

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) PALISADES NUCLEAR PLANT	DOCKET NUMBER (2) 0500021515	PAGE (3) 1 OF 05
--	---------------------------------	---------------------

TITLE (4)  
Potential For Operation Outside of Design Basis With Respect To MSLB Analysis

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)
10	30	87	87	039	01	10	21	88	N/A		05000
									N/A		05000

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) 000	20.402(b)	20.408(e)	80.73(a)(2)(iv)	73.71(b)						
	20.408(a)(1)(i)	80.38(a)(1)	80.73(a)(2)(v)	73.71(e)						
	20.408(a)(1)(ii)	80.38(a)(2)	80.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 388A)						
	20.408(a)(1)(iii)	80.73(a)(2)(i)	80.73(a)(2)(vii)(A)							
	20.408(a)(1)(iv)	X 80.73(a)(2)(ii)	80.73(a)(2)(vii)(B)							
	20.408(a)(1)(v)	80.73(a)(2)(iii)	80.73(a)(2)(viii)							

LICENSEE CONTACT FOR THIS LER (12)	
NAME C S Kozup, Technical Engineer	TELEPHONE NUMBER AREA CODE: 616   764-8913

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPD'S		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPD'S
X	CB	P	G 045	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) (18)

During efforts to close out an NRC open item identified through the Palisades System Functional Evaluation (SFE) Program, it was determined that charging pump P-55B [CB;P] would not automatically actuate upon a pressurizer [AB;PZR] low level signal with coincident safety injection signal (SIS) as previously thought. This discovery resulted in the potential for past Plant operation outside of its design basis as described in Section 14.14, "Steam Line Rupture Incident" of the Palisades Final Safety Analysis Report while operating within current Plant Technical Specification (TS). The Plant was in cold shutdown condition when this item was identified.

The maximum charging flow rate called for in existing MSLB - FSAR analyses is 68 gallons per minute. This is equivalent to two charging pump flow. Analyses completed by Safety Analysis and vendor personnel have demonstrated that scenarios calling for 68 gallons per minute will remain bounded by current analyses if charging flow was reduced to one pump equivalent flow of 34 gallons per minute. Administrative controls have been implemented via an Operations Department Standing Order which require one charging pump be maintained in an operable status on each safety related bus [EB;BU] unless a 24 hour limiting condition of operation is entered. This action assures FSAR MSLB analyses are met and thereby, eliminates any safety consequences.

8802240301 880216  
FDR ADOCK 05000255  
S DCD

JE22/11

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  PALISADES NUCLEAR PLANT	DOCKET NUMBER (2)  0 5 0 0 0 2 5 5	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 7	0 3 9	0 1	0 2	OF 0 5

TEXT (If more space is required, use additional NRC Form 388A's) (17)

Description

During efforts to close out an NRC open item identified through the Palisades System Functional Evaluation (SFE) Program, it was determined that charging pump P-55B [CB;P] would not automatically actuate upon a pressurizer [AB;PZR] low level signal with coincident safety injection signal (SIS) as previously thought. This discovery resulted in the potential for past Plant operation outside of its design basis as described in Section 14.14, "Steam Line Rupture Incident" of the Palisades Final Safety Analysis Report while operating within current Plant Technical Specification (TS). The Plant was in cold shutdown condition when this item was identified.

TS 3.2.2.a defines operational conditions of the Chemical and Volume Control (CVC) system [CB] necessary to assure safe plant operation and requires that "at least two charging pumps be operable" when the reactor is critical. However, it is not delineated as to which of the three charging pumps must be operable.

As stated in Section 14.14 of the Palisades FSAR, the limiting transient in the steam line rupture incident is a main steam line break (MSLB) accompanied by a loss of offsite electric power concurrent with the reactor trip. The loss of offsite power results in immediate coastdown of all four primary coolant pumps [AB;P]. The pump coastdown is turbine/generator [TA;TG] assisted and lasts for approximately 80 seconds at which time unassisted coastdown begins. Failure of one emergency diesel generator [EK;DG] is also assumed and reduces the number of available high pressure safety injection (HPSI) pumps [BQ;P] from two to one and charging pumps from three to one. The maximum flow of borated water to the core is thus reduced by a factor of nearly three, relative to the maximum design flow rate. Charging flow of 34 gallons per minute is assumed to be available during this event. The transient response of the system to these events results in the lowest minimum departure from nucleate boiling ratio (MDNBR) of any of the MSLB events considered in this analysis.

Other cases analyzed and presented in the Palisades FSAR assume 68 gallons per minute of available charging flow. One case considered is MSLB coincident with loss of offsite power, turbine/generator assisted primary coolant pump coastdown and the failure of an auxiliary feedwater [SJ] control feature. Delivery of auxiliary feedwater to the steam generator [AB;SG] with the ruptured line is assumed to begin on reactor trip. Once established, flow is assumed to continue during the duration of the transient. The continued auxiliary feedwater flow adds positive reactivity to the core, enhancing the potential for additional fuel failure during a return to power event. In the initial analysis for this case, 68 gallons per minute of charging flow was assumed to be available based on the TS operability requirement for two charging pumps.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  PALISADES NUCLEAR PLANT	DOCKET NUMBER (2)  0 5 0 0 0 2 5 5	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 7	- 0 3 9	- 0 1	9 3	OF 0 5

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

An NRC open item (255/86035-137) was issued following our discovery that charging pump P-55B would only start on a SIS if a low flow condition existed. A low flow condition exists if less than one pump flow is sensed. The inspector noted that certain FSAR MSLB analysis required 68 gallons per minute of charging flow to the core. This is equivalent to two charging pump flow. TS require that two pumps be operable, but do not delineate between specific pumps. Therefore, if P-55A or P-55C was inoperable as allowed by TS at the time of the event, only one pump flow would be present. This flow would not meet the 68 gallon per minute FSAR requirement. While reviewing this item it was further identified that P-55B would be enabled upon an SIS, however, would not actuate upon a low pressurizer level signal as previously thought, but only on low charging flow. Originally it was thought that P-55B would automatically actuate on low pressurizer level initiated by primary coolant system (PCS) shrinkage when the MSLB occurred.

A further review of steam line rupture incidents then identified that if the event (MSLB with coincident loss of offsite power) occurred when P-55C was out of service as allowed by TS, and the single active failure was diesel generator 1-2, no boric acid injection would be available via the charging pumps. Charging pumps P-55A and P-55B are powered by diesel generator 1-2, and P-55C by diesel generator 1-1. Prior to Plant restart from the ongoing Maintenance Outage, charging pump P-55B was declared administratively inoperable. By doing this, a 24 hour Limiting Condition of Operation (LCO) would be entered at any time P-55A or P-55C were removed from service. This action, permitted by TS, would provide the the availability of adequate charging flow to meet all FSAR MSLB analyses. Additionally at this time, Consumers Power Safety Analysis and vendor personnel began a review of charging needs for the MSLB analyses.

Cause Of The Event

The failure to fully comply with the charging needs identified within the MSLB analyses has been attributed to a mis-identification of Plant design parameters and the lack of specificity within TS regarding charging pump operability requirements. This item was one of many FSAR questions which were derived from the Palisades SFE Program which were evaluated to determine priority of correction action. The initial judgement that charging pump P-55B would actuate on low pressurizer level was thought to mitigate the concern regarding the lack of a SIS start input to P-55B and therefore, not given priority attention.

Corrective Action

Charging pump P-55B was declared administratively inoperable on November 3, 1987. This action assured TS and MSLB analysis compliance. Actions were also initiated by Safety Analysis and vendor personnel to determine the significance of the potential charging flow inadequacies.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  PALISADES NUCLEAR PLANT	DOCKET NUMBER (2)  0 5 0 0 0 2 5 5	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 7	0 3 9	0 1	0 4	OF 0 5

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

This evaluation demonstrated that in scenarios where 68 gallons per minute are currently specified, providing 34 gallons per minute will result in decreased MDNBR's, however, all analyses are still bounded by the existing limiting MSLB analysis. On February 3, 1988 P-55B was returned to operable status and limitations placed on the charging pumps to assure an operable pump is available on each safety related bus [EB;BU] unless a 24 hour LCO is entered. These limitations, placed in an Operations Department Standing Order, and reflected in a forthcoming TS change request state:

- Charging pump P-55C may be inoperable provided the pump is restored to operable status within 24 hours.
- Both charging pumps P-55A and P-55B may be inoperable provided one of the pumps is restored to operable status within 24 hours of the time that the second pump was removed from service.

These controls assure adequate charging pump availability to meet charging flow requirements for FSAR MSLB analyses and thereby, eliminate any potential adverse safety consequences.

SFE results were re-reviewed to identify other potential significant issues which should be given priority. Two additional items were identified which will receive priority over the remaining SFE items. An evaluation is in progress to determine an appropriate methodology for assuring that accident analysis bases reflect actual plant design and operating conditions.

Additional evaluations have been completed or are in progress. These measures are intended to enhance Plant availability by reducing the consequences of long term charging pump operability. One completed evaluation reviewed the potential for increasing shutdown margin by replacing the existing, four part length control rods [AA;ROD] with full length trippable control rods. This review concluded that a modification would not yield satisfactory margin to be cost beneficial at this time. Conceptual designs are complete regarding a modification which will permit P-55B to be powered from either diesel generator 1-1 or 1-2 or associated safety related buses. This would require manual transfer and would ensure P-55B receives an automatic actuation upon a safety injection signal. Still under review is the feasibility of reducing the need for currently identified (34 gallons per minute) charging needs by performing a complete MSLB re-analysis. This analysis would more clearly identify operating parameters and document necessary corrections. A decision whether to proceed with the re-analysis is expected by mid April 1988. This analysis, if undertaken, will take approximately one year to complete from the time analytical work is initiated. The NRC Resident Inspector will be informed as to future actions.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  PALISADES NUCLEAR PLANT	DOCKET NUMBER (2)  0 5 0 0 0 2 5 5	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 7	0 3 9	0 1	0 5	OF	0 5

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

Analysis Of The Event

An evaluation by the fuel vendor shows that in scenarios where 68 gallons per minute are currently specified providing 34 gallons per minute will result in decreased MDNBR's, however, all analyses are still bounded by the existing limiting MSLB analysis. An evaluation of the analysis by the fuel vendor utilizing zero charging flow indicates that the MDNBR remains unchanged for the most limiting case. However, further investigation is required regarding assumptions of boron addition beyond the analysis time frame.

Administrative controls currently in place within the Operations Department Standing Order will provide operable equipment capable of meeting the 34 gallon per minute flow requirement and thereby, eliminating any safety consequences.

This event is being reported in accordance with 10CFR50.73(a)(2)(ii) as a condition that is potentially outside of the Plant design basis.



Consumers  
Power

**POWERING  
MICHIGAN'S PROGRESS**

General Offices: 1945 West Parnall Road, Jackson, MI 49201 • (517) 788-0550

February 16, 1988

Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT -  
LICENSEE EVENT REPORT 87-039 - REVISION 1 (POTENTIAL FOR OPERATION OUTSIDE OF  
DESIGN BASIS WITH RESPECT TO MSLB ANALYSIS).

Licensee Event Report (LER) 87-039, (Revision 1 (Potential for Operation  
Outside of Design Basis with Respect to MSLB Analysis.) is attached. This  
event is reportable to the NRC per 10CFR50.73(a)(2)(ii).

This revision is being submitted to fulfill our commitment to provide an  
update to LER 87-039 by February 16, 1988. Changes have been made in the  
corrective action section since the alternatives for solution to the problem  
have been further investigated. These changes are noted by vertical bars in  
the right hand margin.

Brian D Johnson  
Staff Licensing Engineer

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

Attachment

IE22  
1/1