October 27, 2006

Mr. R. T. Ridenoure
Vice President - Chief Nuclear Officer
Omaha Public Power District
Fort Calhoun Station FC-2-4 Adm.
Post Office Box 550
Fort Calhoun, NE 68023-0550

SUBJECT: FORT CALHOUN STATION, UNIT NO. 1 - ISSUANCE OF AMENDMENT RE: MODIFICATION TO TECHNICAL SPECIFICATION 2.4, "CONTAINMENT COOLING," TO REDUCE OPERABLE CONTAINMENT SPRAY PUMPS (TAC NO. MC9297)

Dear Mr. Ridenoure:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 244 to Renewed Facility Operating License No. DPR-40 for the Fort Calhoun Station, Unit No. 1 (FCS). The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated December 19, 2005, as supplemented on May 30, 2006.

The amendment modifies FCS's Technical Specification 2.4, "Containment Cooling," (and the associated Bases) to reduce the required number of operable containment spray (CS) pumps from three to two in order to enhance net positive suction head margins. The proposed change will be implemented by disabling the containment spray actuation signal automatic start feature of one of the two CS pumps that share the same diesel generator and a common suction line.

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA/

Alan B. Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-285

Enclosures: 1. Amendment No. 244 to DPR-40
2. Safety Evaluation

cc w/encls: See next page

October 27, 2006

Mr. R. T. Ridenoure
Vice President - Chief Nuclear Officer
Omaha Public Power District
Fort Calhoun Station FC-2-4 Adm.
Post Office Box 550
Fort Calhoun, NE 68023-0550

SUBJECT: FORT CALHOUN STATION, UNIT NO. 1 - ISSUANCE OF AMENDMENT RE: MODIFICATION TO TECHNICAL SPECIFICATION 2.4, "CONTAINMENT COOLING" TO REDUCE OPERABLE CONTAINMENT SPRAY PUMPS (TAC NO. MC9297)

Dear Mr. Ridenoure:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 244 to Renewed Facility Operating License No. DPR-40 for the Fort Calhoun Station, Unit No. 1 (FCS). The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated December 19, 2005, as supplemented on May 30, 2006.

The amendment modifies FCS's Technical Specification 2.4, "Containment Cooling," (and the associated Bases) to reduce the required number of operable containment spray (CS) pumps from three to two in order to enhance net positive suction head margins. The proposed change will be implemented by disabling the containment spray actuation signal automatic start feature of one of the two CS pumps that share the same diesel generator and a common suction line.

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,
/RA/
Alan B. Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-285
Enclosures: 1. Amendment No. 244 to DPR-40
2. Safety Evaluation
cc w/encls: See next page

DISTRIBUTION:

PUBLIC	RidsNrrDorl (CHaney/CHolden)	RidsRegion4MailCenter (DGraves)
LPLIV Reading	RidsNrrDorlLpl4 (DTerao)	DChung, DRA
RidsAcrsAcnwMailCenter	RidsNrrLALFeizollahi	GArmstrong, DIRS
RidsNrrDirsItsb	RidsNrrPMAWang	GHill
RidsNrrDorlDpr	RidsOgcRp	

ADAMS Accession No.: PKG ML062620524 (ML062620520, TS Pgs ML063000312)

OFFICE	NRR/LPL4/PM	NRR/LPL4/LA	DRA/AADB/BC	DIRS/IOLB/BC	DRA/ACVB:BC	OGC-NLO subject to comments	NRR/LPL4/BC
NAME	AWang	LFeizollahi	MKotzalas	NSalgado	RDennig	JMartin	DTerao
DATE	10/11/06	10/11/06	2/21/06	7/13/06	8/15/06	10/18/06	10/26/06

OFFICIAL RECORD COPY

OMAHA PUBLIC POWER DISTRICT

DOCKET NO. 50-285

FORT CALHOUN STATION, UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 244
License No. DPR-40

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by the Omaha Public Power District (the licensee), dated December 19, 2005, as supplemented on May 30, 2006, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this license amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, Renewed Facility Operating License No. DPR-40 is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B. of Facility Operating License No. DPR-40 is hereby amended to read as follows:

   B. Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 244, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. The license amendment is effective as of its date of issuance and shall be implemented within 120 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

David Terao, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility Operating
License and Technical Specifications

Date of Issuance: October 27, 2006

ATTACHMENT TO LICENSE AMENDMENT NO. 244

RENEWED FACILITY OPERATING LICENSE NO. DPR-40

DOCKET NO. 50-285

Replace page 3 of the Facility Operating License with the attached revised page 3.

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

REMOVE	INSERT
2.4 - Page 1	2.4 - Page 1
2.4 - Page 2	2.4 - Page 2
2.4 - Page 3	2.4 - Page 3
2.4 - Page 5	2.4 - Page 5

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 244 TO RENEWED FACILITY

OPERATING LICENSE NO. DPR-40

OMAHA PUBLIC POWER DISTRICT

FORT CALHOUN STATION, UNIT NO. 1

DOCKET NO. 50-285

1.0 INTRODUCTION

By application dated December 19, 2005, as supplemented on May 30, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML053550199 and ML061510099), Omaha Public Power District (OPPD) requested changes to the Technical Specifications (Appendix A to Renewed Facility Operating License No. DPR-40) for the Fort Calhoun Station, Unit No. 1 (FCS).

The proposed amendment would revise FCS's Technical Specification (TS) 2.4, "Containment Cooling." Specifically, the proposed changes would remove containment spray (CS) Pump SI-3C from the list of operable equipment required, in TS Limiting Conditions for Operation (LCO) 2.4(1)a.ii, "Minimum Requirements," and would add an exclusion in LCO 2.4(2)a, "Modification of Minimum Requirements," to prevent CS Pumps SI-3A and SI-3B from being simultaneously inoperable. CS Pump SI-3C and SI-3B are in the same safeguards room and share the same diesel generator (DG-2) and a common suction line. CS Pump SI-3A receives its emergency power from Diesel Generator DG-1 and is located in a different safeguards room.

The supplemental letter dated May 30, 2006, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the Nuclear Regulatory Commission (NRC) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on February 28, 2006 (71 FR 10075).

2.0 REGULATORY EVALUATION

The regulatory framework for requesting this licensing action is based on Regulatory Guide 1.82, "Water Source for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident," and Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors." The FCS was designed and constructed to comply with the Atomic Energy Commission General Design Criteria as proposed on July 10, 1967 (AEC GDC). As described in Appendix G of the plant updated

safety analysis report (USAR), AEC GDC 41 and 52 provide guidance for containment cooling system considerations.

AEC GDC proposed Criterion 41, “Engineered Safety Features Performance Capability,” requires that engineered safety features such as emergency core cooling and containment heat removal systems shall provide sufficient performance capability to accommodate partial loss of installed capacity and still fulfill the required safety function. As a minimum, each engineered safety feature shall provide this required safety function assuming a failure of a single active component.

AEC GDC proposed Criterion 52, “Containment Heat Removal System,” requires that where active heat removal systems are needed under accident conditions to prevent exceeding containment design pressure, at least two systems, preferably of different principles, each with full capacity, shall be provided.

The regulatory requirements for which the NRC staff based its acceptance for the accident dose guidelines are in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 100.11, as supplemented by accident-specific criteria in Section 15 of the Standard Review Plan (SRP), and 10 CFR Part 50, Appendix A, General Design Criterion 19 (GDC 19), “Control Room,” as supplemented by Section 6.4 of NUREG-0800, “Control Room Habitability System.” The NRC staff also utilized the regulatory guidance provided in SRP Section 6.5.2, “Containment Spray as a Fission Product Cleanup System,” in its review.

The NRC staff also conducted an evaluation to ensure that operator performance would not be adversely affected as a result of the TS change. The NRC staff reviewed the operator manual actions using guidance contained in NRC Information Notice 97-78, “Crediting of Operator Actions in Place of Automatic Actions and Modifications of Operator Actions, Including Response Times,” American National Standards Institute/American Nuclear Society (ANSI/ANS) Standard 58.8, “Time Response Design Criteria for Safety-Related Operator Actions,” and NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants,” Chapter 18.0, “Human Factors Engineering,” Rev. 1.

For FCS, the CS system is comprised of two trains, each with the capacity to provide 100 percent of the post-accident cooling requirements for the system. The system design provides sufficient capacity for loss of one train following an accident. The CS system and the containment cooling system fulfill AEC GDC proposed Criterion 52 requirements. This amendment would revise FCS TS 2.4, “Containment Cooling,” and the associated bases. The revision would reduce the required number of operable CS pumps from three to two. Both the CS and the containment fan coolers would remain in operation with this proposed change to the bases. The NRC staff also considered relevant information in the FCS USAR and TSs as part of this review.

3.0 TECHNICAL EVALUATION

The function of the CS system is to limit the containment pressure rise and reduce the leakage of airborne radioactivity from the containment following a design basis-accident. The design-basis functions of the CS system and the description of the containment spray actuation signal (CSAS) are discussed in the FCS USAR. Currently, all three CS pumps are started by the

CSAS via the auto-start sequencers. The licensee stated that following the proposed modification to the CS system, only two pumps (SI-3A and SI-3B) will be automatically started by the CSAS, one pump per train. CS Pump SI-3C will remain connected to the electrical bus associated with diesel generator DG-2; however, it will have manual start capabilities only. One pump operation is sufficient to meet the capacity requirements in the event of a design-basis accident (DBA). In the following sections, the impact of the proposed change on the DBA is discussed.

The licensee requested this amendment to implement one of the corrective action options it identified in its response to NRC GL 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors." The licensee states that disabling the automatic start logic for CS pump SI-3C enhances the net positive suction head (NPSH) margins during a DBA by reducing the flow to and through the associated containment sump strainer when the high-pressure safety injection (HPSI) and CS pumps are operating in response to a DBA. This reduction in flow reduces the debris transport to the strainer, reduces the pressure drop across the strainer and associated piping, maximizes the NPSH for the pumps taking suction from the containment sump, and increases the time to the initiation of a recirculation actuation signal (RAS). Additionally, since CS pumps SI-3B and SI-3C share a common suction line, disabling the automatic start logic for CS pump SI-3C ensures that only a single CS pump will be using this suction line in response to a CSAS. The reduction of flow in the common suction line will result in reduced velocity in the piping and reduced piping head loss, which will increase the NPSH margin for the SI-3B pump.

3.1 LOCA Minimum Containment Pressure Analysis

The current FCS Large Break loss-of-coolant accident (LOCA) analysis is performed using two single failure scenarios: (1) failure of one emergency diesel generator (EDG), and (2) failure of one low-pressure safety injecton (LPSI) pump to start/run. The first scenario results in the minimum containment heat removal systems of one CS pump/header and one train of containment fan coolers (CFCs). The LPSI failure to start/run scenario results in the operation of all engineered safety feature containment heat removal systems (i.e., 3 CS pumps/2 headers and all CFCs). The LPSI failure scenario results in the highest calculated peak clad temperature (PCT) of 1956 $^{\circ}$F and is therefore the limiting case. The EDG failure scenario, assuming operation of one CS pump/header and one train of CFC, results in a calculated PCT of 1948 $^{\circ}$F.

The analysis for the first case, EDG failure scenario, is not impacted by the proposed change since it already assumes only a single CS pump is operating. The second case, failure of one LPSI pump scenario, is impacted since it currently assumes that all three CS pumps are operating. However, the licensee concludes the more containment cooling components that are assumed operating the more conservative the evaluation is. Therefore, if one less containment cooling component is operating, i.e., one less CS pump, then the performance of the emergency core cooling system (ECCS) is actually enhanced due to lower containment cooling capacity which results in higher containment pressure which equates to higher ECCS core reflood rate in response to a LOCA.

The current analysis that assumes three CS pumps operating is consistent with SRP Section 6.2.1.5 for minimum containment pressure analysis. Since the licensee is not

proposing to revise the highest calculated PCT value in the USAR, the NRC staff agrees with the licensee's conclusion that following the implementation of the proposed change, the current ECCS performance analysis remains bounding and conservative.

3.2 LOCA Peak Containment Pressure Analysis

The current limiting LOCA containment pressure analysis assumes operation of one CS pump and one CS header. Following implementation of the proposed change at least one CS pump and one CS header will be available to mitigate a LOCA, therefore, the NRC staff concludes there is no adverse effect to the peak containment pressure and temperature response following a LOCA.

3.3 Main Steam Line Break Peak Containment Pressure Analysis

The only FCS USAR safety analysis that currently assumes three CS pumps operating to mitigate an accident is the containment pressure analysis for a main steam line break (MSLB) inside containment. The reason that all three pumps were assumed to be running was that a loss-of-offsite power is not the limiting condition for this accident and the limiting single failure is not the loss of an engineered safeguards electrical bus; therefore, it was assumed that all three CS pumps continued to operate.

Even though the FCS USAR states that the MSLB containment pressure analysis assumes operation of all three CS pumps, the analysis also shows that peak containment pressure occurs prior to the CS system starting, therefore, the CS system does not mitigate the peak pressure for an MSLB.

Since the peak containment pressure occurs prior to the CS system starting, the NRC staff agrees with the licensee's conclusion that the peak containment pressure is not affected by the proposed change.

3.4 Radiological Consequences

The CS system reduces the leakage of airborne radioactivity by effectively removing fission products from the containment. The capacity requirement for CS is addressed in Sections 6.3 and 14.15.8 of the FCS USAR. In the event of a DBA, the licensee states that the success criteria for CS removal of fission products requires that only one pump operates successfully.

The NRC staff reviewed the regulatory and technical analyses performed by OPPD in support of its proposed license amendment, as well as information submitted by OPPD for Amendment No. 235, dated May 20, 2005 (ADAMS Accession No. ML051090567). The proposed amendment does not involve changes to the equipment required to mitigate the radiological consequences of accidents, nor does it change how DBA events are postulated.

With two pumps required to be operable by the proposed revision to TS 2.4, the CS system remains capable of performing its fission product removal function in the event of a DBA. The current licensing basis DBA dose analysis assumes one CS pump in operation, and the proposed TS changes would ensure that operability. As single CS pump operation in response to this event bounds the plant configuration following the proposed modification, the NRC staff

finds that the current licensing basis DBA dose analyses remain bounding for the proposed changes to TS 2.4; therefore, 10 CFR 100.11 and GDC-19 continue to be satisfied.

3.5 Operator Actions and Administrative Controls

In Amendment No. 235, the NRC staff accepted the licensee's operator actions to manually stop two out of three CS pumps following a LOCA after certain conditions were satisfied in order to minimize the potential for containment sump clogging. The proposed amendment request will require one CS pump (SI-3A or SI-3B) to be secured under those conditions since the automatic feature for CS pump SI-3C would be disabled upon receipt of a CSAS. The proposed amendment request does not require any additional operator actions and the operator actions in this proposed request are bounded by the operator actions in Amendment No. 235 since only one CS pump will be required to be manually stopped as opposed to two CS pumps.

The licensee also identified the possibility that an operator could inadvertently start CS pump SI-3C during an event that generates a CSAS that starts CS pumps SI-3A and SI-3B. The adverse effect, however, would be minimal when the HPSI and CS pumps are taking suction from the safety injection and refueling water tank (SIRWT) because the HPSI and CS pumps would have adequate NPSH available during the event. The licensee further stated that the operator would be immediately directed by procedure to stop CS pump SI-3C prior to initiation of an RAS. Immediate operator action would be taken when the HPSI and CS pumps are taking suction from the containment sump, with CS pump SI-3C continuing to run after an RAS, since the increased head loss for containment sump strainer SI-12A will lead to decreased NPSH for the HPSI and CS pumps. Prompt operator action will reduce the adverse impact on the NPSH through strainer SI-12A. Also, the CS system is designed such that if all three CS pumps are in service, both strainers, SI-12A and SI-12B, will be in service to reduce debris load and provide acceptable strainer head loss.

The NRC staff requested the licensee to clarify how much time the operator has to stop the CS pump SI-3C if it is inadvertently started during a large or small break LOCA. The licensee responded by letter dated May 30, 2006, that the operator will have a minimum of 20 minutes (with a maximum of 24 minutes after the removal of the automatic start function on CS pump SI-3C) to stop the CS pump SI-3C from the control room before an RAS during a large break LOCA scenario. Small break LOCA scenarios are bounded by the large break LOCA scenario as it relates to the time to reach an RAS. The licensee previously validated the 20 minute time, as reviewed and accepted by the NRC staff in Amendment No. 235. The licensee will continue to train the operators accordingly with additional emphasis on the caution statements to be included in the licensee's emergency operating procedures (EOP) as part of the administrative controls. The operator will also be directed by the EOPs to stop CS pump SI-3C at the initial 10-minute interval of a large break LOCA if it is found to be running simultaneously with CS pumps SI-3A and SI-3B. The EOPs will also provide guidance to verify that the allowed number of pumps is in operation with sufficient spray flow and guidance to shut down any pumps that may show any sign of distress due to a plugged strainer.

Additionally, the licensee will implement administrative controls through plant procedures to restrict the overall usage of CS pump SI-3C for only emergency conditions. The EOPs will be revised to direct the operators to use CS pump SI-3C only if CS pump SI-3B is unavailable or

displays any adverse physical issues during its operation. The licensee will also place caution statements in the EOPs to caution against operating both CS pumps SI-3B and SI-3C at the same time. The licensee's operator training program will be revised to train the operators on the restrictions regarding CS pump SI-3C as reflected in the EOPs. The NRC staff determined that the operator actions are consistent with those actions stated in Amendment No. 235 for securing CS pump SI-3C in a timely manner in the event of its inadvertent operation. The NRC staff also determined that the licensee's administrative controls, as reflected in the EOPs, and the revised operator training implementation are acceptable to support operators in using CS pump SI-3C during emergency conditions such as a LOCA.

Based on the above, the NRC staff concludes the containment pressure analysis, radiological consequences, and operator actions are bounded by the current analysis. In addition, the NRC staff determined that the licensee's administrative controls support this change and are acceptable. Therefore, the NRC staff has determined that the proposed TS changes are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Nebraska State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (71 FR 10075; published on February 28, 2006). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: G. Armstrong
D. Chung
G. Tesfaye

Date: October 27, 2006

Ft. Calhoun Station, Unit 1
cc:

Winston & Strawn
ATTN: James R. Curtiss, Esq.
1700 K Street, N.W.
Washington, DC 20006-3817

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

Mr. John Hanna, 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. Julia Schmitt, Manager
Radiation Control Program
Nebraska Health & Human Services R & L
Public Health Assurance
301 Centennial 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. Joe L. McManis
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
Lucas State Office Building, 5th Floor
321 East 12th Street
Des Moines, IA 50319