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

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Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT - ASSESSMENT OF UNRESOLVED  
ITEMS FROM THE SWSOPI INSPECTION (NRC INSPECTION REPORT NO. 50-255/94002(DRS))

A Service Water System Operational Performance Inspection (SWSOPI) was conducted at the Palisades plant over the period from January 10 through February 11, 1994. NRC Inspection Report No. 50-255/94002(DRS), dated March 4, 1994, provided the results of the SWSOPI inspection and discussed a number of unresolved items and weaknesses. Consumers Power Company letter, dated April 8, 1994, provided the individual responses to each of the unresolved items and weaknesses. The NRC's May 12, 1994 letter acknowledged that the corrective actions and schedule for addressing the unresolved items and weaknesses appeared appropriate. This letter also requested that we provide the NRC with the unresolved items assessments when they are complete.

This letter provides our assessment of the unresolved items as requested by NRC letter, dated May 12, 1994. The referenced analysis, tests, and inspection results are available at Palisades for NRC review.

Unresolved Item 92028-03

*Use of firewater to provide backup water supply for auxiliary feedwater (AFW). The NRC's concern was based on the lack of an analysis or testing to verify the fire water system's capability to provide backup water to the AFW system. The licensee committed to complete an analysis to document the fire water system adequacy under action item request (AIR) A-PAL-92-098.*

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### Resolution

An analysis of the fire water system's capability to provide backup water to the auxiliary feedwater system has been completed. The analysis (EA-A-PAL-94-095) concludes that the emergency backup supplies from service water and fire water provide a net positive suction head that is greater than the required net positive suction head for the normal auxiliary feedwater pump suction. In addition, a special test (T-345) was performed to verify that the fire system supply is capable of providing the required water to the auxiliary feedwater system. The test results clearly showed that the fire water line to the auxiliary feedwater system is free and clear and capable of providing much more flow than required.

### Unresolved Item 94002-01

*The team identified the lack of over-pressure protection for CCW heat exchangers (HX) E-54A and E-54B. The concern involved over-pressure due to thermal expansion stemming from service water valve isolation. Palisades' ASME Code of record required each vessel to be protected from any conditions specified in the certified design specification. The code further required to document the degree of over-pressure protection in a summary technical report. The licensee was unable to retrieve the summary technical report that justified the lack of over-pressure protection prior to completion of the inspection. The licensee committed to locate the report or perform the technical analysis to show Code compliance.*

### Resolution

A search conducted by the original plant architectural engineer did not find a "summary technical report" for the component cooling water heat exchangers. Therefore, an analysis (EA-A-NL-94-078-01) was performed to verify that the critical portion of the service water system, including the component cooling water heat exchanger, is adequately protected against over pressure. The conclusion of the analysis is that the critical portion of the service water system is adequately protected against over pressure arising from steady state or transient conditions of pressure and temperature.

### Unresolved Item 94002-02

*The results of tests, calculations and engineering evaluations were inconclusive and could not be used to determine if the SWS would fulfill its safety related function at elevated lake water temperatures combined with other adverse design basis conditions.*

The licensee concluded that the SW and CCW systems were currently operable because current lake water temperatures were less than 50°F. This temperature provided significant margin to account for all issues impacting the SW operability margin. The licensee committed to resolve the following issues, documented in DR D-PAL-93-272, by mid April 1994.

- A. Neither test results or design basis calculations accounted for instrument uncertainties.
- B. The analyses that develop required flow rates to HXs served by the SWS used only the original design fouling. No calculations had been performed to evaluate degraded HX performance resulting from fouling beyond the original design value.
- C. The most limiting system lineup may not have been tested.
- D. The impact of increased SW temperatures and reduced SW flow rates on the SW and CCW design pressures and temperatures and systems' operation was not evaluated.
- E. The root cause of declining flow rates to control room chillers VX-10 and VX-11 had not been determined.
- F. As discussed in Section 8.1, the SW pump IST reference values and pump degradation was not coupled to the required system performance.
- G. The elevated lake water temperature was not incorporated into the maximum allowable SW system degradation.

Pending the licensee's completion of all the actions impacting SWS margin documented in DR D-PAL-93-272 and review by the NRC, this is considered an unresolved item (50-255/94002-02).

### Resolution

Appropriate testing and engineering analysis have been performed, as described below, to show that the service water system would fulfill its safety related function under postulated worst single active failures and elevated lake water temperatures.

- A. Engineering analyses of system flows were performed for the service water and component cooling systems taking into account appropriate instrument uncertainties associated with system testing (reference D-PAL-93-272E.)
- B. An analysis (EA-D-PAL-93-272D-01) of appropriate heat exchanger fouling factors to be used in heat exchanger performance analysis for the service water system was completed. The analysis was based on the Tubular Heat Exchanger Manufacturer's Association (TEMA) standards and considered the service conditions of the heat exchangers.

- C. The analysis of system flows (item A above) included verification of the most severe system lineups and single failures.
- D. The maximum expected service water and component cooling system temperatures have been evaluated and found acceptable and in accordance with the design of the system piping and components (reference D-PAL-93-272C and G.)
- E. The primary root cause of the declining service water flows to the control room chillers VC-10 and VC-11 has been determined and corrected. An inspection of the heat exchanger head gaskets found them to be excessively large and blocking a significant number of flow tubes (reference C-PAL-94-0188.)
- F. The engineering analyses of system flows (item A) took into account appropriate allowances for pump degradation. Section XI pump test reference values were established based on these analyses, and test procedures and associated basis documents have been revised to reflect the new reference values. Pump performance was compared to the new reference values and no operability concerns were identified (reference D-PAL-93-272A.)
- G. Engineering analyses have been performed to demonstrate that service water flows are adequate to cool critical plant systems and equipment under all postulated single active failures and assuming a lake water temperature of 85°F. The plant areas and equipment evaluated include the containment building, the control room, the engineered safeguards rooms, and the diesel generators (reference D-PAL-93-272E.)

#### Unresolved Item 94002-03

*Corrective actions in response to D-PAL-93-272 will complete the development of SWS pump testing reference values and required system performance. Additionally, the licensee intended to review the basis for IST reference values and allowed degradation for all Section XI pump tests to ensure that they were adequately coordinated with safety analysis performance criteria. This issue is considered an unresolved item pending the licensee's review to determine impact on the IST reference values and the possible effect on past ESS pump operability.*

#### Resolution

Engineering analyses of system flows taking into account appropriate allowances for pump degradation have been completed for all safety-related pumps. Section XI pump test reference values were established based on these analyses, and test procedures and associated basis documents have been revised to reflect the new reference values. Pump performance was compared to the new reference values and no operability concerns were identified (reference D-PAL-93-272A.)

Commitment Summary

This letter provides the results of our previously committed actions and makes no new commitments.



David W Rogers  
Safety and Licensing Director

CC: Administrator, Region III, USNRC  
Resident Inspector, Palisades