

February 21, 2007

Mr. Charles D. Naslund  
Senior Vice President and Chief Nuclear Officer  
Union Electric Company  
Post Office Box 620  
Fulton, MO 65251

SUBJECT: CALLAWAY PLANT, UNIT 1 - ISSUANCE OF AMENDMENT RE: REPLACING  
CONTAINMENT SUMP TRASH RACKS AND SCREENS WITH STRAINERS  
AND RELOCATE THE CONTAINMENT PH CONTROL SYSTEM FROM  
CURRENT LOCATION (TAC NO. MD2363)

Dear Mr. Naslund:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 180 to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated May 30, 2006 (ULNRC-05293), as supplemented by letters dated November 22 and December 19, 2006 (ULNRC-05347 and ULNRC-05353, respectively).

The amendment revised Surveillance Requirements (SRs) 3.5.2.8 and 3.6.7.1 due to (1) the future replacement of the existing containment recirculation sump suction inlet trash racks and screens with strainers, (2) the resulting relocation of the recirculation fluid pH control (RFPC) system from the sump, and (3) the removal of details from SR 3.6.7.1, including the relocation of the name of the RFPC chemical to a license condition in Appendix C to the license. The modifications will be done in the refueling outage scheduled for the spring of 2007. The amendment also deleted the footnote to the frequency for SR 3.5.2.5 because it is no longer applicable.

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/**

Jack Donohew, Senior Project Manager  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosures: 1. Amendment No. 180 to NPF-30  
2. Safety Evaluation

cc w/encls: See next page

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OFFICE	NRR/LPL4/PM	NRR/LPL4/LA	SSIB/BC	AADB/BC	CSGB/BC	ITSB/BC	OGC	NRR/LPL4/BC
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DATE	2/13/07	2/15/07	12/23/06	12/8/06	2/6/07	1/17/07	2/9/07	2/15/07

OFFICIAL AGENCY RECORD

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 180

License No. NPF-30

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Union Electric Company (UE, the licensee), dated May 30, 2006, as supplemented by letters dated November 22 and December 19, 2006, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's 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 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-

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraphs 2.C(2) and 2.C(15) of Facility Operating License No. NPF-30 are hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 180 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(15) Additional Conditions

The Additional Conditions contained in Appendix C, as revised through Amendment No. 180, are hereby incorporated in this license. UE shall operate the facility in accordance with the Additional Conditions.

3. This amendment is effective as of its date of issuance, and shall be implemented prior to entry into Mode 4 during the plant startup from the refueling outage scheduled for the spring of 2007.

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 Operating License and  
the Technical Specifications

Date of Issuance: February 21, 2007

ATTACHMENT TO LICENSE AMENDMENT NO. 180

FACILITY OPERATING LICENSE NO. NPF-30

DOCKET NO. 50-483

Replace the following pages of the Facility Operating License No. NPF-30 with the attached revised pages. The revised pages are identified by an amendment number and contain a marginal line indicating the area of change.

REMOVE

- 3 -

- 5 -

INSERT

- 3 -

- 5 -

Replace the following page of Appendix C to the Facility Operating License No. NPF-30 with the attached revised page. The revised page is identified by an amendment number and contains marginal lines indicating the areas of change.

REMOVE

- 2 -

INSERT

- 2 -

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 marginal lines indicating the areas of change.

REMOVE

3.5-5

3.6-21

INSERT

3.5-5

3.6-21

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 180 TO  
FACILITY OPERATING LICENSE NO. NPF-30  
UNION ELECTRIC COMPANY  
CALLAWAY PLANT, UNIT 1  
DOCKET NO. 50-483

1.0 INTRODUCTION

By application dated May 30, 2006, as supplemented by letters dated November 22 and December 19, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML061570189, ML063340098, and ML063620096, respectively), Union Electric Company (the licensee) requested changes to Technical Specifications (TSs) 3.5.2, "ECCS [emergency core cooling system] - Operating," and 3.6.7, "Recirculation Fluid pH Control (RFPC) System," of Appendix A to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1 (Callaway). The licensee is proposing to revise Surveillance Requirements (SRs) 3.5.2.8 and 3.6.7.1, and to delete the footnote to the frequency for SR 3.5.2.5. SR 3.5.2.8 would be revised by replacing the phrase "trash racks and screens" with the word "strainers," which reflects (1) the replacement of the existing containment recirculation sump suction inlet trash racks and screens with strainers with significantly greater effective surface area and (2) the resulting relocation of the recirculation fluid pH control system in Refueling Outage 15, which is scheduled for the spring of 2007. The footnote to SR 3.5.2.5 would be deleted because it is no longer applicable to the TSs.

The proposed amendment reflects the replacement of the containment sump suction inlet trash racks and screens with a new strainer design with significantly larger effective screen area in the upcoming Refueling Outage 15. The TSP-C baskets are being relocated from the containment sump because of the space being taken up in the sump by the new strainers. This installation is in response to the U.S. Nuclear Regulatory Commission (NRC) Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors," dated September 13, 2004.

The supplemental letters dated November 22 and December 19, 2006, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination published in the *Federal Register* on August 15, 2006 (71 FR 46940).

The licensee also identified changes to the TS Bases associated with the proposed amendment in its supplemental letter dated November 22, 2006. These changes would be made to the TS 3.6.7 Bases in accordance with TS 5.5.14, "Technical Specifications Bases Control Program," at the time that the amendment is implemented, if approved.

## 2.0 REGULATORY EVALUATION

The license amendment request (LAR) involves (1) replacing the current "trash racks and screens" of the containment sump by installing new "strainers" that increase the area that would screen debris from the water in the containment sump and (2) relocating the baskets of crystalline trisodium phosphate (TSP-C) in the recirculation fluid pH control system from the containment sumps to alternate locations on the containment floor.

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TSs as part of the license. The TSs ensure the operational capability of structures, systems, and components that are necessary to protect the health and safety of the public. The NRC's regulatory requirements related to the content of the TSs are contained in Section 50.36 of Title 10 of the *Code of Federal Regulations* (10 CFR 50.36), which requires that the TSs include items in the following categories: (1) safety limits, limiting safety systems settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) SRs; (4) design features; and (5) administrative controls. However, the rule does not specify the particular requirements to be included in a plant's TSs. SRs are, in accordance with 10 CFR 50.36(c)(3), "requirements relating to tests, calibration, or inspection to assure that the necessary quality of the systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."

NRC's regulatory requirements related to replacing the containment sump trash racks by installing strainers are the following:

- Paragraph 50.46(b)(5) of 10 CFR, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," which states that after any calculated successful initial operation of the ECCS, the calculated core temperature shall be maintained at an acceptably low value and decay heat shall be removed for the extended period of time required by the long-lived radioactivity remaining in the core.
- General Design Criterion (GDC) 35, "Emergency core cooling," in Appendix A to 10 CFR Part 50, which requires, in part, abundant long-term emergency core cooling to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reactions are limited to negligible amounts.
- GDC 38, "Containment heat removal," which requires in part that the system safety function shall be to maintain containment pressure and temperature at acceptably low levels.

- GDC 41, "Containment atmosphere cleanup," which requires in part that the containment cleanup systems control substances which may be released into the containment. These systems shall be provided as necessary to reduce the concentration and quality of fission products released to the environment following postulated accidents and to control the concentration of hydrogen or oxygen and other substances in the containment atmosphere following postulated accidents to assure that containment integrity is maintained.

NRC GL 2004-02, which addresses safety issues associated with Generic Safety Issue (GSI)-191, "Assessment of Debris Accumulation on PWR [Pressurized-Water Reactor] Sump Performance," requested that PWR licensees improve their plant capability to meet the requirements of 10 CFR 50.46(b)(5) for long-term cooling in the aftermath of a design-basis loss-of-coolant accident (LOCA) with debris loading in the containment sumps.

This amendment only affects the containment sump in terms of the screens or strainers that remove debris during accidents. The trash racks, screens, or strainers ensure sufficient flow from the sump to the ECCS pumps (to provide cooling to the core) and containment spray system (CSS) pumps (to provide spray for cooling of the containment and to reduce the radioiodine and particulate radioactivity in the containment atmosphere). Therefore, 10 CFR 50.46(b)(5) and GDCs 35, 38, and 41 must be addressed in the license amendment with respect to the requirements for long-term flow from the containment sumps to the ECCS and CSS with debris loading in the containment sumps. The amendment does not involve a change to the design, testing, or inspection requirements for the ECCS and CSS in GDCs 36 through 43, and in GDC 50.

The NRC regulatory requirements related to baskets of TSP-C in the recirculation fluid pH control system are the following:

- GDC 41, "Containment atmosphere cleanup," which requires, in part, that systems are provided to control fission product releases to the containment following postulated accidents.
- GDC 42, "Inspection of containment atmosphere cleanup systems," which requires, in part, that the systems are designed to permit appropriate periodic inspections.
- GDC 43, "Testing of containment atmosphere cleanup systems," which requires, in part, that the systems are designed to permit appropriate periodic functional testing.

### 3.0 BACKGROUND

GSI-191 addresses PWR sump performance issues during design-basis accidents (DBAs), including the possibility that debris could accumulate on the screens of the recirculation sump inside containment resulting in a loss of net positive suction head (NPSH) margin to the ECCS pumps when drawing suction from the sump during an accident. Loss of NPSH margin could impede or prevent the flow of water needed from the sump to the ECCS pumps to comply with 10 CFR 50.46(b)(5), which requires that licensees design their ECCS to meet five criteria, one

of which is to provide long-term cooling to the core. The ECCS must be able to provide cooling for a sufficient duration such that the core temperature is maintained at an acceptably low value and for the period of time required by the long-lived radioactivity in the core. Loss of NPSH margin could also prevent the CSS pumps from providing adequate containment spray flow.

NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," dated June 9, 2003, requested information from PWR licensees, including Union Electric Company, to verify compliance with NRC regulations and to ensure that any interim risks associated with post-accident debris blockage are minimized while evaluations using the latest sump knowledge proceed. GL 2004-02 is the follow-on generic communication to the bulletin, and it requested information on the results of the evaluations referenced in the bulletin.

In its application, the licensee stated that it had evaluated the containment recirculation sumps for adverse effects due to debris blockage of flow paths necessary for ECCS and CSS recirculation and containment drainage. The licensee stated that it concluded from the evaluation that a new larger sump strainer of a different design was needed by December 31, 2007, to continue to address the applicable provisions in GL 2004-02 that are more restrictive than the current regulatory requirements on the containment recirculation sump trash racks and screens. This modification is to be completed during the upcoming refueling outage in the spring of 2007 to meet the NRC-requested schedule in GL 2004-02 and will entail the relocation of the baskets of the RFPC system from inside the sumps to outside the sumps.

The licensee further explained that, with the installation of the new strainers in the containment recirculation sump, the existing storage baskets for TSP-C must be removed, redesigned, and relocated to the containment floor. The new sump strainers do not allow the TSP-C storage baskets currently in the containment recirculation sump to remain. The licensee stated that the new redesigned baskets will be at an elevation and location in containment that will ensure the dissolution of the TSP-C by the water in the containment recirculation sump.

The licensee has not completed its activities to show that its new sump strainer design is consistent with the revised recirculation sump evaluation methodologies cited in GL 2004-02. One of these activities is the installation of new sump strainers that will significantly increase the surface area to screen debris from the recirculation water supply to the ECCS and CSS during an accident. The other activities and the scheduled completion of these activities are addressed in the licensee's letter dated May 30, 2006 (ADAMS Accession No. ML061570193), where the licensee updated the status of its implementation of GL 2004-02.

The NRC staff has reviewed the licensee's schedule to implement its activities for meeting GL 2004-02. The regulatory commitments and updated schedule out to December 31, 2007, in Attachment 1 to the licensee's letter dated May 30, 2006, show that the licensee will complete GL 2004-02 implementing activities by the NRC staff's requested completion date. Assurance that the new strainer design satisfies an acceptable mechanistic sump performance methodology will be provided by the NRC staff's review of the licensee's GL 2004-02 supplemental responses and the NRC staff's other generic review activities necessary to close out GL 2004-02 and GSI-191. Based on this, the NRC staff concludes that the licensee's GL 2004-02 schedule is acceptable.

#### 4.0 NRC STAFF TECHNICAL EVALUATION

In its application, the licensee proposed the following changes to the TSs:

##### TS 3.5.2, ECCS in Operating Modes 1, 2, and 3

1. Replace the phrase “trash racks and screens” with the word “strainers.”
2. Delete the footnote to the frequency for SR 3.5.2.5 on verifying each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured actuates to its correction position on a actuation signal.

##### TS 3.6.7, RFPC System

1. Replace SR 3.6.7.1 on the TSP-C baskets in the RFPC system by two new SRs 3.6.7.1 and 3.6.7.2 that require the RFPC system to be verified periodically for (1) integrity and (2) ensuring a minimum containment sump water pH of 7.1 during recirculation in accidents, respectively. The surveillance test interval (STI) is not being changed.

#### 4.1 Proposed Change to Replace “Trash Racks and Screens” with “Strainers”

The proposed change revises SR 3.5.2.8 to replace the current phrase “trash racks and screens” with the word “strainers.” This change reflects the replacement of the containment sump suction inlet trash racks and screens with a complex strainer design with significantly larger effective area. There is no change to (1) the requirement to verify that, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the sump inlet screens show no evidence of structural stress or abnormal corrosion or (2) the STI of 18 months.

As stated in Section 6.2.2.1.2.2 of the Callaway Final Safety Analysis Report, there are two containment recirculation sumps that are located in the containment floor or base slab below the concrete pads supporting the accumulator tanks. During and following a LOCA event, these sumps collect water from (1) the ECCS and reactor coolant system that is discharged into containment and (2) the CSS that is sprayed into containment. During recirculation, the sumps provide the water for the ECCS pumps to continue cooling the core and for the CSS to continue spraying into the containment. The existing trash racks and screens prevent debris in the sumps from: (1) reducing the flow to the ECCS and CSS from the sumps such that the flow would be less than that needed to meet the DBA analyses, (2) causing the loss-of-function of any safety-related ECCS and CSS components, and (3) blocking passages in the fuel or CSS spray nozzles.

In its application, the licensee described the new sump strainer design. The new sump strainers to be installed increase the available strainer area from less than 400 square feet to approximately 6,400 square feet. The new design will remove the existing screen hardware and replace it with new fabricated strainer assemblies utilizing the Performance Contracting Inc., Sure-Flow™ strainer system. Inside each sump, 16 stacks (72 total modules) of the strainer assemblies will be installed and will extend approximately 1 foot above the containment

floor. The licensee stated that the strainer design was chosen based on the largest available sump strainer area that would fit within the bounds of the existing sump area and on being compatible with the anticipated water level. The new sump strainer is designed to reduce both head loss and the ingestion of debris, both of which could affect downstream components. The licensee stated further that the sump strainers are sized to preclude the passage of debris large enough to cause loss-of-function of any downstream safety-related CSS and ECCS components or block flow passages such as flow channels in the fuel and the CSS nozzles. Therefore, they are necessary to support operation of the supported systems during postulated DBAs in which the safety analysis takes credit for recirculation flow from the sumps to these systems.

The replacement containment sump strainers are addressed in the licensee's supplemental letter dated November 22, 2006. The licensee stated that the replacement strainers are designed to perform the same safety functions currently performed by the existing trash racks and screens. The licensee stated that the replacement of the trash racks and screens by the strainers does not change (1) any containment piping, or system fluid flows or pressures or (2) the current protection for the containment sumps against missiles, jet impingement, and high-energy pipe whip.

The licensee is undertaking activities to ensure that the functionality of the containment recirculation sump under debris-loading conditions at Callaway will address the provisions of NRC GL 2004-02 by December 31, 2007. Meeting this section of the GL will be ensured through analysis, testing, modifications to increase the available recirculation sump screen area, other changes to the plant to reduce the potential debris loading on the installed containment recirculation sump strainers, and programmatic and process changes.

The licensee stated that the proposed amendment to TS SR 3.5.2.8 is necessary to reflect the new strainer design. Although the configurations of the existing trash racks and screens and the replacement sump strainer assemblies are different, they serve the same fundamental purpose of passively removing debris from the recirculation sump's suction supply to the supported system pumps. The terminology of "trash racks and screens" does not adequately describe the new sump strainers. The licensee further stated that the proposed replacement of "trash racks and screens" with "strainers" is a descriptive change and the revised SR 3.5.2.8 will continue to ensure that the containment recirculation sump strainers are not restricted by debris and show no evidence of structural distress or abnormal corrosion.

The NRC staff has also reviewed the licensee's new sump strainer design. In its supplemental letter dated November 22, 2006, the licensee stated that the replacement strainers are designed to perform the same safety functions of the existing trash racks and screens and that, therefore, the LAR was not changing the current licensing basis for Callaway. Based on the licensee's determination that the new strainers satisfy the Callaway current licensing basis and on the fact that the new sump strainer design has significantly increased surface area, the NRC staff concludes that the new sump strainers are functionally equivalent to the existing trash racks and screens under the current nonmechanistic licensing basis for meeting the requirements of 10 CFR 50.46(b)(5) and GDCs 35, 38, and 41 for long-term cooling of the core, and containment heat removal and atmosphere cleanup.

In assessing the that the new sump strainers are functionally equivalent to the existing trash racks and screens, the NRC staff also concludes that the verification, by visual inspection, in SR 3.5.2.8 that the new strainers show no evidence of structural distress or abnormal corrosion is sufficient to demonstrate the operability of the strainers and no new SR needs to be added to the TSs because of the new design of the replacement strainers.

Based on the above evaluation, the NRC staff concludes that the proposed change in wording in SR 3.5.2 complies with 10 CFR 50.36.

#### 4.2 Proposed Change to Delete Footnote to SR 3.5.2.5

For the current SR 3.5.2.5 to verify that each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured actuates to its correction position on an actuation signal, there is a footnote "" on the frequency of 18 months for the surveillance. The footnote states the following:

Verification of the automatic closure function of [Valve] BNHV8812A shall be performed prior to startup from the first shutdown to MODE 5 occurring after September 8, 2000, but no later than June 1, 2001.

This footnote was added to SR 3.5.2.5 in Amendment No. 140, issued October 6, 2000. This was an exigent amendment that followed the enforcement discretion granted to the licensee on September 8, 2000, because of the failure of the licensee to test the automatic closure function of Valve BNHV8812A, following a maintenance retest of the valve in April 1998. The amendment was a one-time change to the required testing of that valve every 18 months in accordance with SR 3.5.2.5.

The licensee stated that this footnote should be removed from the TSs because it was no longer applicable. In its supplemental letter dated December 19, 2006, the licensee stated that it had performed the required verification in accordance with the footnote. Because the verification was performed in accordance with the terms of the footnote, the NRC staff agrees with the licensee that the footnote is no longer needed in the TSs. Accordingly, the NRC staff concludes that the proposed deletion of the footnote complies with 10 CFR 50.36.

#### 4.3 Proposed Changes to Current SR 3.6.7.1

The licensee has proposed to replace the current SR 3.6.7.1 with the two new SRs 3.6.7.1 and 3.6.7.2. The current SR 3.6.7.1 for LCO 3.6.7, "Recirculation Fluid pH Control (RFPC) System," requires the following verifications:

Verify one TSP-C storage basket is in place in the confines of each containment recirculation sump, each basket shows no evidence of structural distress or abnormal corrosion, and each basket contains between 30" and 36.8" (uniform depth) of granular TSP-C.

As currently stated in the TS 3.6.7 Bases, the RFPC is a subsystem of the containment spray system that assists in reducing the iodine fission product inventory in the containment atmosphere resulting from accidents by controlling the pH of the water in the containment

sump. The RFPC system consists of stainless steel baskets containing sufficient TSP-C to ensure a minimum containment sump recirculation pH of 7.1. The baskets are designed to contain between (1) a maximum of 6720 pound-mass (lbm) of TSP-C, which is the basis for the maximum depth of 36.8 inches stated in SR 3.6.7.1 above, and (2) a minimum of 4500 lbm of TSP-C, which is the basis of the minimum depth of 30 inches stated in SR 3.6.7.1 above, that will ensure a minimum equilibrium pH of 7.1. The minimum equilibrium containment sump pH of 7.1 was approved for Callaway by the NRC in Amendment No. 96, issued March 30, 1995. The amendment approved the pH based on the thyroid dose consequences calculated for the exclusion area boundary, low-population zone, and control room for the plant in the postulated design-basis LOCA, as presented in Table 1 of the NRC staff safety evaluation (SE) for the amendment. These radiological dose consequences meet the limits of 10 CFR Part 100 and GDC 19, and they are not being changed in this amendment.

The proposed new SRs 3.6.7.1 and 3.6.7.2 for the RFPC System are the following:

SR 3.6.7.1: Verify the integrity of the RFPC System.

SR 3.6.7.2: Verify the RFPC System ensures an equilibrium sump pH  $\geq$  7.1.

The STI for the new SRs 3.6.7.1 and 3.6.7.2 is not being changed by this amendment. The STI remains at 18 months.

In its application and the supplemental letter dated December 19, 2006, the licensee stated that the proposed changes are to:

1. Delete the requirement that the TSP-C baskets are located "within the confines of each containment recirculation sump,"
2. Replace the verification that "each basket shows no evidence of structural distress or abnormal corrosion" by a verification of the integrity of the RFPC System,
3. Delete the buffering agent (i.e., the TSP-C) that is in each basket, and
4. Replace the amount of TSP-C to be in the baskets with a required minimum pH for the equilibrium containment sump water that would result from the amount of TSP-C in the baskets. It should be noted that the proposed minimum pH is that which is currently stated in the TS 3.6.7 Bases for SR 3.6.7.1 for the amount of TSP-C currently stated in SR 3.6.7.1 and in Amendment No. 96, and the required amounts of TSP-C are currently stated in the TS 3.6.7 Bases.

These changes are addressed below in the order that they are listed above. The inclusion of details in the TS Bases, the current licensing basis for the RFPC system, and whether the new SRs 3.6.7.1 and 3.6.7.2 are sufficient to demonstrate LCO 3.6.7 is being met are also addressed at the end of this section.

### Delete Requirement That TSP-C Baskets Are Located in Containment Recirculation Sumps

The current SR 3.7.6.1 states that the TSP-C baskets are located in the containment recirculation sumps. The licensee has explained that, with the installation of the new strainers in the containment recirculation sump, there will not be enough space remaining for the baskets. Therefore, the existing storage baskets for TSP-C must be removed and relocated to the containment floor to avoid physical interference with the new strainers. The baskets themselves are not being changed and they will be in the vicinity of the sumps and within the post-accident recirculating water-flow path. Although they will be about 1 inch higher in elevation relative to their current height, they will be about 10 inches below the minimum post-accident recirculating water elevation. In the identified changes to the TS 3.6.7 Bases, the licensee states that the new baskets will be "located within the recirculation paths of each containment recirculation sump." As explained by the licensee, the phrase means that the baskets will be at a location in containment that will ensure the dissolution of the TSP-C by the water in the containment recirculation sump during accidents.

In its supplemental letter dated December 19, 2006, the licensee stated that the baskets will only be moved several feet from their current location in the sump to avoid physical interference with the new strainers to be installed in the sumps. In evaluating the new position of the baskets, the licensee stated that, as in the current location, the TSP-C in the new location will start dissolving prior to containment spray recirculation, and there will be no significant impact on the timing for TSP-C dissolution and, therefore, in the rise in pH of the containment recirculation water.

The purpose of the location of the TSP-C baskets is to have the TSP-C in a place where the containment sump water can mix with and dissolve the chemicals to control the pH of the water. The containment recirculation water is used for containment spray in LOCAs, and the water pH affects the retention of the radioiodines in water. As stated in the background of the current TS 3.6.7 Bases, the TSP-C baskets contain sufficient TSP-C to ensure a minimum equilibrium sump pH of 7.1 and the following:

To enhance the iodine adsorption capacity of the recirculated spray and to maximize retention of volatile [radio]iodine species in the sumps, the sump solution is adjusted to a minimum equilibrium sump pH of 7.1. A pH greater than 7.0 minimizes the evolution of volatile [radio]iodine species from the sump solution as well as the occurrence of chloride and caustic stress corrosion on mechanical systems and components.

As stated above, the minimum equilibrium sump pH of 7.1 was approved for Callaway by the NRC in Amendment No. 96.

Although the new SRs 3.6.7.1 and 3.6.7.2 do not have any statement about the location of the TSP-C baskets, the new SR 3.6.7.2 requires verification that the "the RFPC System ensures an equilibrium sump pH  $\geq$  7.1." The NRC staff concludes that, because a pH of not less than 7.1 in the containment sump water during recirculation in an accident ensures appropriate adsorption capacity and retention of the volatile radioiodine in the water (See Amendment No. 96), the requirement to ensure this sump water pH level provides adequate assurance that the RFPC system will perform its safety function and reduce the radioiodine fission product

inventory in the containment atmosphere and available to be released to the environment in accidents. Moreover, as stated in the proposed changes to the TS 3.6.7 Bases, the licensee will locate the TSP-C baskets “within the recirculation path of each containment sump.” This will ensure the TSP-C will dissolve in the containment recirculation sump water such that a minimum pH is 7.1 is reached in an accident. Accordingly, the NRC staff concludes that it is not necessary to state in the SRs for LCO 3.6.7 that the TSP-C baskets must be located in the containment sump and, based on this acceptance, the NRC staff also concludes that the proposed change meets 10 CFR 50.36.

#### Integrity of RFPC Baskets

Instead of the requirement in the current SR 3.6.7.1 to verify that each basket shows no evidence of structural distress or abnormal corrosion, the new SR 3.6.7.1 requires the verification of the integrity of the RFPC system. The NRC staff concludes that the requirement to verify the integrity of the RFPC system, which includes the TSP-C baskets, provides appropriate assurance that the RFPC system will remain in a condition capable of performing its safety function. Because integrity is defined as sound or unimpaired condition of the baskets such that they capable of performing of performing their safety function, the NRC staff considers that verification of basket integrity will necessarily encompass an examination of the baskets to see that there is no evidence of structural distress or abnormal corrosion. Evidence of structural distress or abnormal corrosion of the baskets could be an indication that the baskets may not be able to perform their safety function. Moreover, as stated in the changes to the TS 3.6.7 Bases, the Bases will continue to state that the surveillance will verify that the baskets show “no evidence of structural distress or abnormal corrosion.” Accordingly, the NRC staff concludes that the proposed change meets 10 CFR 50.36.

#### Delete TSP-C From SR 3.6.7.1

The licensee proposed to remove the reference to the chemical TSP-C in the RFPC baskets from SR 3.6.7.1. This chemical is already identified in the TS 3.6.7 Bases as the chemical in the RFPC baskets that is used to raise the pH of the containment recirculation sump water during the LOCA. This proposed change to remove the word TSP-C from the TSs would, however, allow the licensee to change the chemical in the baskets without NRC review and approval if the minimum pH required for the containment recirculation sump water during accidents is maintained.

In reviewing the proposed relocation of the word “TSP-C,” the NRC staff expressed its concern that until this chemical, or a possible future chemical of choice, is evaluated with respect to the effect of the chemical on the on the sump strainer head loss, it is premature to remove the chemical from the TSs. This evaluation of the chemical to raise the sump pH is a commitment made by the licensee in its response to GL 2004-02 and is discussed below in Section 4.4 of this SE on the “Current Licensing Basis for the RFPC System.” The NRC staff stated to the licensee that it did not want to consider any change to the reference to the current chemical in the baskets until after the evaluation for GL 2004-02 was completed and reviewed by the NRC staff. In response to the NRC staff’s statement, the licensee proposed, in its supplemental letter dated December 19, 2006, to add a license condition to Appendix C of the operating license to require that TSP-C “will be used for pH control as described in TS Bases 3.6.7” and that “NRC approval is required prior to using a different chemical for pH control.” The NRC

staff concludes that this requirement is the same as having the word "TSP-C" in the new SR 3.6.7.1 on pH control. Therefore, adding the proposed license condition to Appendix C maintains the requirement in the current SR 3.6.7.1 that NRC must approve whatever chemical is used at Callaway for pH control in the containment sump recirculation water.

As stated in 10 CFR 50.36(c)(3), SRs are "requirements relating to tests, calibration, or inspection to assure that the necessary quality of the systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met." Because the licensee has proposed to relocate the reference to TSP-C in the RFPC baskets from SR 3.6.7.1 of the TSs in Appendix A of the license to Appendix C of the license, the NRC staff concludes that the requirement to have TSP-C in the RFPC baskets is not being removed from the license and, therefore, the proposed change is acceptable.

#### Delete the Amount of TSP-C in Baskets

On the amount of TSP-C needed in the baskets to have the required pH in the recirculation water, the current SR 3.6.7.1 requires that "each basket contains between 30" and 36.8" (uniform depth) of granular TSP-C." This is stated in the TS 3.6.7 Bases as the amount needed to have the containment sump recirculation water in accidents at a minimum pH of 7.1. The proposed new SR 3.6.7.2 requires the verification that the RFPC System (i.e., the TSP-C baskets) ensures an equilibrium sump water pH  $\geq 7.1$ . This revision to the TSs would allow the licensee to change the amount of chemical in the baskets without NRC review and approval in accordance with the TS Bases control program in TS 5.5.14, as long as the minimum pH of 7.1 is maintained for the containment recirculation sump water during accidents. The requirement that the licensee must meet is the minimum pH of the water and not the amount of the chemical needed to have this minimum pH.

The NRC staff also finds that the requirement that there be sufficient TSP-C in the baskets to maintain a minimum pH of 7.1 is encompassed by the amendment. The statement as to the correct range of the amounts of TSP-C needed in the baskets for this pH will be stated in the revised TS 3.6.7 Bases, and the range of amounts of TSP-C in each basket are consistent with Amendment No. 96.

Based on the above discussion on the new SR 3.6.7.2, the NRC staff concludes that the surveillance will encompass the maintenance of sufficient TSP-C in the RFPC baskets to ensure a minimum pH of 7.1 for the containment recirculation sump water and, therefore, the proposed new SR 3.6.7.2 without specifying the amount of TSP-C needed is acceptable.

#### Details in the TS Bases

As required in 10 CFR 50.36(a), the TS bases provide summary statements on the bases or reasons for the TSs. As such, the TS Bases explain the background, the applicable safety analyses, the LCO, the LCO applicability, the LCO actions, and the SRs for each TS in the TSs. The statements in the TS Bases include a description of the safety-related structure, system or component (SSC), how the SSC is involved in any safety analysis, and how the SSC meets the LCO, LCO actions, and SRs. Therefore, the TS Bases must be accurate and consistent with the Final Safety Analysis Report for the plant.

Therefore, relocating details in the current SR 3.6.7.1 to the TS 3.6.7 Bases is acceptable so long as the details being relocated from the TSs are not needed in the SRs to demonstrate that LCO 3.6.7 is met. However, in the proposed changes by the licensee to remove details from the current SR 3.6.7.1, it appears that all the details being removed are already stated in the TS 3.6.7 Bases. Therefore, the details in SR 3.6.7.1 are being deleted from the TSs and the acceptability of these proposed changes are addressed above.

#### Current Licensing Basis for the RFPC System

In its supplemental letter dated December 19, 2006, the licensee stated that the existing licensing basis for the RFPC System with the relocated baskets will continue to be met in the same manner and to the same extent as with the current baskets in the containment recirculation sump. The current licensing basis for the RFPC system is Amendment No. 96, which is addressed in this section on the relocation of the TSP-C baskets outside the containment sump.

Based on its evaluation, given above, of the relocation of the TSP-C baskets outside the sumps, the NRC staff agrees with the licensee's statement and concludes that compliance with the new SRs 3.6.7.1 and 3.6.7.2 would ensure that the RFPC System continues to meet GDCs 41, 42, and 43. The relocation of the baskets outside the sumps does not change the licensee's compliance with these GDCs with respect to controlling fission product concentrations in the containment atmosphere and the inspection and testing of the RFPC system.

In its letter dated May 30, 2006, in response to GL 2004-02, the licensee updated the schedule for its commitments to the GL, including the commitment to evaluate the impact of chemical effects on the sump strainer head loss. The licensee has committed to complete its evaluation within 90 days after its spring 2007 refueling outage, when the licensee would install the new strainers and relocate the TSP-C baskets. The licensee's current licensing basis for the RFPC system covers the TSP-C baskets until December 31, 2007, when it has committed to meet the provisions in GL 2004-02. If, because of this GL 2004-02 evaluation, the chemical TSP-C must be replaced in the baskets by a new chemical, the licensee will need to complete this replacement by December 31, 2007, to meet its commitment to the GL. If a new chemical is necessary, the licensee will also need NRC approval pursuant to the new license condition being added to Appendix C of the license.

#### New SRs 3.6.7.1 and 3.6.7.2 Sufficient to Demonstrate LCO 3.6.7 is Being Met

LCO 3.6.7 requires that the RFPC System shall be operable for Modes 1, 2, 3, and 4. The licensee has proposed that only the new SRs 3.6.7.1 and 3.6.7.2 are needed to demonstrate that LCO 3.6.7 is being met. Based on the above discussion on the new SRs 3.6.7.1 and 3.6.7.2, which shows that these new surveillances maintain the same assurance that the RFPC system will perform its safety function as provided by the current SR 3.6.7.1, the NRC staff concludes that no additional SRs are needed in the TSs to demonstrate that LCO 3.6.7 is being met.

## Conclusions

In the evaluation above for this section of the SE, the NRC staff has addressed the licensee's proposed changes to the current SR 3.6.7.1. For the reasons given above, the NRC staff further concludes that the proposed changes to SR 3.6.7.1 on the RFPC System comply with 10 CFR 50.36 and the design criteria in GDCs 41, 42, and 43.

### 4.4 Conclusions

Based on the evaluations in Sections 4.1 through 4.3 of this SE, the NRC staff further concludes that the proposed amendment meets the regulations identified in Section 2.0 of this SE, and is, therefore, acceptable.

### 4.5 Changes to the TS Bases

In Enclosure 1 to its letter dated November 22, 2006, the licensee identified changes to the TS 3.6.7 Bases for the proposed amendment. These TS Bases superceded the TS Bases shown in Attachment 4 to the application, in that the November 22, 2006, letter included design information that was not available at the time of the application. The NRC staff has reviewed the identified changes to the TS Bases and has no disagreement with the changes. The changes do not affect any of the analyses or conclusions described in Amendment No. 96, which is discussed in Section 4.3 of this SE. Changes to the TS Bases are controlled by TS 5.5.14.

### 4.6 Regulatory Commitments

In its supplemental letter dated December 19, 2006, the licensee stated the following regulatory commitment in Enclosure 2 to its letter:

- Trisodium phosphate crystalline (TSP-C) will be used for pH control as described in TS Bases 3.6.7. NRC approval is required prior to using a different chemical for pH control.

This commitment is consistent with the proposed license condition for Appendix C of the license. Therefore, this regulatory commitment adds no additional action by the licensee beyond that already required by the proposed license condition.

## 5.0 STATE CONSULTATION

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

## 6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes an SR. 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 46940), which was published in the *Federal Register* on August 15, 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.

## 7.0 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.

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