Consumers Energy

A CMS Energy Company

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

March 8, 2000

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

**DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT**
AUXILIARY FEEDWATER TECHNICAL SPECIFICATIONS CHANGE REQUEST - SUPPLEMENTARY INFORMATION

On February 18, 2000, Consumers Energy Company submitted a Technical Specifications Change Request (TSCR) which proposed removal of all requirements associated with the backup steam supply to the turbine driven Auxiliary Feedwater (AFW) Pump P-8B from both the Current Technical Specifications and the Improved Technical Specifications. On February 29, 2000, the NRC requested additional information needed to support their review of that TSCR. The enclosure to this letter provides the requested information.

The information in the enclosure demonstrates that AFW system reliability, without the backup steam supply line, meets the SRP 10.4.9, Section IV.5 criterion for a loss of main feedwater (LOMF) event. It also provides our assessment of reliability of the AFW system, with and without the backup steam supply line, for two additional cases involving LOMF with loss of offsite power and LOMF with station blackout as discussed in NUREG-0635 (Section 4 of Appendix III).

A copy of this letter has been sent to the appropriate official of the State of Michigan.

SUMMARY OF COMMITMENTS

This letter establishes no new commitments and makes no revisions to existing commitments.

Daniel G. Malone
Acting Director, Licensing

CC: Administrator, Region III, USNRC
Project Manager, NRR, USNRC
NRC Resident Inspector - Palisades
Lou Brandon, Michigan Department of Environmental Quality

Enclosure

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**CONSUMERS ENERGY COMPANY**

**SUPPLEMENTARY INFORMATION**
**TECHNICAL SPECIFICATIONS CHANGE REQUEST**
**AUXILIARY FEEDWATER**

To the best of my knowledge, the content of this letter transmitting supplementary information supporting our February 18, 2000 Auxiliary Feedwater Technical Specifications change request, is truthful and complete.

Daniel G. Malone
Acting Director, Licensing

Sworn and subscribed to before me this 8th day of March 2000

Janice M. Milan, Notary Public
Allegan County, Michigan
(Acting in Van Buren County, Michigan)
My commission expires September 6, 2003

**ENCLOSURE**

CONSUMERS ENERGY COMPANY
PALISADES PLANT
DOCKET 50-255

**SUPPLEMENTARY INFORMATION**
TECHNICAL SPECIFICATIONS CHANGE REQUEST
AUXILIARY FEEDWATER

3 Pages

# PSA AFW RELIABILITY ANALYSIS

## PURPOSE

To support the Technical Specification Change Request associated with the backup steam supply line for the steam-driven auxiliary feedwater (AFW) pump P-8B, a reliability analysis of the AFW system was requested by the NRC. The PSA AFW model was used to evaluate the reliability of the AFW system. The AFW reliability was evaluated with and without the backup steam supply line to AFW pump P-8B. The loss of main feedwater (LOFM) event was evaluated as discussed in NUREG-0635 (Section 4 of Appendix III), and the results were compared to the criterion in SRP 10.4.9, Section IV.5. Two additional events discussed in NUREG-0635 were also evaluated.

## METHODOLOGY

The evaluation calculated the reliability of the AFW system with and without the backup steam supply line. The PSA AFW model (AFWR1) contains the backup steam supply line to AFW pump P-8B. A second AFW model was created (AFWRA) that deleted the components associated with the backup steam supply line (from steam generator E-50B). The following three events were evaluated for each model:

1) loss of main feedwater;
2) loss of main feedwater with loss of off-site power; and
3) loss of main feedwater with loss of off-site power and loss of both diesel generators (station blackout conditions).

## ASSUMPTIONS

The following assumptions were used in the AFW models:

1) Two AFW models were used for this evaluation. One model contained the backup steam supply to AFW pump P-8B and the other reflects the current plant configuration (no backup steam supply).

2) Loss of cooling to the AFW pump room from the turbine building fans will not fail AFW pumps P-8A or P-8B during the mission time. Also, loss of west engineered safeguards room cooling will not fail AFW pump P-8C during the mission time. Room heatup calculations conclude that neither room will exceed the EQ limit during the mission time.

3) The feed only good generator (FOGG) system is disabled. The motor operated valves are electrically locked open. Although the likelihood for spurious closure is small, the AFW models include this failure mode.

4) The success criteria for the AFW system is to maintain an acceptable water level in the steam generators. Any of the three AFW pumps are capable of supplying the required flow rate to either or both steam generators.

5) Component test and maintenance unavailabilities and operator actions to restore components following test or maintenance activities are included in the AFW models.

6) The AFW injection valves (CV-0727, CV-0736A, CV-0737A, CV-0749) are air to close valves. They use instrument air to control flow to the steam generators. Also, CV-0727 and CV-0749 have nitrogen backup to instrument air for flow control. Failure of air to these valves is not modeled as a failure of the AFW system since the valves fail open and provide at least the minimum flow required to meet the success criteria.

7) The mission time used for this evaluation is six hours. This results in evaluating the reliability of the AFW to start and inject the contents of the primary suction source (condensate storage tank T-2 and primary makeup water tank T-81). The contents of these tanks have sufficient volume to last at least six hours. Beyond six hours, makeup may be required. Automatic makeup is supplied by a system that requires off-site power. Other makeup sources include fire pumps and service water pumps. Recovery of off-site power within six hours is very likely. Also, the diesel generator run times are based on a weighted average of loss of off-site power, which is six hours.

8) The steam driven AFW pump P-8B can be locally operated at the steam supply valve or from the alternate shutdown panel (C-150) in the event that control cannot be maintained automatically or from the control room.

## RESULTS/CONCLUSIONS

Attachment A contains the results of this evaluation. AFW system reliability, without the backup steam supply line, meets the SRP 10.4.9, Section IV.5 criterion for a loss of main feedwater event. Attachment A also provides our assessment of reliability of the AFW system with and without the backup steam supply line, for two additional cases involving LOMF with loss of offsite power and LOMF with station blackout as discussed in NUREG-0635 (Section 4 of Appendix III).

# Attachment A

## AFW Reliability Analysis Results

| Event | Unavailability with backup steam supply available | Unavailability without backup steam supply available |
|---|---|---|
| Loss of main feedwater (LOMF) | 3.08E-5 | 3.25E-5 |
| LOMF with loss of off-site power (LOOP) | 3.64E-4 | 4.04E-4 |
| LOMF, LOOP and loss of both diesel generators | 1.56E-2 | 1.71E-2 |