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OPPD
Omaha Public Power District

444 South 16th Street Mall
Omaha NE 68102-2247

June 30, 2009
LIC-09-0043

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

References:
1. Docket No. 50-285
2. Letter from OPPD (R. P. Clemens) to NRC (Document Control Desk), "Fort Calhoun Station (FCS) Unit No. 1 License Amendment Request (LAR) 09-01, Steam Generator Blowdown Isolation Operability and Testing Requirements," dated January 30, 2009 (LIC-09-0004) (ML090340536)
3. Email from NRC (L. E. Wilkins) to OPPD (B. R. Hansher), "RAIs (Request for Additional Information) for LAR 09-01, Steam Generator Blowdown Isolation Operability and Testing Requirements," dated April 9, 2009 (ML091680589)

SUBJECT: Response to Request for Additional Information Concerning License Amendment Request (LAR) 09-01, Steam Generator Blowdown Isolation Operability and Testing Requirements

In Reference 2, the Omaha Public Power District (OPPD) requested a change to Fort Calhoun Station (FCS), Unit No. 1, Renewed Operating License No. DPR-40 to add operability and surveillance testing requirements to the FCS Technical Specifications (TS) for the steam generator (SG) blowdown isolation on a reactor trip. The NRC staff reviewed the proposed change and in an email dated April 9, 2009 (Reference 3) transmitted a request for additional information (RAI) regarding the submittal. In a teleconference on June 3, 2009, the NRC provided additional clarification to the requested information.

OPPD's response is attached. No regulatory commitments are made in this letter.

If you should have any further questions, please contact Mr. Bill R. Hansher at (402) 533-6894.

A001
NRR

I declare under penalty of perjury that the foregoing is true and correct. Executed on June 30, 2009.

R. P. Clemens
Division Manager
Nuclear Engineering

RPC/BRH/brh

Attachment: Response to NRC RAI

c: E. E. Collins, NRC Regional Administrator, Region IV
A. B. Wang, NRC Project Manager
J. C. Kirkland, NRC Senior Resident Inspector

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI)

AMENDMENT REQUEST TO ADD STEAM GENERATOR BLOWDOWN ISOLATION

REQUIREMENTS TO TECHNICAL SPECIFICATIONS (TAC NO. ME0596)

NRC RAI No. 1

Provide the following information:

a) **The purpose and functional description of the steam generator blowdown system.**

b) **Specific consequences, including impact on other Technical Specifications (TS), when isolating the system (immediate and long-term if done as a mitigating action for when equipment is inoperable).**

c) **Any Updated Safety Analysis Report (USAR) references that may discuss (a) or (b) above.**

Background: 10 CFR 50.36(c)(2)(i) requires that TS contain Limiting Conditions for Operation (LCO) which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

Omaha Public Power District (OPPD) is proposing to revise the USAR and TS to contain automatic isolation of the steam generator blowdown system on a reactor scram. However, no functional description of the steam generator blowdown system is included in the License Amendment Request (LAR). A precursory review of the USAR was done, and no information was found. The LAR does reference USAR section 7.2.7.1, however, no description of the system could be found in that section. Section 7.2.7.1, in USAR revision 15, is "Analog Portion of System," for Section 7.2.7, "Effects of Circuits and Components Failure." Section 7.2 is instrumentation and control for reactor protection systems.

In addition, under "Failure Mode Evaluation" of Section 3.0 of the LAR, OPPD states "A spurious de-energization of a relay will result in blowdown isolation. While this is undesirable, the consequences of a spurious blowdown isolation are minimal." However, no specific consequences are discussed.

The information requested by this RAI is needed to support review of the LAR. Specifically, the information is needed to ensure that proposed Function 4, "Steam Generator Blowdown Isolation," in TS Table 2-4, "Instrument Operating Conditions for Isolation Functions" ensures continued safe operation of the facility per 10 CFR

50.36(c)(2)(i). In addition, the supplemental information is needed in order to conclude that the proposed remedial actions, as permitted under 10 CFR 50.36(c)(2)(i), are acceptable.

OPPD Response

a) The steam generator (SG) blowdown system performs no safety-related function. The SG blowdown system is used to:

- Maintain SG water chemistry by removal of impurities through bottom blowdown.
- Provides a sample to monitor SG chemistry and potential primary-to-secondary leakage.
- Recirculate SG water or transfer SG water from one generator to the other.
- Drain the SGs for dry layup.

As discussed in LAR 09-01 (Page 7), the SG blowdown isolation valves operate as follows: There are two signals that initiate a SG blowdown isolation. The first is a SG blowdown high radiation level (indicative of primary-to-secondary SG tube leakage). The second is a containment isolation actuation signal (CIAS). It is important to note that the signal being added (reactor trip) by this proposed modification is to provide an automatic means to isolate SG blowdown on a Loss of Main Feedwater (LMFW) event. The other two isolation features of the valves remain unchanged by this modification.

b) Isolation of SG blowdown (including spurious isolation) has no safety consequences nor impacts on other TS. While not desirable from an operations standpoint (due to SG chemistry constraints), there is no safety significance to operating with SG blowdown isolated. SG blowdown has, at times, been isolated while the plant is at full power to facilitate performance of certain maintenance activities. FCS follows Nuclear Energy Institute (NEI) 97-06 R2, "Steam Generator Program Guidelines," and Electric Power Research Institute (EPRI) TR-10234, "PWR Secondary Water Chemistry Guidelines." Extended periods of SG blowdown isolation may result in exceeding action levels of EPRI TR 10234, which could result in a plant down-power. Sampling lines for SG blowdown lines are on the SG side of the "A" (i.e., inboard) blowdown isolation valves. This ensures the ability to perform required TS surveillances for TS 3.2, Table 3-4 and TS 5.13 with the isolation valves maintained closed. There are no other TS affected by this change.

c) SG blowdown isolation is only addressed in USAR Chapter 14.10. As stated in LAR 09-01, the USAR Chapter 14.10 accident analysis for a LMFW event currently credits manual isolation of SG blowdown. Upon implementation of the proposed modification, SG blowdown isolation will occur automatically following a reactor trip. However, the USAR Chapter 14.10 accident analysis will remain unchanged as a result of the proposed modification and the proposed TS changes.

USAR Sections 11.1, 11.2.3.5, and 11.3 discuss SG blowdown under the context of limiting effluents.

NRC RAI No. 2

Explain how the "Minimum Degree of Redundancy" column, in TS Table 2-4, effects operability requirements in the "Minimum Operable Channels" column.

Background: 10 CFR 50.36(c)(2)(i) requires that TS contain LCOs which are the lowest functional capability or performance levels of equipment required for safe operation of the facility.

OPPD is proposing to revise the TS to contain automatic isolation of the steam generator blowdown system on a reactor scram. Proposed Function 4, "Steam Generator Blowdown Isolation," in TS Table 2-4, "Instrument Operating Conditions for Isolation Functions," contains a column labeled "Minimum Degree of Redundancy," and lists values of "None" for the Steam Generator Blowdown Isolation. TS 2.15(3) and TS 2.15(4) discuss "Minimum Degree of Redundancy," however, it is still unclear how this column impacts the requirements in the column labeled "Minimum Operable Channels."

In order to ensure that 10 CFR 50.36(c)(2)(i) continues to be met, with regard to proposed Function 4, explain how the "Minimum Degree of Redundancy" column effects operability requirements in the "Minimum Operable Channels" column.

OPPD Response

The "Minimum Operable Channels" defines the minimum number of channels required to be operable for the feature to perform the safety function. For SG blowdown isolation, the safety feature (isolation) can be achieved with only one train available. That is, with either the inboard isolation valves (train A) or the outboard isolation valves (train B) available, SG blowdown isolation can be satisfactorily achieved.

The "Minimum Degree of Redundancy" refers to the level of redundancy available when the "Minimum Operable Channels" are in service. In this case, there is no redundancy available when only one train is in service. As such, footnotes (i) and (j) provide for placing the valves in the isolation position (closed) when these LCOs are invoked. This ensures that the TS for SG blowdown isolation contain LCOs that ensure the lowest functional capability is always available or that the isolation function is achieved.

The minimum number of actuation trains required to be operable is two and the notes provide the required actions to be taken if one train is inoperable (Note j) or both trains are inoperable (Note i). A degree of redundancy of None or N/A is appropriate as there are no actions to be taken based on reaching a condition described by the column heading of Minimum Degree of Redundancy.

NRC RAI No. 3

Are the existing SG blowdown valve isolation signals in the current TS? If so, where? If not, are the existing valve isolation signals discussed in the USAR?

Background: 10 CFR 50.36(c)(2)(i) requires that TS contain LCOs which are the lowest functional capability or performance levels of equipment required for safe operation of the facility.

OPPD is proposing to revise the TS to contain automatic isolation of the steam generator blowdown system on a reactor scram. Under "Existing Valve Isolation Signals" of Section 3.0 of the LAR, OPPD states "There are currently two signals that generate a SG blowdown isolation signal. The first is a SG Blowdown Hi Radiation level (indicative of a SG tube rupture event). The second is a Containment Isolation Actuation Signal (CIAS)." A precursory review of the TS was done, and no explicit TS requirement was found for the existing valve isolation signals. However, the TS may or may not implicitly require that the existing valve isolation signals be contained under broader isolation functions contained in TS 2.15.

The information requested by this RAI is needed to ensure that proposed Function 4, "Steam Generator Blowdown Isolation," in TS Table 2-4, "Instrument Operating Conditions for Isolation Functions," contains the appropriate isolation signals in order to ensure safe operation of the facility per 10 CFR 50.36(c)(2)(i).

OPPD Response

As discussed in LAR 09-01 the SG blowdown isolation valves currently receive two isolation signals, (1) containment isolation actuation signal (CIAS), and (2) SG blowdown high radiation levels. The CIAS is discussed in USAR Section 7.3.2.5 and in TS 2.15, Table 2-4. The high radiation signal was removed from the TS in response to Generic Letter 89-01. As described in USAR Section 11.3, radiation monitors RM-054A/B are radioactive effluent monitors and are controlled by the Offsite Dose Calculation Manual (ODCM) of TS 5.17. USAR Section 11.3 references previous TS Amendments that relocated radioactive effluent TS to the ODCM in accordance with NRC Generic Letter 89-01.

LAR 09-01 is not seeking to remove the containment isolation function or to change the SG blowdown high radiation isolation function of these valves. The CIAS isolation of SG blowdown will continue to be controlled by TS 2.15 and the SG blowdown high radiation signal by the ODCM. As stated on page 11 of the LAR, FCS is committed to the draft General Design Criterion (GDC) contained in Appendix G of the FCS USAR. The SG blowdown isolation valves are required to comply with draft GDC 53 for containment isolation valves. Therefore, removal of the containment isolation/actuation function would require prior NRC approval through a License Amendment. The SG

blowdown isolation valves are depicted on USAR Figures 5.9-13 Sheets 10 and 13. These figures identify the signals that reposition the valves and their accident position.

NRC RAI No. 4

Provide the following information:

a) **A technical justification as to why Technical Specification (TS) 2.15(3), TS 2.15(4), and TS 2.01 (including all subparts of TS 2.01) are not applicable to the remedial action contained in Footnote (i).**
b) **A technical justification as to why TS 2.15(1) and TS 2.01 (including all subparts of TS 2.01) are not applicable to the remedial action contained in Footnote (j).**

Background: 10 CFR 50.36(c)(2)(i) requires that TS contain LCOs which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

OPPD is proposing to revise the TS to contain automatic isolation of the steam generator blowdown system on a reactor scram. Proposed Function 4, "Steam Generator Blowdown Isolation," in TS Table 2-4, "Instrument Operating Conditions for Isolation Functions," contains remedial actions for when a steam generator blowdown isolation is inoperable. Footnote (i) states "If both trains become inoperable, power operation may continue provided at least one SG blowdown isolation valve for each steam generator is closed or be in Mode 2 within 8 hours, and be in Mode 3 in the next 6 hours. Specifications 2.15(3) and (4) are not applicable; TS LCO 2.0.1 is not applicable." Footnote (j) states "If one train becomes inoperable, that train may be placed in the bypassed condition. If the train is not returned to Operable status within 24 hours from time of discovery of loss of operability, operation may continue as long as one SG blowdown isolation valve to each steam generator is closed. If the train is not returned to Operable status within 24 hours from time of discovery, with blowdown not isolated to both SGs, be in Mode 2 in 6 hours, and in Mode 3 in the next 6 hours. Specification 2.15(1) is not applicable; TS LCO 2.0.1 is not applicable." However, no technical justification is provided in the License Amendment Request (LAR) as to why TS 2.15(3), TS 2.15(4), and TS 2.01 are not applicable to remedial actions contains in Footnote (i), or why TS 2.15(1) and TS 2.0.1 are not applicable to remedial actions contained in Footnote (j). The LAR states "This proposed change is aligned with the current TS LCO 2.5(1)c for AFW operability," however TS 2.5(1)c does not contain any exceptions and the associated TS 2.5 Basis does not provide any additional information that would seem to relate to the steam generator blowdown isolation.

The information requested by this RAI is needed to support review of the LAR. Specifically, the information is needed to ensure that the remedial actions for proposed

Function 4, "Steam Generator Blowdown Isolation," in TS Table 2-4, "Instrument Operating Conditions for Isolation Functions," are appropriate, as permitted by 10 CFR 50.36(c)(2)(i).

OPPD Response

a) Tables 2-2 through 2-4 in TS 2.15 are primarily focused on operability of channels or logic subsystems that make up the *initiation* portion of automatic functions. That is, when the tables refer to "Minimum Operable Channels" or "Minimum Degree of Redundancy," they are referring to the inputs that are logically combined in order to develop an actuation logic for the associated automatic function. In this context, it makes sense to define requirements for minimum operable channels or a minimum degree of redundancy that could be generically addressed by the paragraphs of TS 2.15(1) through 2.15(4). These paragraphs list various possibilities of failed input channels and provide guidance as to the appropriate action.

In the context of the proposed automatic blowdown isolation function, it is important to note that, because the isolation signal is generated from the logic circuitry of the reactor protective system (RPS), the operability of the *initiation* portion of the blowdown isolation function is addressed by Table 2-2, which addresses operability of the RPS. The proposed addition of the blowdown isolation feature to Table 2-4 would address operability of the *actuation* portion of the function (as opposed to the *initiation* portion). Since the actuation circuitry is made of up two separate trains (see footnote h), both of which are actuated by the processing logic of the RPS, the new TS requirement is only addressing the *actuation* trains, as opposed to the *initiating* (or input) channels. Because the new operability requirement is not addressing initiating channels, it is not appropriate to reference the sections of TS, i.e., 2.15(1), 2.15(2), 2.15(3) and 2.15(4) that address inoperable input channels. Consequently, the actions required for two failed trains are more appropriately addressed in a footnote to the minimum operable channels.

TS 2.0.1 addresses situations not addressed by other sections of the Technical Specifications. Since the proposed addition to Table 2-4 specifically addresses all possible failure scenarios of blowdown isolation initiating trains, it is not necessary to make use of TS 2.0.1. The statement that TS 2.0.1 is not applicable is placed in footnote (i) in order to contrast this footnote with the requirement in the existing footnote (g). Footnote (g) addresses a situation in which redundant logic subsystems A and B are both inoperable, e.g., the Engineered Safety Features (ESF) containment isolation function. Therefore, it is appropriate to enter TS 2.0.1 because an important isolation function is inoperable. In the case of footnote (i), it is not necessary to enter TS 2.0.1 because footnote (i) gives explicit direction to either isolate the blowdown flow from each steam generator, thus pre-empting the automatic isolation function so that it is not necessary to rely on it, or ,to shut down the plant within the prescribed time.

The paragraphs of TS 2.15(1), 2.15(2), 2.15(3), and 2.15(4) also address *initiating* channels as opposed to *actuation* trains. The Note provides specific guidance for 1 or 2 inoperable actuation trains. TS 2.15(1) and 2.15(2) will not be applicable with both trains inoperable. Note (i) is addressing a condition in which both actuation trains are inoperable. Since there are only two installed trains, it is deemed obvious to the operators that TS 2.15(1) and 2.15(2) do not apply, since these paragraphs address partial inoperability of initiation channels. The reference to TS 2.15(3) and 2.15(4) not being applicable will prevent confusion as to what direction to follow in the event that no automatic isolation trains are operable.

TS 2.0.1(1) is not applicable because the required action to maintain the valves closed fulfills the safety function and therefore a plant shutdown is not required.

TS 2.0.1(2) is not applicable because power failure results in S/G blowdown circuitry going to fail-safe position, thus maintaining the valves closed and fulfilling the safety function.

TS 2.0.1(3) applies to snubbers and is not applicable to the SG blowdown isolation function.

b) The justification for not referencing TS 2.15(1) in a single train failure scenario is identical to the justification provided above for not referencing TS 2.15(3) and TS 2.15(4). The statement that TS 2.0.1 is not applicable is simply a clarification to ensure that the reader understands that footnote (j) is intended to address the single train inoperability condition. As in footnote (i), it is intended that, after the allowed time for a single train to be inoperable has elapsed, the required action is to manually force the blowdown isolation function, thus precluding the need to rely on an automatic actuation of this function.

TS Paragraphs 2.15(1), 2.15(2), 2.15(3), and 2.15(4) address *initiating* channels, not *actuation* trains. The note provides specific guidance for 1 or 2 inoperable actuation trains. Note (j) does not take exception to 2.15(2), 2.15(3), and 2.15(4) because they are not applicable with one train inoperable. Note (j) addresses a condition in which one of the two actuation trains is inoperable. Because this situation is similar to conditions addressed in 2.15(1), a note was added to state that this paragraph is not applicable in order to avoid confusion when applying the footnote. In the single inoperable train scenario, it is deemed obvious to operators that 2.15(2), 2.15(3) and 2.15(4) would not be applicable.

TS 2.0.1(1) is not applicable because the required action to maintain the valves closed fulfills the safety function and therefore a plant shutdown is not required.

TS 2.0.1(2) is not applicable because a power failure results in S/G blowdown circuitry going to a failsafe position, maintaining the valves closed to fulfill the safety function.

TS 2.0.1(3) applies to snubbers and is not applicable to the SG blowdown isolation function.

NRC RAI No. 5

Provide the following information:

a) **The plant conditions that require the SG blowdown isolation to be Operable in order to mitigate a Loss of Main Feedwater event as discussed in the USAR.**
b) **Why proposed Function 4 would only be required to be Operable when the reactor is critical, regardless of reactor coolant temperature.**

c) **If the "valve for each steam generator" in the Permissible Bypass Conditions column for proposed Function 4 is referring to the blowdown isolation valve.**

Background: 10 CFR 50.36(c)(2)(i) requires that TS contain LCOs which are the lowest functional capability or performance levels of equipment required for safe operation of the facility.

OPPD is proposing to revise the TS to contain automatic isolation of the steam generator blowdown system on a reactor scram. Proposed Function 4, "Steam Generator Blowdown Isolation," in TS Table 2-4, "Instrument Operating Conditions for Isolation Functions," contains Permissible Bypass Conditions of "Operating Modes 3, 4, & 5 or if at least one valve for each steam generator is closed." Mode 3 in the Fort Calhoun TS is defined as "The reactor is in a hot shutdown condition if the average temperature of the reactor coolant (T_{avg}) is greater than 515°F and the reactor is subcritical by at least the amount defined in Paragraph 2.10.2." Mode 4 and Mode 5 are also based on subcritical conditions, but with lower reactor coolant temperatures. As a result, proposed Function 4 would only be required to be Operable when the reactor is critical, regardless of reactor coolant temperature. Under "Proposed TS Change - Mode Applicability," in Section 3.0 of the LAR, OPPD states "While the new SG blowdown isolation interlock is being added to enhance the performance of the Auxiliary Feedwater (AFW) system, the proposed TS for the interlock will have the same mode dependencies as the automatic initiation for AFAS." However, current TS 2.5, "Steam and Feedwater Systems," contains different Operability requirements for the AFW system. TS 2.5 states that "Two AFW trains shall be Operable when T_{cold} is above 300°F," and that "The motor driven train is required to be Operable when T_{cold} is below 300°F and the steam generators are relied upon for heat removal." There is a Note in TS 2.5 that states "When heating the reactor coolant above 300°F the steam driven auxiliary feedwater (AFW) pump is only required to be Operable prior to making the reactor critical," however, the basis for this Note is unclear. As a result of the discrepancies, the uncertainty in the technical basis for the Note in TS 2.5, and the absence of a technical justification in the LAR with regards to the Loss of Main

Feedwater event in the Updated Safety Analysis Report (USAR), it is unclear, from a technical consideration, what Modes of operation are required for proposed Function 4, in order to ensure safe operation of the facility per 10 CFR 50.36(c)(2)(i).

In addition, Proposed Function 4, in part, contains Permissible Bypass Conditions of "if at least one valve for each steam generator is closed." It is unclear if this refers to the blowdown isolation valve.

For comparison purposes, NUREG-1432, Revision 3.0, "Standard Technical Specifications Combustion Engineering Plants," has a TS 3.7.5, "Auxiliary Feedwater (AFW) System." LCO 3.7.5 requires that the AFW trains be Operable in STS Modes 1, 2, and 3, as well as Mode 4 when the steam generator is relied upon for heat removal. STS Modes 1, 2, and 3 correspond to anytime the reactor is critical as well as anytime the reactor is subcritical with Tavg greater than or equal to 350°F. STS Mode 4 corresponds to anytime the reactor is subcritical with Tavg greater than 200°F but less than 350°F. The reasoning is found in the STS Bases, and states in "Modes 1, 2, and 3, the AFW System is required to be Operable and to function in the event that the MFW is lost. In addition, the AFW System is required to supply enough makeup water to replace steam generator secondary inventory, lost as the unit cools to Mode 4 conditions. In Mode 4, the AFW System may be used for heat removal via the steam generator. In Modes 5 and 6, the steam generators are not normally used for decay heat removal, and the AFW System is not required."

The information requested by this RAI is needed to support review of the LAR. Specifically, the information is needed to ensure that proposed Function 4, "Steam Generator Blowdown Isolation," in TS Table 2-4, "Instrument Operating Conditions for Isolation Functions" continues to ensure safe operation of the facility per 10 CFR 50.36(c)(2)(i).

OPPD Response

a) The Loss of Main Feedwater event as discussed in the USAR assumes that the initial power level is at 100% rated power in order to bound the worst case scenario and be applicable at any power level. The loss of main feedwater at a lower power level and loss of normal decay heat removal while the reactor is not critical are not events specifically analyzed but are expected to be less severe than the 100% power level case. For example, decay heat would be reduced and the initial assumption regarding the loss of steam generator inventory prior to the reactor trip may not be valid, especially in the subcritical reactor case. The impact that these considerations have on blowdown isolation is that a substantially longer amount of time is available for operators to take action to mitigate the event. Since the proposed TS revision does not require automatic blowdown isolation to be operable in Modes 3, 4, or 5, operators will use manual action to isolate blowdown in these modes if it becomes necessary to do so. Procedural guidance currently in place in the form of emergency operating procedures (EOPs) requires a verification that

blowdown isolation has occurred and will continue to do so after the proposed automatic isolation feature has been installed. This procedural guidance is required whether the plant is critical (Modes 1 or 2) or in a hot shutdown condition (Mode 3). (It should be noted that the main feedwater system is not in service in Mode 3. Typically, in this mode, one of the auxiliary feedwater pumps is operating to remove decay heat.)

The text explaining the basis for the question identifies a perceived discrepancy between TS 2.5 (Auxiliary Feedwater Operability requirements) and TS 2.15, Table 2-3 (Auxiliary Feedwater Actuation Signal (AFAS) Operability requirements). The perceived discrepancy lies in the fact that AFAS operability is required, per TS 2.15, in Modes 1 and 2, similar to the proposed operability requirements for the automatic blowdown isolation, while TS 2.5 requires operability for auxiliary feedwater trains (pumps and associated valves) when the RCS is above 300 degrees F. It appears, on the surface, that these two specifications are not consistent with each other in that the automatic actuation portion of the auxiliary feedwater system is not required to be operable when the plant is in hot shutdown, as contrasted with the operability of the pumps and valves associated with the auxiliary feedwater trains being required down to 300 degrees F. The basis for not requiring operability of AFAS in Modes other than 1 and 2 is that, in lower modes, a loss of normal decay heat removal is a much more slowly moving transient than it is in Mode 1. Consequently, as explained above, relying on operator action and procedural direction is reasonable given the amount of time available for operators to respond to the event. Therefore, the AFW trains are required to be operable down to 300 degrees F whereas the automatic actuation circuitry is not required in hot shutdown. Note that AFAS operability requirements as specified in TS 2.15, Table 2-3, were established in 1982 under license amendment No. 65.

Another question regards the note in TS 2.5 that states "When heating the reactor coolant above 300 degrees the steam driven auxiliary feedwater (AFW) pump is only required to be OPERABLE prior to making the reactor critical." The question appears to be asking for the basis for the note. The note was added as part of Amendment No. 212, approved in 2002, in order to address the concern over the ability to demonstrate operability of the steam driven auxiliary feedwater pump during a plant startup from a lengthy period of shutdown. The addition of the note permits the steam driven pump to be tested consistently in hot shutdown prior to taking the reactor critical.

b) The required operator actions for a Mode 3 (hot shutdown) loss of feedwater event would be to manually reinstate feedwater using one of the safety grade auxiliary feedwater pumps. This manual action is required to be performed prior to steam generator inventories becoming depleted to the point where heat transfer from the reactor coolant system is no longer possible. The amount of time available to operators to accomplish this task is dependent on the amount of inventory available in the steam generators for decay heat removal at the time that operators become

aware that a Mode 3 loss of feedwater event has occurred. In any Mode 3 loss of feedwater event, the rate of steam generator inventory depletion will be bounded by the capability of a single auxiliary feedwater (AFW) pump, since the pre-event AFW pump flow must be greater than or equal to the sum of flow required for decay heat removal and blowdown flow. A comparison of steam generator inventory available in this scenario to the maximum possible rate of inventory depletion shows that operators will have a minimum of one hour to take action to restore feedwater prior to losing heat transfer capability from the primary to the secondary side. This estimate assumes that blowdown is not isolated during the response to the event.

Note that control circuits associated with steam generator blowdown isolation, whether automatic or manual, are designed and maintained as safety grade and will be maintained as such in the future.

c) The reference to "one valve for each steam generator" is referring to the blowdown isolation valves, as delineated in footnote (j).

NRC RAI No. 6

Explain how the proposed TS address the use of an override switch and its effect on SG Blowdown Isolation Operability.

Background: 10 CFR 50.36(c)(2)(i) requires that TS contain LCOs which are the lowest functional capability or performance levels of equipment required for safe operation of the facility.

OPPD is proposing to revise the TS to contain automatic isolation of the steam generator blowdown system on a reactor scram. Under "Override Feature," in Section 3.0 of the LAR, OPPD states "The SG blowdown actuation circuit will be equipped with an override switch that will allow operators to re-establish blowdown following a reactor trip." However, no discussions or TS are included that address the use of the override switch and its effect on SG Blowdown Isolation Operability.

For comparison purposes, NUREG-1432, Revision 3.0, "Standard Technical Specifications Combustion Engineering Plants," has LCO 3.0.2 which states, in part, "Upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met." The STS Bases provides amplifying information on LCO 3.0.2 and states "The Completion Times of the Required Actions are also applicable when a system or component is removed from service intentionally. The reasons for intentionally relying on the Actions include, but are not limited to, performance of Surveillances, preventive maintenance, corrective maintenance, or investigation of operational problems. Entering Actions for these reasons must be done in a manner that does not compromise safety. Intentional entry into Actions should not be made for operational convenience. Additionally, if intentional entry into Actions would result in redundant equipment being inoperable, alternatives should be used instead." No similar

TS could be found in the current Fort Calhoun TS that would address the use of the override switch and its effect on SG Blowdown Isolation Operability.

It is unclear how the use of an override switch and its effect on SG Blowdown Isolation Operability is addressed in the proposed TS in a manner that ensures safe operation of the facility per 10 CFR 50.36(c)(2)(i).

OPPD Response

The proposed revision to Table 2-4 in TS 2.15 specifically authorizes bypassing the automatic SG blowdown isolation function when the plant is in operating Modes 3, 4 or 5. This is acceptable since operability of the automatic blowdown isolation function is not required in these modes. Bypassing the blowdown isolation function is accomplished by the placement of the override switches to the override position, which prevents the RPS-actuated isolation signal from automatically closing the blowdown isolation valves.

Bypass (or override) is also permitted, as specified in footnote (j) of Table 2-4, when a single train of the automatic blowdown isolation function is inoperable. In the single train failure scenario, bypass of the failed channel is permitted for a period of 24 hours after which time, operators would be required to either return the bypassed train to operability or close at least one valve isolating blowdown from each steam generator or shutdown the plant within the prescribed amount of time.

The TS will not prohibit the use of override during Modes 1 or 2, but putting the actuation train in override makes the train inoperable and the required LCO action statements would have to be taken.

NRC RAI No. 7

Provide the following information:

a) A technical justification why 18 months is an appropriate frequency to perform a Channel Functional Test for the SG Blowdown Isolation instrumentation.

b) A technical justification why a Channel Check, Channel Calibration, and a Response Time Test do not need to be performed on the SG Blowdown Isolation instrumentation.

Background: 10 CFR 50.36(c)(3) requires that TS include Surveillance Requirements (SR) which are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

OPPD is proposing to revise the TS to contain automatic isolation of the steam generator blowdown system on a reactor scram. The proposed SRs are listed in TS Table 3-2, "Minimum Frequencies for Checks, Calibrations and Testing of Engineered Safety Features, Instrumentation and Controls." The proposed SR for Channel Description 25, "Manual Steam Generator Blowdown Isolation," and Channel Description 26, "Automatic Steam Generator Blowdown Isolation," consist of a Channel Functional Test being performed at least once every 18 months (Refueling). However, no technical justification for the proposed types of tests or frequency is included. The License Amendment Request (LAR) only states in Section 2.0 that "Testing (Channel Functional Test) to ensure operability of the interlock will be performed on a refueling outage frequency, consistent with the current testing frequency for other interlocks that perform similar type functions."

For comparison purposes, NUREG-1432, Revision 3.0, "Standard Technical Specifications Combustion Engineering Plants," contains SR for isolation instrumentation. Although there are variations among individual instruments, SR typically consist of a Channel Check performed on a shift (12 hour) frequency, a Channel Functional Test performed on a quarterly (92 days) frequency, a Channel Calibration Test performed every refueling cycle (18 months), and a Response Time Test performed every refueling cycle (18 months).

The information requested by this RAI is needed to support review of the LAR. Specifically, the information is needed to ensure that the proposed SR for Channel Description 25, "Manual Steam Generator Blowdown Isolation," and Channel Description 26, "Automatic Steam Generator Blowdown Isolation," will assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met per 10 CFR 50.36(c)(3).

OPPD Response

a) As explained in the answer to question 4 above, the new automatic blowdown isolation function will be accomplished by utilizing existing circuitry, which is part of the RPS. Spare contacts, which are currently part of RPS actuated relays, will be wired into the control circuits for the blowdown isolation valves such that actuation of the RPS will cause power to be removed from solenoids associated with the isolation valves thus allowing the valves to "fail" closed. Thus, the blowdown isolation circuitry consists of two distinct parts. The first part is the initiation logic, which exists entirely within the existing RPS circuitry. The second part is the portion that ties the RPS output relays to the control circuits for the isolation valves. Testing of the RPS portion of the blowdown isolation circuitry is addressed in existing TS Table 3-1, which contains numerous requirements for channel calibrations, channel checks, and channel functional tests. Since requirements for these tests are part of the current operating license, their associated frequencies are previously approved as appropriate for these kinds of tests. The testing requirement being proposed for

addition to Table 3-2 is a channel functional test, which is focused on testing only the portion of the automatic isolation function from the RPS output relays to the isolation valve control circuits. Since there are no instrument loops associated with this portion of the isolation circuitry, there is no need for channel checks or calibrations. The only active components being tested are the normally energized RPS output relays which, when de-energized, interrupt power to the isolation valve solenoids. This portion of the isolation circuitry is similar to other isolation functions in the plant, which are already approved for testing at an 18-month (refueling) frequency, e.g., much of the safety injection actuation (SIAS) circuitry is tested at a refueling frequency. Given the fail-safe nature of the relay portion of this design, it is appropriate to test at this frequency.

b) The response to the first part of this question addresses the question regarding channel checks and channel calibrations. These types of tests are not needed because there is no new initiation instrumentation being added. Testing requirements for existing instrumentation in the form of RPS inputs and initiation logic already exist in TS Table 3-1. With regard to response time testing of the automatic blowdown isolation function, the required time for blowdown isolation, as assumed in the LMFW analysis, is 15 minutes after the reactor trip. The actual delay time of the blowdown isolation function can be attributed to two areas: (1) the delay associated with the processing of the low steam generator level trip logic causing an actuation of the reactor trip signal, and (2) stroke time of the isolation valves after power is removed from the associated air solenoids. RPS signal processing time for a low level steam generator trip is documented in USAR section 14.1 as being less than 0.9 seconds. Blowdown isolation valve stroke time is tested periodically by a surveillance test, which establishes the acceptance criterion as less than 17 seconds (refer to surveillance OP-ST-BD-3000). Since the RPS processing time is minor in comparison to the valve stroke time and insignificant in comparison to the assumed blowdown isolation time of 15 minutes, it is concluded that additional response time testing is not necessary. Note that TS testing requirements for the RPS specify functional testing of all portions of the RPS circuitry. Any abnormal delay in the operation of RPS circuitry would be identified in these tests.