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OPPD
Omaha Public Power District

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May 21, 2004
LIC-04-0050

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

References:

1. Docket No. 50-285
2. NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," dated June 9, 2003 (NRC-03-114)
3. Letter from OPPD (Richard P. Clemens) to NRC (Document Control Desk), Fort Calhoun Station Unit No. 1, 60 Day Response to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors" dated August 8, 2003 (LIC-03-0105)

SUBJECT: **Fort Calhoun Station Unit No. 1 License Amendment Request, "Incorporation of Allowance to Secure Containment Spray Pumps During a Loss-of-Coolant-Accident to Minimize the Potential for Containment Sump Clogging"**

Pursuant to 10 CFR 50.90, Omaha Public Power District (OPPD) hereby transmits an application for amendment to the Fort Calhoun Station Unit 1 (FCS) Operating License. Attachment 1 provides the No Significant Hazards Evaluation and the technical bases for this requested change to the Technical Specifications (TS). Attachments 2 and 3 contain the marked-up and clean-typed Technical Specification page reflecting the requested Technical Specification Basis changes.

The proposed amendment adds information to the TS Basis allowing containment spray pumps to be secured during a Loss-of-Coolant-Accident to minimize the potential for containment sump clogging when certain conditions are met. Reference 2 required that operators of Pressurized Water Reactor (PWR) plants state that the Emergency Core Cooling (ECCS) and Containment Spray (CS) Recirculation functions meet applicable regulatory requirements with respect to adverse post-accident debris blockage or describe interim compensatory measures to reduce risk associated with the potentially degraded or non-conforming ECCS and CS Recirculation functions. In Reference 3, OPPD committed to evaluating and implementing interim compensatory measures for the FCS. The compensatory measures are intended to compensate for the increased risk associated with sump clogging. Item 2b of Reference 3 committed that OPPD perform the following action by May 21, 2004:

A001

> "OPPD will evaluate operating with one Containment Spray Pump (stopping one or two pumps) prior to the receipt of the recirculation actuation signal if operator resources are available or shortly after [Recirculation Actuation Signal] RAS. The licensing amendment will be completed or the basis for the decision not to implement the change will be documented."

This license amendment request constitutes OPPD's submittal with respect to Item 2b of Reference 3.

OPPD requests that this amendment be in effect only for the remainder of Cycle 22 and all of Cycles 23 and 24.

OPPD requests approval of the proposed amendment by January 31, 2005. OPPD requests 120 days to implement this amendment. No commitments are made to the NRC in this letter.

I declare under penalty of perjury that the forgoing is true and correct. (Executed on May 21, 2004.)

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

Sincerely,

5-21-04

Ralph L. Phelps
Division Manager
Nuclear Engineering

RLP/TRB/trb

Attachments
1. Fort Calhoun Station's Evaluation for Amendment of Operating License
2. Mark-up of Technical Specifications Page
3. Clean-Typed Technical Specification Page

c: B. S. Mallett, NRC Regional Administrator, Region IV
A. B. Wang, NRC Project Manager
J. G. Kramer, NRC Senior Resident Inspector
Division Administrator, Public Health Assurance, State of Nebraska

Attachment 1

Fort Calhoun Station's Evaluation
For
Incorporation of Allowance to Secure Containment Spray Pumps During a Loss-of-Coolant-Accident to Minimize the Potential for Containment Sump Clogging

1.0 INTRODUCTION

This letter is a request to amend Operating License DPR-40 for the Fort Calhoun Station (FCS) Unit No. 1.

Omaha Public Power District (OPPD) proposes to add information to the Technical Specification (TS) Basis allowing containment spray pumps to be secured during a Loss-of-Coolant-Accident to minimize the potential for containment sump clogging when certain conditions are met. Reference 10.1 required that operators of Pressurized Water Reactor (PWR) plants state that the Emergency Core Cooling (ECCS) and Containment Spray (CS) Recirculation functions meet applicable regulatory requirements with respect to adverse post-accident debris blockage or describe interim compensatory measures to reduce risk associated with the potentially degraded or non-conforming ECCS and CS Recirculation functions. In Reference 10.2, OPPD committed to evaluating and implementing interim compensatory measures for the FCS. The compensatory measures are intended to compensate for the increased risk associated with sump clogging. Item 2b of Reference 10.2 committed that OPPD perform the following action by May 21, 2004:

> "OPPD will evaluate operating with one Containment Spray Pump (stopping one or two pumps) prior to the receipt of the recirculation actuation signal if operator resources are available or shortly after [Recirculation Actuation Signal] RAS. The licensing amendment will be completed or the basis for the decision not to implement the change will be documented."

This license amendment request constitutes OPPD's submittal with respect to Item 2b of Reference 10.2.

OPPD requests that this amendment be in effect only for the remainder of Cycle 22 and all of Cycles 23 and 24.

2.0 DESCRIPTION OF PROPOSED AMENDMENT

The proposed change adds the following to the Basis of TS 2.4:

> "During a LOCA, excess CS pumps may be secured indefinitely such that only one pump and one header of CS remain in service provided the following conditions are met:
>
> 1) At least two CS pumps are operating normally and delivering design flow rate prior to securing the excess CS pump(s);
>
> 2) Containment pressure is < 60 psig and NOT increasing;
>
> 3) Containment temperature is < 288°F and NOT increasing;

4) VA-3A, VA-3B, VA-7C, and VA-7D and associated cooling units are operating; AND

5) SI has actuated and is delivering flow within the flow delivery curves in Emergency Operating Procedure (EOP)/Abnormal Operating Procedure (AOP) Attachment 3

The above containment pressure and temperature conditions indicate an excess of CS flow than what is required to maintain containment pressure and temperature control. A single CS pump is capable of meeting the design basis function for accident mitigation. Verifying that at least two CS pumps are operating, and that both trains of Containment Fan Coolers (CFCs) are in operation, indicates that maximum containment cooling has been provided following occurrence of the LOCA. Verifying that SI flow has been maintained within the delivery curves ensures that significant core damage has not occurred and that a significant source term does not exist inside the containment. This allowance applies only to the remainder of Cycle 22 and all of Cycles 23 and 24."

3.0 BACKGROUND

This amendment request proposes to add information to the Technical Specification (TS) Basis allowing containment spray pumps to be secured during a Loss-of-Coolant-Accident to minimize the potential for containment sump clogging when certain conditions are met. Reference 10.1 required that operators of Pressurized Water Reactor (PWR) plants state that the Emergency Core Cooling (ECCS) and Containment Spray (CS) Recirculation functions meet applicable regulatory requirements with respect to adverse post-accident debris blockage or describe interim compensatory measures to reduce risk associated with the potentially degraded or non-conforming ECCS and CS Recirculation functions. In Reference 10.2, OPPD committed to evaluating and implementing interim compensatory measures for the FCS. The compensatory measures are intended to compensate for the increased risk associated with sump clogging. Item 2b of Reference 10.2 committed that OPPD perform the following action by May 21, 2004:

"OPPD will evaluate operating with one Containment Spray Pump (stopping one or two pumps) prior to the receipt of the recirculation actuation signal if operator resources are available or shortly after RAS. The licensing amendment will be completed or the basis for the decision not to implement the change will be documented."

This license amendment request constitutes OPPD's submittal with respect to Item 2b of Reference 10.2.

4.0 REGULATORY REQUIREMENTS AND GUIDANCE

FCS was licensed for construction prior to May 21, 1971, and at that time committed to the preliminary General Design Criteria (GDC). These preliminary design criteria are contained in the FCS USAR Appendix G (Reference 10.3).

This activity complies with FCS Design Criterion 52, Containment Heat Removal Systems," which is similar to 10 CFR 50 Appendix A GDC 38, "Containment Heat Removal." FCS Design Criterion 52 states 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.

This FCS Design Criterion will continue to be satisfied after the change to add information to the Technical Specification (TS) Basis allowing containment spray pumps to be secured during a Loss-of-Coolant-Accident to minimize the potential for containment sump clogging when certain conditions are met.

5.0 TECHNICAL ANALYSIS

Evaluation

The proposed amendment permits securing of CS pumps so that one pump and one header of CS is in service if both trains of CS are not needed for containment pressure and temperature control.

This action would only be performed if:

1) At least two CS pumps are operating normally and delivering design flow rate;
2) Containment pressure is < 60 psig and NOT increasing;
3) Containment temperature is < 288°F and NOT increasing;
4) Both trains of CFCs are operating; and
5) SI has actuated and is delivering flow within the flow delivery curves in EOP/AOP Attachment 3.

The above containment pressure and temperature conditions indicate an excess of CS flow than what is required to maintain containment pressure and temperature control. A single CS pump is capable of meeting the design basis function for accident mitigation. Verifying that at least two CS pumps are operating, and that both trains of CFCs are in operation, indicates that maximum containment cooling has been provided following occurrence of the Loss-of-Coolant-Accident (LOCA). Verifying that SI flow has been maintained within the delivery curves ensures that significant core damage has not occurred and that a significant source term does not exist inside the containment.

Operator actions to stop Containment Spray pumps will be directed by EOP's and prioritized with other critical operator actions in response to the event. The actions are expected to be completed prior to RAS or as soon thereafter as practicable.

This change requires regulatory approval because manual operator action will be required to stop two of the three pumps that started in response to a Containment Spray Actuation Signal (CSAS). If a single active failure occurs that results in failure of the operating pump, a manual action will be required to restart one of the two pumps that were previously shut off. Therefore, this change is requesting regulatory approval for substituting manual actions for automatic actions.

Risk Discussion

The intent of the compensatory actions evaluated in response to NRC Bulletin 2003-01 is to provide strategies for:

1) Reducing the potential for sump blockage;

2) Increasing the plant/operator capabilities to diagnose sump blockage;

3) Preventing the loss of injection capability in the event of sump blockage;

4) Pre-planning for continued injection capabilities in the event of sump blockage such that the strategies can be implemented in a timely manner to preclude core damage; and

5) Delay the time to RAS.

From a risk perspective, the combination of the above strategies provides reasonable assurance that core cooling can be continued if sump blockage occurs. Taking action to reduce to one train of CS system operation provides significant benefits in the first strategy of reducing the potential for sump blockage. Actions to address strategies two through four above are being implemented in accordance with other commitments made in Reference 10.2.

The following benefits are associated with a pre-emptive compensatory action of early termination of CS pumps:

- Delay time to RAS actuation

  The depletion rate of the Safety Injection and Refueling Water Tank (SIRWT) is a direct function of the flow rate through the High Pressure Coolant Injection (HPSI), Low Pressure Coolant Injection (LPSI) and CS Pumps. The CS pump flow rate is a significant contribution to the total flowrate from the SIRWT pre-RAS.

- Reduce debris transport

  The amount of debris collected on the sump screens is a function of screen size, flow through the screens, and overall inflow of debris into the containment sump area. A greater volumetric flow will result in a higher rate of debris deposition on

the sump screen and is more likely to sweep debris into the sump screens due to higher velocity in the sump pool, thereby increasing the risk of sump blockage. A reduction in flow rate, by termination of unneeded CS pumps, will reduce the rate of sump screen debris buildup and reduce the probability of strainer blockage.

The CS pump flow rate is a significant contribution to the total flowrate through the sump screens. This significant reduction in flow across the screen is expected to reduce the time in the recirculation mode prior to impact due to debris buildup.

- Preserve an operable CS pump

  Early termination of unneeded CS pumps will ensure that the pumps are not damaged due to debris ingestion or loss of NPSH post-RAS, and are available for future mitigation strategies should the strainer blockage occur on the operating CS train.

The risk associated with implementing this compensatory action is the loss of CS flow in the event of the failure of the operating CS pump after operator action is taken to reduce to one CS pump. If the operating CS pump is lost, the result is a total loss of CS flow until operators recognize the condition and take action to restore one CS pump that was previously stopped. This loss of CS flow may have adverse effects on containment pressure and removal of radioactive particles from the containment atmosphere.

The following sections evaluate:

- Impact of the proposed action on operator response times;
- Single failure criteria;
- Effects of a temporary loss of CS on the LOCA containment pressure; and
- Effects of a temporary loss of CS flow on LOCA radiological consequences.

Impact on Operator Response Times

The action for reducing to one CS train operation is assumed to occur prior to RAS, but after safety function status checks and initial Emergency Operating Procedure (EOP) actions have been taken. Based on the time for the operator to complete the above described EOP actions, it is assumed that the compensatory action to reduce to one CS train will not occur prior to T=10 minutes.

Reference 10.4 evaluated operator action times for various proposed compensatory actions based on the following standards:

ANSI/ANS-58.8-1994, "Time Response Design Criteria for Safety-Related Operator Actions"

WCAP-14996, "ERG Operator Response Time Assessment Program Final Report"

Although the ANSI/ANS-58.8-1994 methods are not directly applicable to the evaluation of potential EOP changes, the criteria are conservative and are used in the Westinghouse evaluation.

Reducing to One CS Train Operation

Current EOP's include instructions for termination of CS. Operators are trained on the method of securing the CS pumps and the requirements for CS termination. This compensatory action changes the EOP's to perform these actions at an earlier time.

The manual operator actions required for early termination of CS pumps so that one CS train is in operation are as follows:

1. Verify the required conditions for early CS pump termination:
   a. Determine that at least two CS pumps are running;
   b. Determine that containment pressure is < 60 psig and NOT increasing;
   c. Determine that containment temperature is < 288°F and NOT increasing;
   d. Determine that both trains of CFCs are in operation; and
   e. Verify that SI flow has been maintained within the flow delivery curves in EOP/AOP Attachment 3
2. Determine which CS pumps will be secured
3. Take selected CS pumps to pull-to-lock
4. Verify that containment pressure is NOT increasing

The operator action time assumed for early termination of CS pumps in Reference 10.4 is less than 5 minutes. The report assumes based on the ANSI/ANS-58.8-1994 standard that each discreet operator manipulation takes one minute, and that verifying the termination criteria is simple in nature and is one discreet action.

Applying the criteria to FCS estimates an operator action time of four minutes based on one minute to verify the conditions for securing CS pumps, one minute to take each of the two CS pumps to pull-to-lock, and one minute to verify that containment pressure is not increasing following the reduction to one train of CS operation.

The proposed changes to the EOPs do not direct this action until other, more time restrictive actions such as post trip actions, safety function status checks, or tripping of reactor coolant pumps are performed. However, it is intended that these actions be taken as soon as possible, and prior to RAS, to provide some benefit in delaying time to RAS during smaller break LOCA scenarios. These proposed actions will not adversely affect the function of transition to the recirculation mode because no operator actions are necessary to accomplish the transition.

Restoration of CS flow following recognition of changed plant conditions or incorrect reduction/termination of CS flow

If additional CS flow is required, or CS flow is lost, after taking the compensatory measure to reduce to one CS train, operators would be required to manually restore the CS function.
The manual actions required for restoration of CS flow are as follows:

1. Operator recognition of the loss of CS flow
   a. "CNTMT SPRAY PUMP SI-3(x) TRIP" alarm on panel AI-30A/B
   b. Recognition of CS flow less than 2300 gpm
   c. Containment pressure rising
2. Take selected CS pump out of pull-to-lock
3. Verify proper CS flow

If the remaining CS pump trips following reduction to one CS train, an annunciator on Panel AI-30A/B in the Control Room will provide immediate notification of the malfunction to the operators.

In addition, operators continuously monitor that the actions they are taking satisfy the Safety Function Acceptance Criteria contained in the EOP's. Safety Function Status Check (SFSC) data is logged by the Shift Technical Advisor (STA) at approximate 10 minute intervals until plant conditions are stabilized. The SFSC data monitors for containment parameters of CS flow rate of >2300 gpm or containment pressure of $\leq$5 psig.

Based on the Annunciator received upon a CS pump trip, and the performance of SFSC's at the approximate 10 minute intervals, it is reasonable to assume a period of 10 minutes to recognize a loss of CS flow, and take the necessary actions to restore flow.

Single Failure Considerations

The design of FCS is based on the concept that no single failure of active components will inhibit necessary safety action when required. The CS system, as an Engineered Safety Feature, is designed to perform its safety functions assuming a failure of a single active component. The failure of one CS pump will not limit the performance of the system. The worst-case single failure assumed is the loss of one train of CS due to loss of off-site power and failure of one diesel generator.

The accident analysis (Reference 10.5) (for both LOCA radiological consequences and containment pressure) assumes a single failure occurring at the beginning of the accident that leaves only one CS pump/header operable. If there is no initial single failure and all CS pumps are operating following the LOCA, it is possible to go to one CS pump/header operation and remain within the FCS licensing basis unless there is a single delayed failure that stops the operating pump.

Deliberate manual securing of two CS pumps to reduce to one train of CS is not considered a failure. Therefore, the effect of a misoperation resulting in the loss of all CS, and the effect of a loss of the remaining CS pump following the operator action must be considered. Failure of the operating pump results in a loss of containment spray until operators recognize the failure, and take actions to restore the system. Based on the above analysis of operator response times, the period of time that CS flow is lost will not exceed ten (10) minutes.

Effects on the containment pressure analysis

Containment Design

The containment building and associated penetrations are designed to withstand an internal pressure of 60 psig at 305°F, including all thermal loads resulting from the temperature associated with this pressure, with a leakage rate of 0.1 percent by weight or less of the contained volume per 24 hours. The penetrations have been environmentally qualified to be able to withstand 60 psig and design basis accident temperatures in excess of 300°F for a period of two hours.

To maintain containment pressure and temperatures within design limitations, and assure that the release of fission products to the environment following a design basis accident will not exceed regulatory guidelines, the following Engineered Safety Systems are incorporated into the FCS design:

a. Containment Spray System with redundant features to remove heat from the containment and to provide for reduction of airborne particulate radioactivity following a LOCA; and

b. CFCs with redundant features to remove heat from the containment atmosphere.

The CS System consists of three pumps, two shutdown cooling (SDC) heat exchangers, and necessary pipes, valves, instrumentation, and controls necessary to spray water into the containment following a LOCA. The pumps discharge borated water through the SDC heat exchangers to a dual set of spray headers and spray nozzles inside containment. Two of the CS pumps are powered from the respective safeguards buses, and one (SI-3C) is manually transferable between either safeguards bus. FCS Technical Specification 2.4(1) requires all three Containment Spray pumps to be operable to support reactor operation. The CS pumps take suction from the SIRWT during the LOCA injection phase. The RAS signal shifts the suction source to the containment sump, and initiates component cooling water (CCW) flow to the SDC heat exchangers to provide for removal of heat from the containment.

Three CS pumps start on a simultaneous containment pressure high signal and a pressurizer pressure low signal. The FCS licensing basis credits only one of the three pumps to limit the containment pressure to below the design value without taking credit for CFCs.

The CFCs operate independently of the CS system to remove heat from the containment atmosphere. The CFCs consist of two redundant trains; each train with one air cooling

and filtering unit and one air cooling unit, for a total of four cooling units. If all normal power sources are lost and one diesel generator fails to function, one train of CFCs will operate. The CFCs are not credited for heat removal or filtration in the LOCA analysis; however operation of the CFCs with a heat removal capacity of $200x10^6$BTU/hr is credited in the MSLB containment pressure analysis.

LOCA Containment Pressure Analysis

The limiting LOCA containment pressure analysis assumes operation of one CS pump and one CS header, with one spray nozzle missing and five spray nozzles per header blocked. An assumed CS flow rate of 1885 gpm takes into account pump degradation, instrument uncertainties and flow through the mini-recirculation lines. To provide for added conservatism, the CFCs are not credited for pressure and temperature control for the LOCA containment pressure analyses. Reference 10.5 shows the following results:

- Peak containment pressure is 57.81psig occurring at 290 seconds,
- Peak containment temperature is 280.9°F occurring at 282 seconds.

The compensatory action to reduce to one CS train operation occurs at approximately T=10 minutes, which is after the peak containment pressure and temperature transients occur. The action will have no adverse effect on the peak containment pressure and temperature response following a LOCA.

The compensatory action to reduce to one CS train operation will only occur if all CFCs have started and are in operation and if at least two CS pumps are operating. These conditions indicate that the worst-case single failure has not occurred. The result is that maximum containment cooling has been provided between the start of the LOCA and the time when the compensatory action is implemented.

Although the condition of all CS pumps and all CFCs running at the start of the LOCA has not been specifically analyzed using the GOTHIC Model (Reference 10.6), it is reasonable to conclude that the peak pressure and temperature transients will be significantly less than the limiting LOCA case based on the following design information:

- The CS system is designed for a minimum heat removal capacity of 280 x 10^6 BTU/hr at containment atmosphere conditions of 60 psig and 288°F assuming a SIRWT initial temperature of 120°F. Operation of one CS pump and header (1885 gpm flow rate) provides the required cooling capacity.
- The CFCs were designed to remove heat from moisture-saturated air at 60 psig and 288°F. The CFCs are credited in the MSLB containment pressure analysis with a total heat removal rate of 200 x 10^6 BTU/ hour.

If at least two CS pumps with two headers and both trains of CFCs operate at the onset of the LOCA, the total heat removal capacity of these systems far exceeds the heat removal capacity of one pump and header CS system operation. Therefore, the resulting

containment peak pressure and temperature transient will be lower than the case of minimum safeguards operation.

Verifying that containment pressure is <60 psig and temperature is <288°F prior to taking this compensatory action ensures that the containment Engineered Safeguards have performed the intended safety functions of removing heat from the containment and limiting the pressure and temperature transients. In the event that only one CS pump is operating, and fails, initial containment pressure would be sufficiently low to allow for operator action to restore CS flow prior to approaching design pressure and temperature limits.

Reference 10.4, Candidate Operator Action A1a-CE, analyzed the effect of a loss of all CS for the reference CE plant following a LOCA, after the peak pressure and temperature transients, with various combination of CFCs. The analysis shows that the time available to restart CS is infinite because CFCs will maintain containment pressure and temperature control following a loss of CS after the initial blowdown period.

It is acceptable to apply the results of the reference CE plant results to the FCS because:

- The basic design and operation of the reference CE plant containment heat removal systems are similar to the FCS;
- The heat removal capacity of the FCS CFCs exceed the capacity of the CS system operating in a one pump/one header configuration;
- The reference plant analysis shows that CS flow does not have to be reinitiated to assure containment pressure and temperature control. FCS EOP's will require CS flow be restored in an assumed worst-case time period of ten minutes following the loss of CS. There is reasonable assurance that the capacity of the CFCs is sufficient to prevent exceeding containment design parameters during the assumed ten-minute period; and
- The compensatory action would not be taken unless both trains of CFCs are in service.

Effect on the LOCA Radiological Consequences Analysis

The FCS LOCA analysis demonstrates that, in the event of a postulated large break LOCA, core cooling is maintained and that severe damage of the reactor core will not occur. The analysis, summarized in the USAR Section 14.15 (Reference 10.5), demonstrates that the limits of 10 CFR 50.46 are met assuming a worst-case single failure that limits core cooling. The FCS analysis assumes that one train of SI delivers the required flow to limit the consequences of a LOCA to within 10 CFR 50.46 limits.

The LOCA radiological consequences analysis assumes, based on Regulatory Guide 1.183, that a certain level of core damage has occurred during the LOCA, and that fission products are released into the containment atmosphere in two stages over a period of 1.8 hours:

- Gap Release Phase which starts immediately following the LOCA and has a duration of 0.5 hours; and
- Core Melt Phase which starts at T=0.5 hours and continues for a duration of 1.3 hours.

Particulate fission products that are released into the containment are removed by the CS system. The water spray strips radioactive particles from the atmosphere where they fall to the floor and are washed into the containment sump. The radiological consequences analysis credits CS system operation for removal of particulates from the containment atmosphere during a LOCA. The proposed action occurs following the peak containment pressure transient, therefore, the action has no impact on the peak containment pressure analysis. A quantitative analysis of the change in LOCA consequences due to suspension of CS flow for 10 minutes has not been performed.

Credit for aerosol and elemental iodine removal via sprays is taken starting at T=185 seconds and continued to approximately T=5 hours. Assumed CS flow rates are 1885 gpm prior to RAS, and 2800 gpm post-RAS for the remainder of the five-hour period. The analysis does not credit the containment charcoal filters for removal of iodine in the containment atmosphere.

The LOCA analysis source term is based on operation of minimum safeguards due to a worst-case single failure, and a presumption of core damage. The action to reduce to one CS pump and header operation is only performed if required safeguards are operating. The operators are required to verify that required SI pumps are operating and that flow greater than the requirement of EOP/AOP Attachment 3 has been delivered. If these conditions exist it can be assumed that even greater core protection has been provided than that assumed in the LOCA analysis.

This greater degree of core protection would include:

- Required SI flow because all HPSI and LPSI Pumps are operating; and
- Core flow was maintained because all RCP's operate until manually tripped in accordance with the trip 2/leave 2 criteria, which occurs following verification of required SI Flow.

This greater degree of protection provides reasonable assurance that any resultant source term to the containment would be less than that assumed using the Regulatory Guide 1.183 assumptions. Verifying proper safety injection and delivery of SI flow greater than the EOP/AOP Attachment 3 curve confirms that no significant core damage has occurred. If core damage has not occurred, then the CS system is not needed for reduction of source term. Therefore, a loss of CS for ten minutes following the reduction to one pump and header operation, will not significantly affect the LOCA radiological consequences.

6.0 REGULATORY ANALYSIS

This amendment request proposes to add information to the Technical Specification (TS) Basis allowing containment spray pumps to be secured during a Loss-of-Coolant-Accident to minimize the potential for containment sump clogging when certain conditions are met. Reference 10.1 required that operators of Pressurized Water Reactor (PWR) plants state that the Emergency Core Cooling (ECCS) and Containment Spray (CS) Recirculation functions meet applicable regulatory requirements with respect to adverse post-accident debris blockage or describe interim compensatory measures to reduce risk associated with the potentially degraded or non-conforming ECCS and CS Recirculation functions. In Reference 10.2, OPPD committed to evaluating and implementing interim compensatory measures for the FCS. The compensatory measures are intended to compensate for the increased risk associated with sump clogging. Item 2b of Reference 10.2 committed that OPPD perform the following action by May 21, 2004:

> "OPPD will evaluate operating with one Containment Spray Pump (stopping one or two pumps) prior to the receipt of the recirculation actuation signal if operator resources are available or shortly after RAS. The licensing amendment will be completed or the basis for the decision not to implement the change will be documented"

In conclusion, based on the considerations discussed above, (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.

7.0 NO SIGNIFICANT HAZARDS CONSIDERATION

This amendment request proposes to add information to the Technical Specification (TS) Basis allowing containment spray pumps to be secured during a Loss-of-Coolant-Accident to minimize the potential for containment sump clogging when certain conditions are met. NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," dated June 9, 2003 required that operators of Pressurized Water Reactor (PWR) plants state that the Emergency Core Cooling (ECCS) and Containment Spray (CS) Recirculation functions meet applicable regulatory requirements with respect to adverse post-accident debris blockage or describe interim compensatory measures to reduce risk associated with the potentially degraded or non-conforming ECCS and CS Recirculation functions. In the letter from OPPD (Richard P. Clemens) to NRC (Document Control Desk), Fort Calhoun Station Unit No. 1, 60 Day Response to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors" dated August8, 2003 (LIC-03-0105), OPPD committed to evaluating and implementing interim compensatory measures for the FCS. The compensatory measures are intended to compensate for the increased risk

associated with sump clogging. Item 2b of this letter committed that OPPD perform the following action by May 21, 2004:

> "OPPD will evaluate operating with one Containment Spray Pump (stopping one or two pumps) prior to the receipt of the recirculation actuation signal if operator resources are available or shortly after RAS. The licensing amendment will be completed or the basis for the decision not to implement the change will be documented"

OPPD has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

1. **Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?**

   Response: No.

   The proposed changes will not increase the probability or consequence of any accident based on the following:

   The proposed compensatory action is only taken following a LOCA if all safeguards have functioned and if an excess of CS flow exists above that required to control containment pressure, temperature, and remove the accident source term. The proposed action is only taken if the worst-case single failure has not occurred indicating maximum containment cooling and SI flow delivered, and minimum source term due to no severe core damage. The proposed action occurs following the peak containment pressure transient, therefore, the action has no impact on the peak containment pressure analysis. A quantitative analysis of the change in LOCA consequences due to suspension of CS flow for 10 minutes has not been performed. However, the prerequisite conditions for taking this action provide reasonable assurance that the loss of the remaining CS train for ten minutes will not result in a significant increase in the LOCA consequences. Therefore, the proposed changes will not increase the probability or consequence of any accident.

2. **Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?**

   Response: No.

   The proposed revision does not involve physical changes to any equipment required to mitigate the consequences of an accident, nor alter how design basis accident events are postulated. The proposed change alters the method of controlling an Engineered Safety Feature following a design basis event so that manual actions are substituted for automatic actions. Reasonable assurance exists that these manual actions can be taken in a timely manner to allow continued CS system operation to provide containment cooling and source term reduction with no significant increases in the radiological consequences or

approaching of design containment limits. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. **Does the proposed change involve a significant reduction in a margin of safety?**

Response: No.

The proposed change alters the method of controlling an Engineered Safety Feature following a design basis event so that manual actions are substituted for automatic actions. The proposed actions are only taken following a LOCA if all safeguards have functioned and if an excess of CS flow exists above that required to control containment pressure, temperature, and remove the accident source term. The prerequisite conditions for taking this action provide reasonable assurance that the loss of the remaining CS train will not result in a reduction in the margin of safety for radiological consequences or containment design parameters. Therefore, the proposed changes do not involve a significant reduction to the margin of safety.

Based on the above, OPPD concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

8.0 ENVIRONMENTAL CONSIDERATION

The proposed amendment is confined to administrative procedures or requirements. The changes meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) for the following reasons:

1) As demonstrated in Section 7.0, the proposed amendment does not involve a significant hazards consideration.

2) The proposed amendment does not result in a significant change in the types or increase in the amounts of any effluents that may be released offsite. Also, the USAR change does not introduce any new effluents or significantly increase the quantities of existing effluents. As such, the change cannot significantly affect the types or amounts of any effluents that may be released offsite.

3) The proposed amendment does not result in a significant increase in individual or cumulative occupational radiation exposure. The proposed change does not result in any physical plant changes. No new surveillance requirements are anticipated as a result of these changes that would require additional personnel entry into radiation controlled areas. Therefore, the amendment has no significant affect on either individual or cumulative occupational radiation exposure.

Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no

environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

9.0 PRECEDENCE

None

10.0 REFERENCES

10.1 NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," dated June 9, 2003 (NRC-03-114)

10.2 Letter from OPPD (Richard P. Clemens) to NRC (Document Control Desk), Fort Calhoun Station Unit No. 1, 60 Day Response to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors" dated August 8, 2003 (LIC-03-0105)

10.3 FCS USAR Appendix G

10.4 WCAP-16204, "Evaluation of Potential ERG and EPG Changes to Address NRC Bulletin 2003-01 Recommendations (PA-SEE-0085)"

10.5 FCS Updated Safety Analysis Report, Chapter 14

10.6 Letter from NRC (Alan B. Wang) to OPPD (R. T. Ridenoure) dated November 5, 2003, Fort Calhoun Station Unit No. 1 – Issuance of Amendment 222 (TAC No. MB7496) (NRC-03-203)

Attachment 2

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Technical Specification Page

2.0 LIMITING CONDITIONS FOR OPERATION
2.4 Containment Cooling (Continued)

During a LOCA, excess CS pumps may be secured indefinitely such that only one pump and one header of CS remain in service provided the following conditions are met:

1) At least two CS pumps are operating normally and delivering design flow rate prior to securing the excess CS pump(s);
2) Containment pressure is < 60psig and NOT increasing;
3) Containment temperature is <288°F and NOT increasing;
4) VA-3A, VA-3B, VA-7C, and VA-7D and associated cooling units are operating; AND
5) SI has actuated and is delivering flow within the flow delivery curves in Emergency Operating Procedure (EOP)/Abnormal Operating Procedure (AOP) Attachment 3

The above containment pressure and temperature conditions indicate an excess of CS flow than what is required to maintain containment pressure and temperature control. A single CS pump is capable of meeting the design basis function for accident mitigation. Verifying that at least two CS pumps are operating, and that both trains of CFCs are in operation, indicates that maximum containment cooling has been provided following occurrence of the LOCA. Verifying that SI flow has been maintained within the delivery curves ensures that significant core damage has not occurred and that a significant source term does not exist inside the containment. This allowance applies only to the remainder of Cycle 22 and all of Cycles 23 and 24. (12)

References

(1) Deleted

(2) USAR, Section 6.2.3.1

(3) USAR, Section 6.2.3.4

(4) USAR, Section 9.8.2

(5) USAR, Section 6.4.5

(6) USAR, Section 6.3.5

(7) USAR, Section 14.16.5

(8) Deleted

(9) USAR, Section 9.7

(10) USAR, Section 6.3

(11) USAR, Section 9.8

(12) Report WCAP-16204, "Evaluation of Potential ERG and EPG Changes to Address NRC Bulletin 2003-01 Recommendations (PA-SEE-0085)

Attachment 3

Clean-Typed Technical Specification Page

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