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License Number NPF-3

Docket Number 50-346

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United States Nuclear Regulatory Commission
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Subject: Response to Request for Additional Information Regarding License Amendment Application to Revise Technical Specification 3/4.7.5.1, Ultimate Heat Sink (License Amendment Request No. 96-0008; TAC No. MA6092)

Ladies and Gentlemen:

On July 28, 1999, the FirstEnergy Nuclear Operating Company (FENOC) submitted an application for an amendment to the Davis-Besse Nuclear Power Station (DBNPS), Unit Number 1, Operating License Number NPF-3, Appendix A Technical Specifications, regarding Technical Specification (TS) 3/4.7.5.1, "Ultimate Heat Sink," which presently requires that the Ultimate Heat Sink (UHS) average water temperature be $\leq$ 85 °F during plant Operating Modes 1 through 4. The proposed amendment (DBNPS Serial Number 2397) would allow plant operation in these Modes with a water temperature $\leq$ 90 °F. On March 30, 2000, following discussions with the NRC staff, FENOC received from the NRC a verbal request for additional information regarding the license amendment application. Enclosure 1 provides the response to this request for additional information.

With the submittal of this additional information, FENOC requests that the NRC staff complete its review and approval of the license amendment application by June 30, 2000, due to potentially increased UHS temperatures. Should the UHS temperature approach 85 °F prior to NRC approval of the license amendment application, FENOC would request that the license amendment application be approved and issued as an emergency or exigent license amendment, in the manner allowed by 10 CFR 50.91(a).

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NRR-057

Should you have any questions or require additional information, please contact Mr. James L. Freels, Manager - Regulatory Affairs, at (419) 321-8466.

Very truly yours,

MKL/laj

Enclosures

cc: J. E. Dyer, Regional Administrator, NRC Region III
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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REGARDING

LICENSE AMENDMENT REQUEST (LAR) 96-0008

FOR

DAVIS-BESSE NUCLEAR POWER STATION
UNIT NUMBER 1

NRC Request for Information:

1. The submittal discusses analyses (LOCA, MSLB and Containment Response Analysis) that have been completed to support the proposed increase in the temperature of the ultimate heat sink (UHS). The staff requests a better understanding of any modeling differences between the new analyses and the analyses supporting the current licensing basis. For example, the discussion on page 7 of the submittal (under containment response re-analysis) indicates that the containment air cooler heat removal analysis has been modified and that modeling changes have been made, but no specific information or comparisons with the previous analyses is provided. Where there are differences (e.g., methodology, assumptions, computer codes, analyses results, manual vs. automatic actions), describe the differences in sufficient detail in order to provide a better understanding of the changes that are being proposed.

DBNPS Response:

The Ultimate Heat Sink (UHS) is the source of cooling water for the Service Water (SW) System. During a design basis accident (DBA), the SW System supplies cooling water from the intake forebay to the Containment Air Coolers (CACs), the Component Cooling Water (CCW) heat exchangers, the Emergency Core Cooling System (ECCS) room coolers, and the Control Room Emergency Ventilation System (CREVS). The previous containment performance analysis assumed that the connection between the intake canal and Lake Erie remains intact following a DBA, such that a constant SW temperature is maintained, at the Technical Specification (TS) upper limit of 85 °F. The updated containment performance analysis, which was performed in support of the license amendment application, does not credit the connection between the intake canal and Lake Erie. In this case, the SW discharge would be recirculated back to the intake canal forebay or intake structure. This would result in a variable SW temperature, initially at the proposed TS upper limit of 90 °F. Figure 3 of the submittal shows the predicted temperature profile.

As stated in the submittal, the CAC heat removal duty was determined for the variable SW temperature using the COOLNUC program developed by the CAC manufacturer, and benchmarking runs for this program show that the heat removal duties predicted by this program are conservative when compared to the CAC heat removal duties used in the previous analysis. For the updated analysis, the assumed fouling factor for the CACs was conservatively increased from 0.00045 to 0.003.

The updated containment performance analysis was performed using a Bechtel COPATTA model based on the original model used for the DBNPS. There were no major changes in modeling assumptions except for the changed heat removal duty from the COOLNUC program and the variable SW temperature profile. Figures 1 and 2 of the submittal show the resulting containment temperature and pressure profiles. Also included in these figures, for comparison purposes, is the containment temperature and pressure profiles for the present analysis. The following were the other changes to the Bechtel COPATTA model:

- The overall heat transfer coefficient for the CCW heat exchanger was conservatively reduced from 335 BTU/hr-ft^2-°F to 250 BTU/hr-ft^2-°F to account for potential fouling of the CCW heat exchanger.

- The assumed initiation time for full Containment Spray flow was conservatively increased from 80 seconds to 160 seconds to allow additional margin to the TS Safety Features Actuation System (SFAS) response time limit of 80 seconds. This change did not affect the peak containment temperature or pressure because both occur before the original 80 seconds.

- The containment pressures which result in CAC initiation and Containment Spray initiation were conservatively increased to 20.83 psia and 42.8 psia, respectively.

- Typographical errors in the Mass and Energy release data were corrected. These changes do not significantly affect the calculation results.

- Typographical, rounding, and averaging errors in the Mass and Energy spillage to the sump data were corrected. These changes do not significantly affect the calculation results.

- The Containment Spray water flow rate was adjusted from 6.4345 x 10^5 lbm/hr to 6.4809 x 10^5 lbm/hr. The original value was based on a Borated Water Storage Tank (BWST) temperature of 130 °F. The revised value is based on a BWST temperature of 90 °F. This change does not significantly affect the calculation results.

- The containment heat sink data was corrected, including a typographical error in the thickness of the refueling canal liner, the order of the containment structure paint and primer applications, and the thermal conductivity of the paint and primer. These changes do not significantly affect the calculation results.

NRC Request for Information:

2. Discuss the impact of increasing the UHS temperature on containment air coolers, component cooling water heat exchangers, and ECCS room coolers during a LOCA condition.

DBNPS Response:

Following a LOCA, the SW System supplies cooling water from the intake forebay to the CACs, the CCW heat exchangers, the ECCS room coolers, and the CREVS.

As discussed in the response to the previous question, the updated containment performance analysis assumed a variable UHS temperature profile, as shown in Figure 3 of the submittal. The maximum peak containment temperature and pressure, which are influenced by the CAC performance, remain well below the maximum design conditions for the containment vessel. The impact of the increased containment temperature on equipment located in containment was evaluated, as described on page 8 of the submittal.

Since the CCW heat exchangers are cooled by SW, the increased UHS temperature also impacts CCW temperature. As described on page 8 of the submittal, the peak CCW temperature predicted by the LOCA containment response analysis is slightly less than 120 °F at approximately 40000 seconds following the accident, which is within the temperature requirements of the essential components served by CCW.

The ECCS room coolers are also cooled by SW, therefore the increased UHS temperature also impacts the temperature profile for the ECCS Pump rooms. As discussed on page 8 of the submittal, the resulting temperature profile is conservatively bounded by the temperature profile used for the present environmental qualifications for the equipment within these rooms.

The CREVS condenser cooling units also receive cooling water directly from the SW System. As described on page 9 of the submittal, the maximum SW temperature is predicted to remain below 110 °F (as shown in Figure 3 of the submittal), therefore the increased SW temperature does not impact the availability of CREVS.

NRC Request for Information:

3. Assuming that Lake Erie is not available, demonstrate that there will be sufficient water available to supply the service water pumps for 30 days without impacting the performance of the safety-related components when the initial UHS temperature is 90 degree F. Describe any plans for alternative or system re-alignment to support long term cooling. In addition, describe any compensatory measures planned to assure an adequate water supply is available for long term cooling.

DBNPS Response:

Lake Erie water flows through a buried intake conduit to the intake canal. The updated analysis performed in support of the license amendment application does not credit this non-seismic connection between the intake canal and Lake Erie following a LOCA. The analyses credit only the forebay portion of the intake canal, which is seismic Category I, plus one-third of the water surface area and one-third of the water volume in the non-seismic portion of the intake canal.

With the connection to Lake Erie not available, in order to conserve the water inventory contained in the intake canal and forebay, the SW discharge would be routed to the forebay or intake structure. This would result in a variable SW temperature, initially at the proposed TS upper limit of 90 °F. Figure 3 of the submittal shows the predicted temperature profile from the time of the start of the LOCA, through and beyond 30 days. The evaluation provided in the license amendment application demonstrates that there will be sufficient water available to supply the SW pumps for 30 days without impacting the performance of the safety-related components.

Forebay level indication is provided in the control room. In addition, low and low-low level alarms, 564 ft International Great Lakes Datum (IGLD) and 562 ft IGLD, respectively, are provided on the control room annunciator panels.

If a seismic event were to result in a loss of connection between the intake canal and Lake Erie, DBNPS Emergency Plan Off Normal Occurrence Procedure RA-EP-02820, "Earthquake," includes the following actions:

- Perform a rapid shutdown of the reactor
- Close CT 840, Cooling Tower Blowdown Valve
- Verify SW valve returns are aligned to the intake forebay or the intake structure
- If the dilution pump is running in the dilution mode, shutdown the dilution pump

Each of these actions has the effect of conserving UHS inventory. The procedure requires further actions, including tripping the reactor, should forebay water level decrease to 564 ft IGLD. The procedure also provides direction to establish temporary pumping to the intake forebay. It is

expected that the connection between Lake Erie and the intake canal could be re-established well within a 30 day period, as currently stated in the DBNPS Updated Safety Analysis Report (USAR) Section 9.2.5.2, "Amount of Conservatism Available for Dissipating Heat Loads."

NRC Request for Information:

4. Provide additional explanation regarding the evaluation for HPI pump bearing temperature as discussed on page 8 of the submittal.

DBNPS Response:

As stated on page 8 of the submittal, the maximum allowable bearing temperature for the HPI pumps is 165°F. This limit prevents oil degradation and damage to the bearing. The HPI pump bearing oil coolers are cooled by CCW. The automatic controls on the CCW System modulate SW flow to the CCW heat exchanger to maintain the CCW heat exchanger outlet temperature in a normal range between 85 °F and 95 °F. If CCW temperature were to rise to approximately 120 °F post-LOCA, the HPI pump bearing temperature is predicted to rise by about the same delta (i.e., 25 to 35 °F). Test data from quarterly HPI pump surveillance testing shows a maximum stabilized thrust bearing temperature of approximately 112 °F. Assuming CCW is in the normal temperature range during the quarterly surveillance testing, and assuming a post-LOCA CCW temperature delta of 25 to 35 °F, bearing temperature is predicted to increase to a maximum of 147 °F, which is well below the 165 °F limit.

NRC Request for Information:

5. Provide a discussion of the effects of the increased UHS temperature on the ability to mitigate a seismic event.

DBNPS Response:

For a seismic-only event (no LOCA), the heat load will be much lower than for the LOCA event, therefore, the UHS temperature will be lower. The heat load for the seismic-only event is at least 8×10^6 BTU/hr below the heat load for the LOCA event at any given time after shutdown.

Docket Number 50-346
License Number NPF-3
Serial Number 2654
Enclosure 2

COMMITMENT LIST

THE FOLLOWING LIST IDENTIFIES THOSE ACTIONS COMMITTED TO BY THE DAVIS-BESSE NUCLEAR POWER STATION (DBNPS) IN THIS DOCUMENT. ANY OTHER ACTIONS DISCUSSED IN THE SUBMITTAL REPRESENT INTENDED OR PLANNED ACTIONS BY THE DBNPS. THEY ARE DESCRIBED ONLY FOR INFORMATION AND ARE NOT REGULATORY COMMITMENTS. PLEASE NOTIFY THE MANAGER – REGULATORY AFFAIRS (419-321-8466) AT THE DBNPS OF ANY QUESTIONS REGARDING THIS DOCUMENT OR ANY ASSOCIATED REGULATORY COMMITMENTS.

COMMITMENTS	DUE DATE
None	N/A