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U.S. Nuclear Regulatory Commission
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DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT
SUPPLEMENTAL INFORMATION REGARDING PALISADES TECHNICAL
SPECIFICATION CHANGE REQUEST - ULTIMATE HEAT SINK TEMPERATURE
LIMIT

In a teleconference on February 7, 2001, and subsequent contact on February 27, NRC staff requested additional information in support of Palisades January 26, 2001 Technical Specification Change Request to establish 85° F as the Ultimate Heat Sink temperature limit in Technical Specifications. The enclosure to this letter provides the requested information in the form of questions and answers.

SUMMARY OF COMMITMENTS

This letter contains no new commitments and no revisions to existing commitments.



Daniel J. Malone
Director, Engineering

CC Administrator, Region III, USNRC
Project Manager, NRR, USNRC
NRC Resident Inspector - Palisades

Enclosure

A001

CONSUMERS ENERGY COMPANY

**SUPPLEMENTAL INFORMATION REGARDING
TECHNICAL SPECIFICATION CHANGE REQUEST
ULTIMATE HEAT SINK TEMPERATURE LIMIT**

To the best of my knowledge, the content of this letter, which provides supplemental information to support the previous Technical Specifications change request to revise the Palisades Technical Specifications Ultimate Heat Sink water temperature surveillance requirement, is truthful and complete.



Daniel J. Malone
Director, Engineering



Sworn and subscribed to before me this 13th day of March, 2001
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**

March 13, 2001

**SUPPLEMENTAL INFORMATION
REGARDING
PALISADES PLANT TECHNICAL SPECIFICATION
CHANGE REQUEST –
ULTIMATE HEAT SINK TEMPERATURE LIMIT**

6 Pages

SUPPLEMENTAL INFORMATION REGARDING PALISADES TECHNICAL SPECIFICATION CHANGE REQUEST – ULTIMATE HEAT SINK TEMPERATURE LIMIT

The NRC staff's preliminary review of Consumers Energy Company's January 26, 2001 request for an amendment to change the Palisades Technical Specification upper limit for ultimate heat sink temperature identified some additional information that would facilitate completion of the review. This information is presented below in the form of questions and answers.

Q1. NRC has approved TSTF-330, Revision 3, which established a specific format for Technical Specifications related to ultimate heat sink temperature limits. Palisades did not use TSTF-330 in requesting the subject change - explain why TSTF-330 was not followed.

A1. TSTF-330, Revision 3, permits the use of two UHS temperature limits in TS, instead of one. A hard upper limit, similar to the pre-TSTF-330 format is retained as a bounding limit for short-term accident responses. TSTF-330 also creates a lower limit to reflect design UHS temperature limits associated with post-LOCA long-term cooling, and permits this lower limit to be exceeded as long as the average UHS temperature over the previous 24 hours was less than the specified value. This format presupposes that the analytical limit for short-term accident response is higher than the UHS temperature limit for long-term cooling.

At Palisades, there is only one defined analytical limit for UHS temperature (85° F). Equipment and accident analyses have shown that affected equipment remains able to perform its safety function, and accident analyses results meet acceptance criteria, at UHS temperatures up to the requested limit. The short-term plant response to a LOCA inside containment does rely on the UHS at a maximum temperature of 85° F for a portion of containment heat removal. Containment air coolers are credited for heat removal in the first hour of the event. Therefore, Palisades does not meet one of the TSTF-330, Revision 3, conditions specified for its use. This condition states:

"The UHS is not relied upon for immediate heat removal (such as to prevent containment overpressurization), but is relied upon for longer-term cooling such that the temperature averaging approach continues to satisfy the accident analysis assumptions for heat removal over time."

For long-term post-LOCA cooling, 85° F is an acceptable UHS temperature limit. Therefore, there is no need or value to Palisades to establish a different long-term limit. Accordingly, TSTF-330 is not applicable to Palisades.

**SUPPLEMENTAL INFORMATION REGARDING
PALISADES TECHNICAL SPECIFICATION CHANGE REQUEST – ULTIMATE HEAT
SINK TEMPERATURE LIMIT**

Q2. The submittal is lacking certain information - either provide references to indicate NRC has previously reviewed the use of 85° F lake temperature, or provide analyses or results showing that relevant safety/accident analyses continue to meet acceptance criteria.

A2. The following items provide references that indicate NRC has previously reviewed the use of 85° F lake temperature.

A2.1 As noted in our January 26, 2001 letter, Palisades original Technical Specifications did not contain a limit for UHS temperature. They did contain design information on the containment cooling function indicating that 75° F was the design inlet temperature for the containment air coolers. During a shutdown period in 1986, the question arose as to the service water system's capability to meet its design function, given then existing equipment conditions. As part of a March 27, 1987 Confirmatory Action Letter to allow startup from that outage, NRC approved 53° F as an interim limit on UHS temperature. On April 13, 1987, Consumers Power (now Consumers Energy) requested NRC to lift the 53° F limit and provided justification for a UHS temperature limit of 80° F. This letter also withdrew a previous request to add a UHS temperature limit to TS, and requested NRC concurrence that no limit was needed in Technical Specifications, based on analyses, testing, physical changes completed to certain equipment, and a probabilistic estimation of the likelihood of exceeding a lake temperature of 80° F for any significant period. NRC responded with a Safety Evaluation Report (SER) on May 4, 1987, that approved the analysis for operation with UHS temperatures up to 80° F. This letter also stated "Although the staff may not agree with these specific probability values, the staff believes the likelihood of this sequence of events to be negligibly low and thus concludes that a limit in the Technical Specifications is not appropriate." Thus, the Technical Specifications continued to have no limit on UHS temperature.

As noted, prior to 1992, Section 5.2.3.a of the Technical Specifications (TS) specified 75° F as the service water supply design temperature for containment cooling. On September 27, 1991, Consumers submitted a request for a Technical Specification change to raise 75° F to 85° F in 5.2.3.a. This request was based on an evaluation of the containment air cooler design which concluded the coolers could meet the required post-accident heat removal rates with an 85° F inlet temperature (the inlet is Service Water, which comes directly from Lake Michigan). The Consumers submittal stated "This change has no effect on containment pressure and temperature analysis (FSAR Section 14.18) since the heat removal rate assumed in the analysis is consistent with this

**SUPPLEMENTAL INFORMATION REGARDING
PALISADES TECHNICAL SPECIFICATION CHANGE REQUEST – ULTIMATE HEAT
SINK TEMPERATURE LIMIT**

technical specification change. Furthermore, this change has no effect on the LOCA analysis (FSAR Section 14.17) since the assumptions made regarding the containment air cooler heat removal rate in the LOCA analysis are still conservative.” On July 28, 1992, NRC issued Amendment 151 to the Palisades license to approve the requested changes to Section 5.2.3.a. The Staff’s Safety Evaluation concluded “The NRC staff has reviewed the information provided by the licensee in support of the proposed TS change including the American Air Filter report NESE 923. Based on our review, we find the proposed change to TS Section 5.2.3.a acceptable.” (This information was not retained in this form in the conversion to the ITS, which were issued on November 30, 1999. The ITS format does not contain the containment cooling design description as it had previously existed in TS.)

A2.2 During 1993, Palisades completed an assessment of the service water system (SWS). This effort identified several design and performance questions, as well as served as the basis for updating of Design Basis Documents (DBD) and the FSAR. A number of issues involving inaccuracies and inconsistencies in SWS analysis and testing were documented on Deviation Reports, one of which was D-PAL-93-272. Corrective actions included completion of analyses to determine the maximum allowable SWS temperature, after accounting for allowable system degradations. These analyses used 85° F as the input UHS temperature to confirm SWS capability to perform its design safety function at the elevated temperature.

Subsequent to the plant assessment, the NRC conducted a Service Water System Operational Performance Inspection (SWSOPI) from January 10 through February 11, 1994. One of the open items from this inspection included the previously identified issues for which corrective actions were already in progress under D-PAL-93-272. Unresolved Item (URI) 50-255/94002-02 stated “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 URI further stated “Pending the licensee’s completion of all the actions impacting SWS margin documented in D-PAL-93-272 and review by the NRC, this is considered an unresolved item.”

On September 2, 1994, Consumers Power docketed a response to the SWSOPI inspection which indicated that “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

SUPPLEMENTAL INFORMATION REGARDING PALISADES TECHNICAL SPECIFICATION CHANGE REQUEST – ULTIMATE HEAT SINK TEMPERATURE LIMIT

failures and elevated lake water temperatures.” The response further stated that “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.” Thus, all critical systems and equipment cooled by service water were evaluated and confirmed to be capable of performing their safety-related design functions at the proposed UHS temperature limit.

Finally, on July 30, 1996, NRC issued an inspection report that closed URI 50-255/94002-02. The report indicated that “Regarding item (3), the impact of higher SW temperatures was analyzed and determined not to exceed any SW or CCW [component cooling water] system design limits.” The analyses referred to were those associated with D-PAL-93-272, which used 85° F as the input UHS temperature. The report indicated that, “Based on the actions taken or planned, this item is closed.”

A2.3 On March 29, 1996, Consumers Power submitted a request to convert to Improved Technical Specifications (ITS). This letter identified that the ITS included an LCO on UHS temperature, and that the limit proposed (81.5°) was then being re-analyzed. The analyses related to D-PAL-93-272 were already completed by this time, with the results having been identified to the NRC on September 2, 1994. However, NRC had not closed URI 50-255/94002-02 at the time of this initial ITS submittal. Subsequently, on May 31, 1996, Consumers Power withdrew the March 29 request, committing to resubmit the request to convert to ITS after preparation of additional details regarding the comparison of the then current TS, the ITS, and the NRC NUREG 1432, Standard TS for CE Plants. On January 26, 1998, Consumers Energy again submitted its request for conversion to ITS. This submittal retained the 81.5° F UHS limit. During final site reviews of the ITS conversion request, it was concluded that the bases for an 85° F UHS temperature limit should be rechecked to verify completeness. To avoid delaying the ITS conversion submittal, 81.5° F was simply retained as the UHS limit. As noted in our January 26, 2001 letter, that verification was completed. NRC approved the ITS on November 30, 1999. Palisades implemented the ITS on October 24, 2000. Lake temperatures in the summer of 2000 approached, but did not exceed the current TS limit, so actions to request a higher UHS temperature limit were delayed to accommodate higher priority work (the limit did not apply until October, after lake temperature had declined and could not reach the limit). The summer of 2001 will be the first time since ITS

**SUPPLEMENTAL INFORMATION REGARDING
PALISADES TECHNICAL SPECIFICATION CHANGE REQUEST – ULTIMATE HEAT
SINK TEMPERATURE LIMIT**

implementation that a TS lake temperature limit will apply to the operation of the Palisades Plant. The fact that ITS were issued with a UHS limit of 81.5° F, therefore, does not indicate that 85° F was not the actual limiting temperature.

- A2.4 There are also more recent records of NRC review of licensing actions where the 85° F lake temperature was one of the design inputs in the applicable analyses. Examples include:

Consumers Energy submitted a request to change the minimum primary coolant system flow rate on June 17, 1998. The supporting analyses for this request showed, in part, that primary system flow changes did not result in a change in the results of the LOCA or MSLB containment response analyses; the 85° F UHS temperature was an input to the heat transfer calculations for these analyses. NRC approved Amendment 187 on September 3, 1999.

On October 29, 1999, Consumers applied for a Technical Specification change for approval of changes in core analysis methodologies and peak containment pressure. The peak pressure change was due to analytical update work resulting from minor changes in containment coatings. NRC approved Amendment 188 on November 15, 1999. The staff's Safety Evaluation Report for this change indicates they reviewed the containment response results obtained using the CONTEMPT-LT/28 code model of the Palisades containment, which is one of the plant's analysis methodologies directly affected by the assumption of 85° F service water temperature.

- Q3. Confirm that any changes in assumptions due to the proposed increase in the UHS temperature limit have been reflected in the appropriate plant procedures and test acceptance criteria.
- A3. Plant procedures and test acceptance criteria reflect the assumptions (e.g., flow rates, fouling factors, etc.) consistent with use of the higher UHS temperature. Periodic flow balance testing and adjustments are used to verify the 85° F modeling assumptions and safety analyses acceptance criteria are met for service water system heat removal capacity. This assures that the service water system is balanced so that the system's safety functions can be performed at any UHS temperature up to this limit.