Omaha Public Power District

444 South 16th Street Mall
Omaha NE 68102-2247

July 8, 2005
LIC-05-0075

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

References:
1. Docket No. 50-285
2. Letter from David J. Bannister (OPPD) to Document Control Desk (NRC) dated November 23, 2004, Fort Calhoun Station Unit No. 1, License Amendment Request, "Revisions of Technical Specifications Table 1-1 and Section 4.0" (LIC-04-0117)

SUBJECT: Fort Calhoun Station Unit No. 1, Response to Request for Additional Information on the License Amendment Request, "Revisions of Technical Specifications Table 1-1 and Section 4.0"

In Reference 2, the Omaha Public Power District (OPPD) requested amendments to the Fort Calhoun (FCS) Technical Specifications in support of operation of FCS after major components (steam generators, pressurizer, and reactor vessel head) are replaced in 2006. In subsequent conversations with the NRR Project Manager, clarifications to the proposed changes to Technical Specification 4.3.1 were requested and are being provided as attachments to this letter. Specifically, OPPD proposes reworded versions of Technical Specifications 4.3.1.1.e, 4.3.1.1.f, 4.3.1.1.g, 4.3.1.2.b and 4.3.1.2.c to replace the corresponding Technical Specifications proposed in Reference 2. These revised Technical Specifications reflect plant-specific nomenclature for the FCS spent fuel pool (consistent with existing Technical Specification Figure 2-10), and licensing basis for the existing new fuel storage racks. These changes therefore supersede the Reference 2 wording that originated in NUREG-1432, Revision 3, Standard Technical Specifications to Combustion Engineering Plants.

These clarifications to Reference 2 are enclosed as Attachments 1 and 2, replacement Markup and Clean Copies, respectively, of the proposed Technical Specifications and Attachment 3, the replacement to Table 2, Administrative Changes to Standard Technical Specifications.

I declare under penalty of perjury that the forgoing is true and correct. (Executed on July 8, 2005.)

If you have any questions or require additional information, please contact Tom Matthews at (402) 533-6938.

Sincerely,

H. J. Faulhaber
Division Manager
Nuclear Engineering

HJF/RLJ/rlj

Attachments:
1. Replacement Markup of Technical Specification Pages
2. Replacement Clean Copy of Technical Specification Pages
3. Replacement Table 2: Administrative Changes to Standard Technical Specifications

Attachment 1

Replacement Markup of Technical Specification Pages

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4.0 DESIGN FEATURES

4.1 Site

The site for Fort Calhoun Station Unit No. 1 is in Washington County, Nebraska, on the west bank of the Missouri River and approximately nineteen miles north, northwest of the city of Omaha, Nebraska. The exclusion area, as defined in 10 CFR Part 100, Section 100.3(a), consists of approximately 1242 acres. The exclusion area boundary extent includes approximately 660 acres in Washington County, Nebraska, owned by the Omaha Public Power District (OPPD), and 582 acres in Harrison County, Iowa, on the east bank of the river directly opposite the facility, on which the District retains perpetual easement rights. The minimum exclusion area boundary point is located approximately at the 187.0 degree radial from the outer wall of the containment building and at a distance of 910 meters.

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 133 fuel assemblies. Each assembly shall consist of a matrix of Zircalloy or ZIRLO fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO_2) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions.

4.2.2 Control Element Assemblies

The reactor core shall contain 49 control element assemblies (CEAs). The control material shall be silver indium cadmium, boron carbide, or hafnium metal as approved by the NRC.

4.3 Fuel Storage

4.3.1 Criticality

4.3.1.1 The spent fuel storage racks are designed and shall be maintained with:

a. Fuel assemblies having a maximum U-235 enrichment of 4.5 weight percent,

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.5 of the USAR,

4.0 **DESIGN FEATURES** (Continued)

c. A nominal 8.6 inch center to center distance between fuel assemblies placed in Region 2, the high density fuel storage racks,

d. A nominal 9.8 inches (East-West) by 10.3 inches (North South) center to center distances between fuel assemblies placed in Region 1, the low density fuel storage racks,

e. New or partially spent fuel assemblies with a discharge burnup in the "acceptable domain" of Figure 2-10 for "Region 2 Unrestricted" may be allowed unrestricted storage in any of the Region 2 fuel storage racks in compliance with Reference (1),

f. Partially spent fuel assemblies with a discharge burnup between the "acceptable domain" and "Peripheral Cells" of Figure 2-10 may be allowed unrestricted storage in the peripheral cells of the Region 2 fuel storage racks in compliance with Reference (1),

g. New or partially spent fuel assemblies with a discharge burnup in the "unacceptable domain" of Figure 2-10 will be stored in Region 1 in compliance with Reference (1).

4.3.1.2 The new fuel storage racks are designed and shall be maintained with:

a. Fuel assemblies having a maximum U-235 enrichment of 5.0 weight percent,

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Reference (2).

c. $k_{eff} \leq 0.98$ if moderated by aqueous foam, which includes an allowance for uncertainties as described in Reference (2).

d. A nominal 16 inch center to center distance between fuel assemblies placed in the storage racks.

References:

(1) Letter from R. Wharton (NRC) to T. Patterson (OPPD), Amendment 174 to Facility Operating License No. DPR-40, (TAC NO. M94789) Dated July 30, 1996, NRC-96-0126.

(2) Ft. Calhoun USAR, Reference 9.5-1

4.0 **DESIGN FEATURES** (Continued)

4.3.2 Drainage

The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 23 ft.

4.3.3 Capacity

The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 1083 fuel assemblies.

~~4.2 Containment Design Features~~

~~4.2.1 Containment Structure~~

~~The containment structure completely encloses the reactor coolant system to minimize release of radioactive material to the environment should a failure of the reactor coolant system occur. The prestressed, post tensioned concrete structure provides adequate biological shielding for both normal operation and accident situations and is designed for low leakage at a design pressure of 60 psig and 305°F.~~

~~The principal design basis for the structure is that it be capable of withstanding the internal pressure resulting from a design basis loss of coolant accident. In this event, the total energy contained in the water of the reactor coolant system is assumed to be released into the containment through a double-ended break of the largest reactor coolant pipe coincident with a loss of normal and off-site electrical power. Subsequent pressure behavior is determined by the engineered safety features and the combined influence of energy sources and heat sinks.~~

~~The external design pressure of the containment shell is 2.5 psig; this is the positive differential pressure that would result if the containment were sealed during a period of low barometric pressure and high internal temperature and subsequently, the containment atmosphere were cooled with a concurrent major rise in barometric pressure. Vacuum breakers are therefore not provided.~~

~~The containment is designed as a seismic Class I structure.~~

~~4.2.2 Penetrations~~

~~All penetrations through the steel-lined concrete structure for electrical conductors, pipe, ducts, air locks and hatch doors are of the double barrier design.~~

~~The automatically actuated containment isolation valves are designed to close upon low pressurizer pressure or high pressure in the containment structure.[(1)] No single component failure in the actuation system will prevent the isolation valves from functioning as designed.~~

~~4.0 DESIGN FEATURES~~

~~4.2 Containment Design Features (Continued)~~

~~4.2.3 Containment Structure Cooling Systems~~

~~The containment air recirculation, cooling, and iodine removal system includes four separate self-contained units which cool the containment air during normal operation and limit the pressure rise in the event of a design accident. A cooling water flow of 4,680 gpm with an inlet temperature of 120°F will remove 280 x 10^6 Btu/hr.~~[(2)]

~~The containment spray system is capable of removing 280 x 10^6 Btu/hr (2 pumps) from the containment atmosphere at 288°F by spraying cool borated water from the 314,000 gallon SIRW tank. Recirculation of spray water from the containment sump and through the shutdown cooling heat exchangers into the containment atmosphere is also provided. Under this mode of operation, the heat removal capability per heat exchanger is 87.5 x 10^6 Btu/hr based upon 4,000 gpm of cooling water at 114°F inlet temperature.~~[(3)]

~~Two of the four containment air cooling units are equipped with particulate filters and with activated impregnated charcoal absorbers for iodine removal.~~

~~References~~

~~(1) FSAR, Table 5.9-1~~

~~(2) FSAR, Table 6.4-5~~

~~(3) FSAR, Table 6.3.1~~

~~4.0 DESIGN FEATURES~~

~~4.3 Nuclear Steam Supply System (Continued)~~

~~4.3.1 Reactor Coolant System (Continued)~~

~~The reactor coolant system is designed and constructed in accordance with the ASME Boiler and Pressure Vessel Code, Section III, Rules for Construction of Nuclear Vessels including all addenda through the winter of 1967 and the Code for Pressure Piping USAS B31.1. The reactor coolant system is designed for a pressure of 2500 psia and a temperature of 650°F except for the pressurizer which has a design temperature of 700°F. The volume of the reactor coolant system is approximately 6,616 cubic feet.~~

~~4.3.2 Reactor Core and Control~~

~~The reactor shall contain 133 fuel assemblies. Each assembly shall consist of a matrix of zircaloy or ZIRLO® fuel rods with an initial composition of natural, depleted, or slightly enriched uranium dioxide (UO_2) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions.~~

~~The reactor core shall contain 49 control element assemblies (CEAs). The control material shall be silver indium cadmium, boron carbide, or hafnium metal as approved by the NRC.~~

~~4.3.3 Emergency Core Cooling~~

~~Emergency core cooling is provided by the Safety Injection System which consists of various subsystems, each with internal redundancy. Included in the Safety Injection System are four safety injection tanks, three high-pressure and two low-pressure safety injection pumps, a safety injection and refueling water storage tank, and interconnecting piping as shown in USAR Section 6.~~

~~4.0 DESIGN FEATURES~~

~~4.4 Fuel Storage~~

~~4.4.1 New Fuel Storage~~

~~The new unirradiated fuel bundles will normally be stored in the dry new fuel storage rack with an effective multiplication factor of less than 0.9. The new fuel storage rack is located 18'-9" above the main floor of Room 25A which provides for adequate drainage and precludes flooding of the new fuel storage rack.~~

~~New fuel may also be stored in shipping containers or in the spent fuel pool racks which have a maximum effective multiplication factor of 0.95 with Fort Calhoun Type C fuel and unborated water.~~

~~The new fuel storage racks are designed as a Class I structure.~~

~~4.4.2 Spent Fuel Storage~~

~~Irradiated fuel bundles will be stored prior to off-site shipment in the stainless steel lined spent fuel pool. The spent fuel pool is normally filled with borated water with a concentration of at least the refueling boron concentration.~~

~~The spent fuel racks are designed as a Class I structure.~~

~~Normally the spent fuel pool cooling system will maintain the bulk water temperature of the pool below 120°F. Under other conditions of fuel discharge, the fuel pool water temperature is maintained below 140°F.~~

~~The spent fuel racks are designed and will be maintained such that the calculated effective multiplication factor is no greater than 0.95 (including all known uncertainties) assuming the pool is flooded with unborated water. The racks are divided into 2 regions. Storage in Region 1 and Region 2 of the spent fuel racks shall be restricted to fuel assemblies having initial enrichment less than or equal to 4.5 weight percent of U-235. Region 1 and 2 cells are surrounded by Boral. Acceptance criteria for fuel storage in Regions 1 and 2 are delineated in Section 2.8 of these Technical Specifications.~~

~~4.0 DESIGN FEATURES~~

~~4.5 Seismic Design for Class I Systems~~

~~Class I systems and equipment including piping (excluding the reactor coolant system) are designed to the criteria for load combinations and stresses shown in Table F-1 of the FSAR.~~

~~Design criteria for the reactor coolant are as shown in Table 4.2-3 of the FSAR.~~

TABLE 1-1

RPS LIMITING SAFETY SYSTEM SETTINGS

No.	Reactor Trip	Trip Setpoints
1	High Power Level (A) 4-Pump Operation	$\leq$109.0% of Rated Power
2	Low Reactor Coolant Flow (B)(F) 4-Pump Operation	$\geq$95% of 4 Pump Flow
3	Low Steam Generator Water Level	31.2% of Scale ~~(Top of feedwater ring; 4'10" below normal water level)~~
4	Low Steam Generator Pressure (C)	$\geq$500 psia
5	High Pressurizer Pressure	$\leq$2400 psia
6	Thermal Margin/Low Pressure (B)(F)	1750 psia to 2400 psia (depending on the reactor coolant temperature as shown in the Thermal Margin/Low Pressure 4 Pump Operation Figure provided in the COLR)
7	High Containment Pressure (D)	$\leq$5 psig
8	Axial Power Distribution (E)	(as shown in the Axial Power Distribution for 4 Pump Operation Figure provided in the COLR)
9	Steam Generator Differential Pressure	$\leq$135 psid

Amendment No. ~~7,32,47,77,92,141,170~~, 210

Attachment 2

Replacement Clean Copy of Technical Specification Pages

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a. Fuel assemblies having a maximum U-235 enrichment of 4.5 weight percent,

b. k_{eff} ≤ 0.95 if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.5 of the USAR,

4.0 **DESIGN FEATURES** (Continued)

c. A nominal 8.6 inch center to center distance between fuel assemblies placed in Region 2, the high density fuel storage racks,

d. A nominal 9.8 inches (East-West) by 10.3 inches (North South) center to center distances between fuel assemblies placed in Region 1, the low density fuel storage racks,

e. New or partially spent fuel assemblies with a discharge burnup in the "acceptable domain" of Figure 2-10 for "Region 2 Unrestricted" may be allowed unrestricted storage in any of the Region 2 fuel storage racks in compliance with Reference (1),

f. Partially spent fuel assemblies with a discharge burnup between the "acceptable domain" and "Peripheral Cells" of Figure 2-10 may be allowed unrestricted storage in the peripheral cells of the Region 2 fuel storage racks in compliance with Reference (1),

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Amendment No. ~~7,32,47,77,92,141,170~~, 210

Replacement Table 2

Administrative Changes to Standard Technical Specifications

TABLE 2: ADMINISTRATIVE CHANGES TO STANDARD TECHNICAL SPECIFICATIONS

Affected FCS Technical Specification	Summary of Change
4.3.1.1.c and 4.3.1.1.d	FCS Technical Specifications 4.3.1.1.c and 4.3.1.1.d are revised from the STS to include "Region 2" and "Region 1", respectively, to assure consistent nomenclature of the high and low density fuel storage racks to be consistent with the nomenclature presented on existing FCS TS Figure 2-10.
4.3.1.1.e	FCS TS 4.3.1.1.e is revised from the 4.3.1.1.e STS wording as follows: 1) "acceptable range" is changed to "acceptable domain," 2) "Figure [3.7.18.1]" is changed to "Figure 2-10 for "Region 2 Unrestricted,"" 3) "[either]" is replaced with "any of the Region 2," and 4) after "storage rack(s)" add "in compliance with Reference (1)", to specify: 1) where the spent fuel falling within this burnup domain will be stored, 2) incorporate the reference prescribing the storage requirement, and 3) be consistent with the terminology of existing TS Figure 2-10.
4.3.1.1.f	FCS TS 4.3.1.1.f is added based on revisions to the 4.3.1.1.e STS wording as follows: 1) Delete "New or," 2) begin the specification with "Partially," 3) replace "the "acceptable range"" with "between the "acceptable domain" and "Peripheral Cells,"" 4) replace "Figure [3.7.18-1]" with "Figure 2-10", 5) replace "[either]" with "peripheral cells of Region 2 storage," 6) after "storage rack(s)" add "in compliance with Reference (1)," to specify: 1) where the spent fuel falling within this burnup domain will be stored, 2) incorporate the reference prescribing the storage requirement, and 3) be consistent with the terminology of existing TS Figure 2-10.
4.3.1.1.g	FCS TS 4.3.1.1.g is revised from the 4.3.1.1.f STS wording as follows: 1) replace "unacceptable range" with "unacceptable domain," 2) replace "Figure [3.7.18.1]" with "Figure 2-10," 3) replace "compliance with the NRC approved [specific document containing the analytical methods, title, date, or specific configuration or figure]" with "Region 1 in compliance with Reference (1)." to specify: 1) where the spent fuel falling within this burnup domain will be stored, 2) incorporate the reference prescribing the storage requirement, and 3) be consistent with the terminology of existing TS Figure 2-10.
4.3.1.2.b	FCS TS 4.3.1.2.b is revised from the STS wording of "keff ≤0.98 if fully flooded with unborated water, which includes an allowance for uncertainties as described in [Section 9.1 of the FSAR]" to "keff ≤0.95 if fully flooded with unborated water, which includes an allowance for uncertainties as described in Reference (2)." because the licensed FCS limit of the new fuel storage racks is 0.95.