Omaha Public Power District
444 South 16th Street Mall
Omaha, NE 68102-2247

February 4, 2011
LIC-11-0002

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

References:
1. Docket No. 50-285
2. Letter from OPPD (J. A. Reinhart) to NRC (Document Control Desk), "Fort Calhoun Station, Unit No. 1, License Amendment Request (LAR) Revision to Technical Specification (TS) 2.15, Table 2-5, Item 1 and TS 3.1, Table 3-3, Items 1, 2 and 4, Control Element Assembly Position Indication and Correction of TS 2.10.2(7)c," dated July 12, 2010 (LIC-10-0034) (ML101930443)
3. Letter from NRC (L. Wilkins) to OPPD (D. J. Bannister), "Fort Calhoun Station, Unit No.1 - Request For Additional Information Re: License Amendment Request To Revise Technical Specification (TS) 2.15, Table 2-5, Item 1 and TS 3.1, Table 3-3, Items 1, 2, and 4, Control Element Assembly Position Indication and Correction of TS 2.10.2(7)c (TAC No. ME4230)," dated January 7, 2011 (NRC-11-0001) (ML103550188)

SUBJECT: Response to NRC Request for Additional Information (RAI) Regarding Independence of CEA Full-in and Full-out Indication from Primary and Secondary Control Element Assembly (CEA) Position Indication Systems (CEAPIS)

In accordance with the NRC's Reference 3 RAI, attached is the Omaha Public Power District's (OPPD) response.

No commitments to the NRC are contained in this submittal.

If you have any questions regarding this submittal, please contact Mr. Bill Hansher at (402) 533-6894.

Sincerely,

J. B. Herman
Division Manager-Nuclear Engineering

JBH/KW/mle

Attachment: OPPD Response to NRC Request for Additional Information

c: E. E. Collins, NRC Regional Administrator, Region IV
L. E. Wilkins, NRC Project Manager
J. C. Kirkland, NRC Senior Resident Inspector

OPPD Response to NRC Request for Additional Information

REQUEST FOR ADDITIONAL INFORMATION

Given that the FCS [Fort Calhoun Station] USAR [Updated Safety Analysis Report] identifies having "two independent rod position indicating systems:"

NRC Question

Please state if the CEA [control element assembly] full-in and full-out indications are independent from the primary CEAPIS [CEA position indication system]. If the full-in and full-out indications are not independent from the primary CEAPIS, please clarify if FCS would consider the CEA full-in and full-out indications appropriate for use in performing CHANNEL CHECKS of the primary CEAPIS if the secondary CEAPIS was inoperable. If these indications are not independent from the primary system, but are still intended for use in channel checking the primary system, please justify their use in this manner with regard to commitments made to implement FCS Design Criterion 13.

OPPD Response

Limit switches on the regulating CEAs and reed switches on the shutdown CEAs provide CEA full-in and full-out indication. When the CEAs are raised to the limit switch operated upper electrical limit (UEL), a full-out signal is sent to the distributed control system (DCS) and displayed in the control room on the DCS flat-panel touch monitors. A similar signal occurs when the CEAs are inserted to the lower electrical limit (LEL). However, that condition is not particularly relevant to the discussion as the reactor would be shutdown at that time.

In contrast, the primary CEA position indication system gets its indication from the output of a synchro transmitter geared to the clutch output shaft. Primary CEAPIS indication is displayed visually at gauges on control board panel CB-4. One position indicating meter is provided for each group; any CEA within the group may be selected for monitoring. Thus, from sensor output to control room indication, the data provided by CEA full-in and full-out indication (hereafter referred to as DCS core mimic) is separate and independent from primary CEAPIS.

NRC Question

Please state if the CEA full-in and full-out indications are independent from the secondary CEAPIS. If the full-in and full-out indications are not independent from the secondary CEAPIS, please clarify if FCS would consider the CEA full-in and full-out indications appropriate for use in performing CHANNEL CHECKS of the secondary CEAPIS if the primary CEAPIS was inoperable. If these indications are not independent from the secondary system, but are still intended for use in channel checking the secondary system, please justify their use in this manner with regard to commitments made to implement FCS Criterion 13.

OPPD Response

As described above, CEA full-in and full-out indication is provided by limit switches on the regulating CEAs and reed switches on the shutdown CEAs. CEA position indication is fed to the DCS and displayed on three (3) DCS flat-panel touch monitors. For the secondary CEA position indication system (SCEAPIS), each control element drive mechanism (CEDM) is equipped with 64 reed switches in a 128-inch string that provides CEA position indication accurate to within ± 2 inches. Like DCS core mimic, SCEAPIS data acquisition is also through the DCS and is displayed on the DCS flat-panel touch monitors. Therefore, due to a common data acquisition and indication system, DCS core mimic and SCEAPIS are not fully independent of each other. It should be noted that, for the shutdown CEAs, the reed switches that provide full-in/full-out indication (i.e., DCS core mimic) and the reed switches that provide full-length indication are separate and independent from each other.

The DCS flat-panel touch monitors are powered from diverse power sources and workstations. The DCS is a Foxboro I/A system that is fault tolerant by design and has been demonstrated to be immune to hardware single failures, with the exception of inputs that are located on a common input module. However, the DCS core mimic and the SCEAPIS do not share common input modules. Therefore, a single failure in the DCS is unlikely to affect both DCS core mimic and the SCEAPIS. Furthermore, no logic dependencies exist within the DCS that could cause an error in one system to affect the position indication of the other.

The FCS Technical Specifications (TS) define CHANNEL CHECK as "A qualitative determination of acceptable operability by observation of channel behavior during normal plant operation. This determination shall where feasible, include comparison of the channel with other independent channels measuring the same variable." Obviously, when the primary CEAPIS channel is inoperable, it is not feasible to use it to verify the secondary CEAPIS channel. However, due to the fault tolerant design of the DCS and lack of common input modules, when the CEAs are fully withdrawn, it is feasible to use DCS core mimic albeit not considered a "channel" to complete the CHANNEL CHECK of secondary CEAPIS.

The proposed changes do not contradict the commitment of Criterion 13 to maintain two independent rod position indication systems. Both the primary CEAPIS and the secondary CEAPIS will continue to be maintained and operated as described in the USAR. The proposed Technical Specifications will allow OPPD to continue to operate the plant if the secondary CEAPIS becomes inoperable and DCS core mimic is available to verify primary CEAPIS indication.

This is acceptable for several reasons. First, continued operation with only one channel of CEA position indication is currently permitted by Technical Specification (TS) 2.15, Table 2-5, Item 1, which states that one channel is the minimum that must be operable. TS 2.15, Table 2-5, Item 1 also does not require a minimum degree of redundancy for

CEA position indication. However, the flexibility of TS 2.15, Table 2-5, Item 1 cannot currently be utilized due to the requirement of TS 3.1, Table 3-3, Items 1 and 2 to compare primary CEAPIS data with secondary CEAPIS data each shift.

Secondly, changing TS 3.1, Table 3-3, Items 1 and 2 to a CHANNEL CHECK will require that primary and secondary CEAPIS data be verified not only by each other each shift but by DCS core mimic as well when the CEAs are fully withdrawn. Requiring this third check of CEA positions provides additional confidence in the accuracy of CEA position indication. It also provides confidence in the accuracy of DCS core mimic data in the event that either primary or secondary CEAPIS become inoperable. The diversity of the input sensors and the inherent fault tolerance of the DCS make it unlikely that a single failure could adversely affect the position indication of both DCS core mimic and secondary CEAPIS. For the reasons discussed above, when available, the use of DCS core mimic to fulfill the requirements of a CHANNEL CHECK of primary CEAPIS if secondary CEAPIS is inoperable is justified.