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OPPD
Omaha Public Power District

444 South 16th Street Mall
Omaha NE 68102-2247

April 15, 2002
LIC-02-0039

U. S. Nuclear Regulatory Commission
ATTN.: Document Control Desk
Washington, DC 20555-0001

References:
1) Docket No. 50-285
2) Letter from OPPD (W. G. Gates) to NRC (Document Control Desk), dated December 14, 2001, Fort Calhoun Station Unit No. 1 – License Amendment Request, "Minimum Reactor Coolant System (RCS) Flow Rate" (LIC-01-0115)
3) Letter from OPPD (R. T. Ridenoure) to NRC (Document Control Desk), dated January 15, 2002, Fort Calhoun Station Unit No. 1 – "Updated Evaluation of Minimum Reactor Coolant System (RCS) Flow Rate License Amendment Request" (LIC-02-0004)

SUBJECT: Confirmation of Minimum Flow Rate Amendment Request Assumptions

In Reference 2, Omaha Public Power District (OPPD) requested an amendment to Technical Specification (TS) 2.10.4 to decrease the minimum required reactor coolant system (RCS) flow rate from 206,000 gallons per minute (gpm) to 202,500 gpm. Reference 3 provided an update to the in-progress analysis supporting the amendment request. This letter confirms that the assumptions and statements made in References 2 and 3 have been substantiated by analysis, thereby confirming that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c).

The completed analysis is described and results are summarized in the Attachment.

OPPD requests approval of the amendment requested by Reference 2 before May 20, 2002, to support the startup from the refueling outage. Once approved, the amendment shall be implemented prior to criticality for Cycle 21, presently planned to occur on May 30, 2002.

I declare under penalty of perjury that the foregoing is true and correct. (Executed on April 15, 2002)

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If you have any questions or require additional information, please contact Dr. R. L. Jaworski of my staff at 402-533-6833.

Sincerely,

R. T. Ridenoure
Division Manager
Nuclear Operations

RTR/RLJ/rlj

c: E. W. Merschoff, NRC Regional Administrator, Region IV
A. B. Wang, NRC Project Manager
W. C. Walker, NRC Senior Resident Inspector
Division Administrator, Public Health Assurance, State of Nebraska
Winston & Strawn

Cycle 21 Minimum RCS Flow Rate Confirmation

The events affected by a reduced RCS flow rate, with respect to Minimum DNBR, were reanalyzed for Fort Calhoun Station (FCS) Cycle 21 as identified in References 1 and 2 below. As noted in Reference 2 sufficient DNB margin was identified to accommodate the reduction in reduced flow. All events analyzed were previously projected to show adequate DNB margin to the Framatome ANP HTP DNB correlation limit value of 1.164 (including a 2% mixed core penalty, for the 93 Framatome ANP fuel assemblies and the remaining 40 Westinghouse assemblies). The final results from completion of these analyses confirm this position and the results are summarized below with "21" corresponding to Cycle 21 and "20" corresponding to the present cycle of operation:

Event	MDNBR(20)	MDNBR (21)
CEA Withdrawal Incident (USAR Section 14.2)	1.363	1.399
CEA Drop Incident (USAR Section 14.4)	1.348	1.199
Loss of Coolant Flow (USAR Section 14.6.1)	1.339	1.297
Seized Rotor Event (USAR Section 14.6.2)	1.267	1.244
Excess Load Increase (USAR Section 14.11)	1.314	1.277
CEA Ejection Accident (USAR Section 14.13)	1.823	1.778
RCS Depressurization (USAR Section 14.22)	1.715	1.666

It should be noted that additional margin appears to have been gained in one event. The source of this offsetting margin gain is attributable to a change in the application of NRC-approved methodologies for FCS (i.e. ABB/CE methodology versus Framatome ANP methodology). Use of the generic Framatome ANP methodology for plant specific application at FCS was previously approved in Reference 3 and utilized in Cycle 20 for reanalysis of events not bounded by the existing Cycle 19 analyses. In Reference 4 the NRC approved the FCS application of several updates/revisions to the Framatome ANP methodologies previously generically approved by the staff. These most recent NRC-approved methodologies were used for the Cycle 21 analyses whose results are reported here. It is not unexpected to see an increase in MDNBR for any of these events as the effect of the comparison of analysis results from different codes and methodologies (e.g. biasing of parameters, etc.) may easily be greater than the effect of the change in T.S. flow rate. In general, the MDNBRs seen here are not widely different than those using the ABB/CE transient analysis methodology. Although the Cycle 21 neutronics parameters are a little different than for Cycle 20, these differences are not likely a major contributor to the results.

Reference 2 identifies "Events Presently Analyzed at 202,500 gpm Indicted or Less". These analyses were performed previously at or below the RCS flow rate being pursued in this License Amendment Request. Thus the existing analyses of record contained in the FCS Updated Safety Analysis continue to remain bounding and no further analysis is

required for the limiting heatup events (included in the Reference 2) list which affect peak primary and peak secondary pressure.

For the CEA Drop Incident a bounding analysis was performed to accommodate future core design changes, thus the appearance of a greater loss of DNB margin. For the Loss of Coolant Flow and Seized Rotor events the dominant input is RCS flow rate and the reduced proposed Technical Specification flow rate does result in a reduction in DNB margins as expected.

The Large Break LOCA was also reanalyzed for Cycle 21 with a Peak Clad Temperature (PCT) of 1955 °F being the result. This event was reanalyzed even though it was recognized that the minimum Technical Specification RCS flow rate was at best a second order contributor to the results of this analysis. The Cycle 21 analysis also included code corrections identified in Reference 4. The calculation documented in Reference 5, which utilized the higher RCS flow rate and the code corrections, resulted in a PCT of 1956 °F. Thus the new Large Break LOCA analysis PCT result is comparable to that of Reference 4 and demonstrates that the RCS Flow Rate Reduction had little to no effect on the expected PCT results. For the Small Break LOCA the effects of reducing the RCS Flow Rate is much less significant than for the Large Break LOCA with only a third to fourth order effect. The Small Break LOCA analysis of record (from Cycle 20) currently shows only a -1 °F PCT change or error identified for the margin utilization. Thus with only a third to fourth order effect from a relatively small reduction in RCS flow rate combined with only one minor error in the analysis of record, reanalysis of the Small Break LOCA for Cycle 21 is not necessary.

Use of the Framatome ANP fuel which has a higher pressure drop (i.e. flow resistance) than the co-resident Westinghouse fuel was evaluated as part of the Cycle 20 licensing process and found acceptable by the NRC (see Reference 2 Safety Evaluation, Section 2.0). This fuel design has been successfully utilized in the cores of numerous other Combustion Engineering designed plants including Palisades, Millstone 2, and St. Lucie 1. As part of the Cycle 20 analyses, Siemens Power Corporation (now Framatome ANP) performed a thermal hydraulic compatibility analysis. This analysis concluded that the difference in forced flow between a full core of Westinghouse fuel and a full core of Siemens (Framatome ANP) fuel is less than 1%. The purpose of the proposed License Amendment is to account for this 1% reduced flow as well as any further reduction resulting from potential/projected steam generator tube plugging. Based on only a 1% reduction for forced flow conditions one would expect at most a similar 1% reduction under natural circulation conditions, thus indicating little change from previous core loadings and the ability to successfully establish natural circulation during hot shutdown. The very small reduction in natural circulation flow rate following a reactor trip with loss of of-site power is insignificant and will not affect safe shutdown of the plant.

The methodology applied in these analyses, including the assumptions made and the plant initial conditions used, remain consistent with both the licensing and design bases of the plant.

In response to an NRC question, regarding the ability to maintain an adequate condensate inventory while in an indefinite period of hot shutdown, it should be noted that FCS was designed and licensed as a hot shutdown plant and as such has a very large condensate storage tank (that contains approximately 80% of the 150,000 gallon capacity). In addition to the condensate storage tank FCS also has a line from the City of Blair Water System. Thus there is assurance that FCS will have adequate condensate for maintaining the plant in a hot shutdown mode for an indefinite period of time.

References:

(1) Letter from OPPD (W.G. Gates) to NRC (Document Control Desk), dated December 14, 2001, Fort Calhoun Station Unit No. 1--License Amendment Request, "Minimum Reactor Coolant System (RCS) Flow Rate (LIC-01-0115)
(2) Letter from OPPD (W.G. Gates) to NRC (Document Control Desk), dated January 15, 2002, Fort Calhoun Station Unit No. 1--"Updated Evaluation of Minimum Reactor Coolant System (RCS) Flow Rate License Amendment Request" (LIC-02-0004)
(3) Letter from NRC (L.R. Wharton) to OPPD (S.K. Gambhir), dated March 19, 2001, "Fort Calhoun Station Unit No. 1--Issuance of Amendment (TAC No. MB083)" (Amendment No 196)
(4) Letter from NRC (A.B. Wang) to OPPD (R.T. Ridenoure), dated March 4, 2002, "Fort Calhoun Station Unit No. 1--Issuance of Amendment RE: Addition of Topical Report References to T.S. 5.9.5, Core Operating Limits Report (TAC MB3449)" (NRC-02-030)
(5) Letter from OPPD (R.T. Ridenoure) to NRC (Document Control Desk), dated March 22, 2002, "Report of Significant Change/Error in the Large Break Loss of Coolant (LOCA)/Emergency Core Cooling System (ECCS) Models and Evaluations Pursuant to 10 CFR 50.46" (LIC-02-0035)