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME William L. Roberts, Staff Licensing Engineer	TELEPHONE NUMBER AREA CODE: 6 1 6 7 6 4 - 8 9 1 3
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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 <i>if yes, complete EXPECTED SUBMISSION DATE</i>	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>	EXPECTED SUBMISSION DATE (16)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (18)

On March 31, 1992, at approximately 1100 hours, the plant was in cold shutdown preparing to start up from a refueling outage. Results of analysis of the emergency diesel generator rooms cooling requirements and installed safety related cooling capability revealed that the existing cooling capability was not adequate to maintain the room temperature within the required design temperatures. Analysis results indicate that the existing configuration of having only 1 of the 2 emergency diesel generator room cooling fans powered from a class 1E source is not adequate to maintain the emergency diesel generator room temperature below the design limit of 104°F, with a design outdoor temperature of 95°F. The analysis results also showed that with one cooling fan in operation, the room temperature could be maintained below the design limit only if the outdoor temperature does not exceed 75°F.

Procedures have been revised to allow for re-energizing the non-safety related electrical bus that powers the second fan when the outdoor temperature exceeds 75°F. This condition was caused by an original design and construction error. The rooms were designed to be cooled by 2 safety related fans however, only one fan in each room is powered from a safety related power source.

During conceptual engineering for powering the second cooling fan in each diesel generator room from class 1E sources, it was determined that the existing power supply cables for all four fans are located in a single fire area, and do not meet the Appendix "R" criteria for cable separation. Technical Specifications required hourly fire tours were initiated and will continue until the design is corrected.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (3)						PAGE (4)		
		YEAR	-	SEQUENTIAL NUMBER	-	REVISION NUMBER		OF		
Palisades Plant	0 5 0 0 0 2 5 5	9	2	-	0 2 8	-	0 2	0 2	of 0 5	

EVENT DESCRIPTION

On March 31, 1992, at approximately 1100 hours, the plant was in cold shutdown preparing to start up from a refueling outage. Results of analysis of the emergency diesel generator rooms cooling requirements and installed safety related cooling capability revealed that the existing cooling capability was not adequate to maintain the room temperature within the required design temperatures. Analysis results indicate that the existing configuration of having only 1 of the 2 emergency diesel generator room cooling fans [EK;FAN] powered from a class 1E source is not adequate to maintain the emergency diesel generator room temperature below the design limit of 104°F, with a design outdoor temperature of 95°F. The analysis results also showed that with one cooling fan in operation, the room temperature could be maintained below the design limit only if the outdoor temperature does not exceed 75°F.

To permit plant operation at outside temperatures greater than 75°F, actions were taken such that power would be supplied to the second fan in each room when needed. System Operating Procedure (SOP) 22, "Emergency Diesel Generators", was revised to require that the electrical bus that powers the non-safety room cooling fan be re-powered from the emergency diesel generator needing the cooling, within 30 to 40 minutes after the generator is started, if the outside air temperature is greater than 75°F. This action is deemed as an interim action until a permanent class 1E power source can be supplied to the second room cooling fan. The analysis also showed that under existing plant conditions, the two cooling fans would only be able to cool the room to a temperature of 110°F versus the 104°F design temperature. The temperature rating of the limiting equipment in the rooms will be revised to allow operation of the equipment in a higher temperature environment.

During conceptual engineering of the modification for powering the second cooling fan in each diesel generator room from class 1E sources, it was determined that the existing power cables for all four fans are all located in a single fire area (cable spreading room) and do not meet the Appendix "R" criteria for cable separation. Technical Specification required fire tours were initiated in the cable spreading room.

Further reviews found indications that some of the diesel fan cables also followed a parallel route through the plant and fire tours were initiated in these routing areas as well. This discovery was reported to the NRC on May 20, 1992, as a condition outside of the plant design basis.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(ii) as a condition outside of the design basis of the plant.

CAUSE OF THE EVENT

The root cause of the event was the inadequate implementation of the original emergency diesel generator room cooling design. The original design fan sizing calculations show that the original design intent was to have both of the room fans in operation to maintain the diesel generators operable.

This event did not involve the failure of any equipment important to safety.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (3)						PAGE (4)		
		YEAR	-	SEQUENTIAL NUMBER	-	REVISION NUMBER		OF		
Palisades Plant	0 5 0 0 0 2 5 5	9	2	-	0 2 8	-	0 2	0 3	OF	0 5

When it was determined that the fans were needed to support diesel generator operability, the Appendix "R" cable separation implications were not immediately recognized, and was a cognitive personnel error.

ANALYSIS OF THE EVENT

In 1991 as part of the on-going Palisades Configuration Control Project a number of apparent discrepancies in circuit routing were identified. The power and control circuits, for one of the safety related emergency diesel generator cooling fans, were two of the circuits determined to be mis-routed. Because of these two circuit deficiencies a special Plant Review Committee (PRC) meeting (91-030) was convened to address the operability of the associated emergency diesel generator (1-1). The committee found that actions were needed to provide alternate room cooling for the (1-1) diesel generator. These actions were established and remained in place until the fans cables could be rerouted to resolve the deficiency. The fan cables were rerouted on October 19, 1992.

Prior to this time, as part of an Appendix R safe shutdown analysis, an analysis had been completed to assess the ability to cool the diesel generator room by natural convection rather than by forced convection. This analysis concluded that opening the doors and blocking open the ventilation louvers would provide adequate cooling to maintain the diesel generator operable. As a follow-up and as part of the corrective actions for the identified cable routing discrepancies, an evaluation for the operability requirements for the diesel generator ventilation was assigned.

As a result, the System Engineering Department performed a preliminary analysis which concluded that natural circulation may not be sufficient to cool an operating diesel generator, and when outside temperatures reach near the design limit, two room cooling fans may be needed. This issue was addressed at the regular PRC (92-038) meeting in October of 1991. The PRC concluded that based on a Plant Safety Engineering analysis that the diesel generators were operable, but that an unreviewed safety question may exist in that we were outside the design basis of the plant. At this time we did not have the knowledge that the original design had called for both room cooling fans to cool the room under maximum design conditions. This was discovered when we requested the plant architect engineer to complete a formal room HVAC analysis. Therefore, we believed that the original design was as the plant was configured, that is with one room cooling fan powered from a 1E power source.

As a follow-up to the PRC meeting the operability of the emergency diesel generator was discussed with the Palisades Senior Resident Inspector and the Region III Reactor Projects Section Chief for Palisades. It was agreed that there was no immediate operability concern and a license amendment need not be pursued unless we proposed to permanently accept the condition.

The plant architectural engineer was asked to perform a formal analysis of the emergency diesel generator room cooling requirements. The results of their analysis showed that both room cooling fans would be required to maintain the required room cooling above an outdoor temperature of 75°F and that design limit of 104°F cannot be maintained with an outdoor temperature above approximately 88°F, even with both fans operating. Diesel

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (3)						PAGE (4)							
		YEAR		SEQUENTIAL NUMBER		REVISION NUMBER									
Palisades Plant	0 5 0 0 0 2 5 5	9	2	-	0	2	8	-	0	2	0	4	OF	0	5

generator operability will be assured for outdoor temperatures above 75°F by procedural controls which require the operators to re-energizing the bus which feeds the non-1E powered fans. This procedural re-powering action will be in place until a modification can be completed to power the fans from a 1E source.

In addition, by the time the outdoor temperature exceeds 88°F, it is our intent to assure that the diesel generator can operate in an environment six degrees higher than was originally called for in the Palisades design.

We are examining the vendor ambient temperature limitations for critical operational components on the emergency diesel generators and have found that NEMA rated components are the limiting components. The NEMA standards provide for temperature rating of components at an ambient temperature of 104°F. The standard also provides guidelines for operation of components at higher ambient temperatures. We believe that based on the small temperature difference between the rooms original design rating and that which is now calculated (6°F), that we will have no problem adjusting the rating of the necessary components to meet the 110°F limit.

When the results of the plant architectural engineer analysis of the emergency diesel generator room cooling was received, it was not immediately realized that the Appendix "R" cable separation criteria may also need to be reviewed. The calculation (EA-A-PAL-86-01, Rev. 2) that originally showed the diesel generators could be cooled without the installed fans, discussed Appendix "R" room cooling requirements, but not fan cable separation.

The Appendix "R" cable separation deficiencies were uncovered as part of the conceptual engineering phase of the modification to provide class 1E power to the second cooling fan in each diesel generator room. The plant modification process requires that Appendix "R" design criteria be evaluated for every plant modification.

All four existing power cables for the cooling fans, two per generator, are located in the cable spreading room which is a single fire area. Technical Specification required hourly fire tours are in place to compensate for these design deficiencies. Since some of the cooling fan power cables follow parallel routes from the C40 panel and cable spreading room to the diesel generator rooms, fire tours are also in place in the fire zones that these cables are routed. The fire tours will remain in place until modifications are completed to resolve these deficiencies.

CORRECTIVE ACTION

Activities to improve temperature qualification of necessary equipment in the emergency diesel generator rooms to approximately 115°F will be completed by June 30, 1992. (Previously reported in letter dated May 29, 1992.)

A modification will be implemented which will power all emergency diesel generator room ventilation fans from class 1E power sources and comply with Appendix "R" cable separation criteria. Hourly fire tours will continue until the modification is completed.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (3)			PAGE (4)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Palisades Plant	0 5 0 0 0 2 5 5	9 2	- 0 2 8	- 0 2	0 5	of	0 5

ADDITIONAL INFORMATION

Recently submitted licensee event reports which also dealt with the subject of operability of the emergency diesel generator room cooling fans was LER 91-014.

This emergency diesel generator room cooling condition is an open item in NRC Inspection Report 91-019, Item 23.