Mr. R. T. Ridenoure
Division Manager - Nuclear Operations
Omaha Public Power District
Fort Calhoun Station FC-2-4 Adm.
Post Office Box 550
Fort Calhoun, NE 68023-0550

October 14, 2003

SUBJECT: FORT CALHOUN STATION, UNIT NO. 1 - MEASUREMENT UNCERTAINTY RECAPTURE POWER UPRATE (TAC NO. MC0029)

Dear Mr. Ridenoure:

By letter dated July 18, 2003, Omaha Public Power District (OPPD) proposed a measurement uncertainty recapture (MUR) power uprate license amendment request for the Fort Calhoun Station, Unit 1 (FCS). OPPD requested an increase in licensed power from 1500 MWt to 1525 MWt. By letter dated August 28, 2003, OPPD revised its request to increase the licensed power from 1500 MWt to 1524 MWt. This was a result of changing the measurement instrumentation from *CROSSFLOW* XT to *CROSSFLOW*. The staff has reviewed the submittal and has determined that additional information is needed to complete our review. A request for additional information is enclosed. This request was discussed with Thomas Matthews of your staff on October 9, 2003, and it was agreed that a response would be provided by November 7, 2003.

If you have any questions, please contact me at (301) 415-1445.

Sincerely,

/RA/

Alan B. Wang, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-285

Enclosure: Request for Additional Information

cc w/encl: See next page

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cc:
Winston & Strawn
ATTN: James R. Curtiss, Esq.
1400 L Street, N.W.
Washington, DC 20005-3502

Chairman
Washington County Board of Supervisors
P.O. Box 466
Blair, NE 68008

Mr. John Kramer, Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 310
Fort Calhoun, NE 68023

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-4005

Ms. Sue Semerera, Section Administrator
Nebraska Health and Human Services
Systems
Division of Public Health Assurance
Consumer Services Section
301 Cententiall Mall, South
P.O. Box 95007
Lincoln, NE 68509-5007

Mr. David J. Bannister, Manager
Fort Calhoun Station
Omaha Public Power District
Fort Calhoun Station FC-1-1 Plant
P.O. Box 550
Fort Calhoun, NE 68023-0550

Mr. John B. Herman
Manager - Nuclear Licensing
Omaha Public Power District
Fort Calhoun Station FC-2-4 Adm.
P.O. Box 550
Fort Calhoun, NE 68023-0550

Mr. Daniel K. McGhee
Bureau of Radiological Health
Iowa Department of Public Health
401 SW 7th Street, Suite D
Des Moines, IA 50309

Mr. Richard P. Clemens
Division Manager - Nuclear Assessments
Omaha Public Power District
Fort Calhoun Station
P.O. Box 550
Fort Calhoun, NE 68023-0550

REQUEST FOR ADDITIONAL INFORMATION
MEASUREMENT UNCERTAINTY RECAPTURE SUBMITTAL
OMAHA PUBLIC POWER DISTRICT
FORT CALHOUN STATION, UNIT 1
DOCKET NO. 50-285

By letter dated July 18, 2003, Omaha Public Power District (OPPD/the licensee) proposed a measurement uncertainty recapture (MUR) power uprate license amendment request for the Fort Calhoun Station, Unit 1 (FCS). The licensee requested an increase in licensed power from 1500 MWt to 1525 MWt. By letter dated August 28, 2003, the licensee revised its request to increase the licensed power from 1500 MWt to 1524 MWt. This was a result of changing the measurement instrumentation from *CROSSFLOW* XT to *CROSSFLOW*. OPPD's submittal in support of this request is based on the NRC's Regulatory Issue Summary (RIS) 2002-3, "Guidelines on the Content of Measurement Uncertainty Recapture Power Uprate Applications," dated January 31, 2002. The staff has reviewed the submittal and has determined that additional information is needed to complete our review. The questions are divided based on the engineering discipline from which they are based.

Instrumentation and Control

1. Provide a detailed description of the FCS plant-specific implementation of the guidelines in the Topical Report CENPD-397-P, Rev. 1, "Improved Flow Measurement Accuracy Using CROSSFLOW Ultrasonic Flow Measurement Technology." This question is based on Item l.1.C of RIS 2002-03.

2. Provide a detailed description of the FCS calculation of the total power measurement uncertainty at the plant, explicitly identifying all parameters and their individual contribution to the power uncertainty. Justify that by using plant-specific data, the FCS total power measurement uncertainty is bounded within ±0.4 percent. This question is based on Item l.1.E of RIS 2002-03.

3. Provide an independent "re-check" calculation based on a 0.4 percent uncertainty case to verify that the numbers calculated in the spreadsheet equations are correct. The calculation should be similar to the calculation in Attachment 3, "Calorimetric Uncertainty Evaluation," of your August 28, 2003, submittal (pages 54 through 60), which provided an independent re-check of the flow meter uncertainty calculation for a 0.3 percent uncertainty case. (Page 53 of Attachment 3 states that this attachment does not document the independent re-check of values at 0.4 percent). Because your license amendment request is based on the 0.4 percent uncertainty, the 0.3 percent uncertainty calculation in your August 28, 2003, submittal may not serve the purpose as an independent verification.

4. Provide a detailed description of the information to specifically address the following aspects of the calibration and maintenance procedures related to all instruments that affect the power calorimetric: (i) maintaining calibration, (ii) controlling software and hardware configuration, (iii) performing corrective actions, (iv) reporting deficiencies to the manufacturer, (v) receiving and addressing manufacturer deficiency reports. This question is based on Item l.1.F of RIS 2002-03.

5. Page 19 of Attachment 2 states that if the *CROSSFLOW* system is not returned to service within 24 hours, power will be reduced and maintained at the 1500 MWt levels until the *CROSSFLOW* ultrasonic flow measurements (UFMs) are returned to service. Provide the technical basis for the time selected. This question is based on Item l.1.G of RIS 2002-03.

6. The August 28, 2003, submittal states that "Installation of new feedwater temperature resistance thermal detector (RTD) provides more accurate temperature measurement than that assumed in the development of original Appendix K requirements." Provide a detailed comparison between the new RTD and the existent temperature measurement instruments using the plant-specific data with respect to the uncertainty of the temperature measurements.

7. On September 5, 2003, Westinghouse issued a Technical Bulletin TB-03-6, "*CROSSFLOW* Ultrasonic Flow Measurement System Signal Issues" to all *CROSSFLOW* users. TB-03-6 identified a potential for contamination of the signals used to determine feedwater flow rate. There are potential errors in the correction factors, produced by the UFM, used in calorimetric calculation for plant power. The NRC staff has advised Westinghouse to verify the integrity of the information contained in previously approved topical report (CENPD-397-P-A, Rev. 1) for generic applications of the CROSSFLOW UFM, and to establish guidelines instructing users of the UFM how to operate their system in a manner that will minimize the potential for signal contamination in the future. Address the "Future Actions" listed in the TB-03-6 for the FCS plant.

Materials Engineering

8. In Section VII.6.4, "Flow-Accelerated Corrosion (FAC) Program," a listed reference at the end of the section mentions the CHECWORKS program. However, in the body of Section VII.6.4, CHECWORKS is not specifically mentioned as the program used to predict changes in wear rates in piping and other systems as a function of power level uprates.

   Please include a reference to CHECWORKS in the body of Section VII.6.4 and briefly describe how CHECWORKS is a part of your FAC program.

9. In Section VII.6.4, "Flow-Accelerated Corrosion (FAC) Program," it is stated that "The 1.6 percent MUR power uprate changes the operating pressure, temperature, quality, and velocity in several of the BOP [balance-of-plant] systems," and "Changes to piping wear rates at the MUR power uprate conditions have been identified."

   Based on FAC calculations for the 1.6 percent MUR power uprate, which plant component will have the largest increase in corrosion rate? How much does the corrosion rate increase in this component?

Mechanical Engineering

10. In Attachment 7 to the reference, OPPD indicated that the core shroud is the most critical component affected by the proposed power uprate due to the increased thermal loading in the reactor vessel internal structures. Discuss the rational that the power uprate is small (1.6 percent), but the stress for the girth rib flexure component increased from the current 19,632 psi for the current operating condition to 39,981 psi for the proposed 1.6 percent power uprate condition. With this large increase in stress for the core shroud, provide a summary of evaluation for other reactor vessel internals components such as core shroud barrel, control element assembly shroud assembly, core support plate and upper guide structure components that are affected by the proposed power uprate.

11. In Section IV.1 of Attachment 2, provide the calculated maximum stresses and fatigue usage factors at the critical locations of the reactor vessel including the outlet and inlet nozzles, the reactor pressure vessel (RPV) (main closure head flange, studs, and vessel flange), control rod drive mechanism housing, safety injection nozzles, external RPV supports brackets, bottom head to shell juncture, core support guides, and the incore instrumentation tubes, as a result of the power uprate. Also, provide the allowable code limits for the critical components evaluated, and the Code and Code Edition used for the evaluation. If different from the Code of record, justify and reconcile the differences.

12. In Section IV.2 of Attachment 2, you indicated that reactor coolant loop piping analyses adhere to the ASME Boiler and Pressure Vessel Code, Section III and USAS B31.1. Provide the Code Editions and Addenda that are applicable for the reactor coolant system component evaluation for the proposed power uprate.

13. In Section IV.5 of Attachment 2, the design input parameters changes are provided on page 52, where you also indicated that these changes are well within the design envelope of the FCS steam generators (SG) and demonstrate that the power uprate will not affect SG performance. Accordingly, operation at the proposed power uprate is acceptable. Provide the design values for each of these listed parameters that are changed due to the power uprate.

14. In Section IV.6 of Attachment 2, OPPD indicated that a review of the revised temperature parameters show that any changes in T_{hot} and T_{cold} are very small and are bounded by the existing pressure stress analysis performed for the FCS (WCAP-15889, Rev. 0, Table 8.1.4). Provide a summary of evaluation and confirm that delta T_{hot} between the pressurizer and the hot leg temperature, and Delta T_{cold} between the pressurizer and the cold leg temperature for the proposed power condition are bounded by the design basis values. Provide the Code and the Code Edition for the evaluation of the pressurizer and surge line piping for the power uprate condition.

15. In Section VII.6 of Attachment 2, OPPD evaluated the FCS motor-operated valve and air-operated valve programs for the MUR power uprate conditions. Confirm whether and how your responses to GL 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," on the thermal binding and pressure locking of safety-related power-operated gate valves and to GL 96-06, "Assurance of

Equipment Operability and Containment Integrity During Design Basis Accident Conditions," regarding overpressurization of isolated piping segments are acceptable for the MUR power uprate conditions.