

Palisades Nuclear Plant: 27780 Blue Star Memorial Highway, Covert, MI 49043

August 22, 1991

Nuclear Regulatory Commission Document Control Desk Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT -LICENSEE EVENT REPORT 91-016: INOPERABILITY OF CONTAINMENT SPRAY PUMP P-54C

Licensee Event Report (LER) 91-016 (Inoperability of Containment Spray Pump P-54C) is attached. This event is reportable to the NRC per 10CFR50.73(a)(2)(i).

Gerald B Slade General Manager

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

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Attachment

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G B Slade General Manager

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On May 23, 1991, with the Plant operating at 100% power, containment spray pump, P-54C, failed to start using the local control switch at the station breaker. The last documented run of containment spray pump P-54C was on February 11, 1991. At the time of occurrence the pump was being tested using a technical specifications surveillance procedure. The auxiliary operator (A0) conducting the test notified the control room of the failed first attempt and was instructed to perform a second closure attempt. The pump failed to start on the second closure attempt. The AO was then instructed by the control room to check both sets of fuses. The AO pulled both the closing coil and the control fuse holders. The AO visually inspected the holders and the fuses and found the them to be in good condition. The AO then performed a continuity check of the fuses, found them to be good, re-installed the fuses and the fuse holder and attempted another pump start. The pump started on the third attempt.																	
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EVENT DESCRIPTION

RC: Form JB6A

On May 23, 1991, with the Plant operating at 100% power, containment spray pump [BE;P], P-54C, failed to start using the local control switch [BE;JS] at the station breaker [BE;BKR]. The last documented run of containment spray pump P-54C was on February 11, 1991. [P-54C was operated during the performance of a technical specifications surveillance test, QO-11, which was completed on February 11, 1991. However, the plant did not go above 325°F until March 3, 1991, at which time operability of the containment spray pumps was required. During the time between February 11, 1991 and March 3, 1991, the fuses for P-54C were pulled and re-installed a number of times in support of various plant evolutions.] At the time of occurrence the pump was being tested using technical specifications surveillance procedure, QO-16, "Inservice Testing Procedure - Containment Spray Pumps." The auxiliary operator (AO) conducting the test notified the Shift Supervisor of the pump's failure to start and noted that the control power lights [BE;JI] were illuminated prior to the first attempted start of the pump. (Prior to the first attempted start of the pump the AO had verified proper orientation of the control power and closing coil fuse holders.) The AO was instructed by the control room to perform a second closure attempt. The pump failed to start on the second closure attempt. The AO was then instructed by the control room to check both sets of fuses. The AO pulled both the closing coil and the control power fuse holders, visually inspected the holders and the fuses and found them to be in good condition. The AO also performed a continuity check of the fuses and found them to be good, re-installed the fuses and fuse holders and attempted another pump start. The pump started on the third attempt.

CAUSE OF THE EVENT -

The most probable cause of the breaker's failure to close on the first and second attempts was the failure of the closing coil fuses to complete the closing circuit.

This event involved the failure of closing coil fuse holder to complete the electrical circuit.

ANALYSIS OF THE EVENT

The closing coil fuses were removed and inspected by electrical maintenance on May 23, 1991 and found to be satisfactory. Electrical maintenance then adjusted the fuse holder fingers to ensure good electrical contact. These actions were performed after successful completion of the technical

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specifications surveillance procedure (QO-16) that was in progress when the pump failed to start. Thermography was also performed on the breaker cubicle with the breaker both energized and de-energized. Special attention was focused on the closing coil fuse block during the closing operation. Thermography results showed no high resistance or deficient connections.

Possible causes of the breaker's failure to close were:

1. Closing coil fuses were not making up properly, thus disabling the breaker's closing circuitry.

According to the AO the control power lights were illuminated prior to the initial breaker closure attempt. Existence of control power indication is indicative of proper insertion and make up of the trip/control fuses but not the closing coil fuses. Verification of proper fuse holder orientation prior to the failed first pump start attempt confirmed that the fuse holder was in the proper orientation. It is not known whether the closing coil fuses actually made electrical contact to energize the closing coil circuit.

2. P-54C local control switch contacts may not have adequately closed during the first and second closure attempts.

The AO may have failed to move the local control switch to the fully closed position or the switch contacts may have been dirty. Assuming the AO performed the closing operation in the same manner on all closure attempts, it is unlikely that the failure was operator related.

Assuming that the contacts were dirty, then the wiping action of the switch contacts during the failed first and second attempted pump starts may have sufficiently cleaned the contacts to allow a successful closure on the third attempt.

The local control switch and closing coil circuitry were inspected as part of the corrective action resulting from this event. The switch contacts were found to be clean with only slight discoloration. The closing coil circuitry wiring was tight, in good condition and exhibited low resistance.

The type of electrical troubleshooting on the failed first and second attempted starts of P-54C may have masked whether or not the problem was the fuse block connection or some other problem. In the future, detailed troubleshooting should be initiated on the failure of safety related equipment to operate properly with an emphasis on not disturbing existing conditions so that the events leading to the failure can be reproduced.

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The most probable cause of the breaker's failure to close on the first and second attempts was the failure of the closing coil fuses to complete the closing circuit. Over time, as the fuse holder is removed and replaced during planned plant evolutions, the fuse holder fingers may become sufficiently deformed, resulting in poor or no contact with the circuit.

This event is reportable to the NRC per 10CFR50.73(a)(2)(i).

At the time of the event (5/23/91) a plant corrective action document was initiated to investigate root cause and assure appropriate corrective action. The initial event evaluation and follow-up evaluations were unable to determine a conclusive root cause. Since NRC reportability was determined to be dependant upon the outcome of the root cause analysis, no reportability determinations were made until the evaluations were completed. Although the operability of the spray pump is indeterminent from the time it was last tested until the time of this event, an LER is being submitted within 30 days of the final evaluation completion date.

CORRECTIVE ACTION

The following corrective actions have been initiated as a result of this event:

- 1. Ensure electrical maintenance workers are aware of 2400/4160V breaker troubleshooting methods.
- Provide remote and local indication of closing coil power for 2400/4160V solenoid operated breakers for Buses 1A, 1B, 1C, 1D, 1E, 1F and 1G. Include addition of normally open contact into green indicator light circuit.
- 3. Provide training to the operators on this event and incorporate the information into initial training.
- 4. Revise Administrative Procedure 4.02 concerning electrical breaker testing.

ADDITIONAL INFORMATION

NRC FORM 3864

We are currently investigating what appears to be a similar event that occurred with a diesel generator output breaker in August of 1990. Pending the results of that review, a supplement to this LER may be initiated.