Omaha Public Power District

444 South 16th Street Mall
Omaha NE 68102-2247

February 16, 2006
LIC-06-0016

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

References:
1. Docket No. 50-285
2. Letter from OPPD (R. T. Ridenoure) to NRC (Document Control Desk) dated July 1, 2005, "Fort Calhoun Station Unit No. 1 License Amendment Request, "Updated Safety Analysis Report Clarification of Operator Action during Loss of Main Feedwater Event" (LIC-05-0001)
3. Letter from OPPD (R. T. Ridenoure) to NRC (Document Control Desk) dated November 15, 2005, "Second Response to Requests for Additional Information and Revision of Fort Calhoun Station Unit No. 1 License Amendment Request, "Updated Safety Analysis Report Clarification of Operator Action during Loss of Main Feedwater Event" (LIC-05-0133)
4. Letter from NRC (A. B. Wang) to OPPD (R.T. Ridenoure) dated February 7, 2006, "Request for Additional Information Related to License Amendment Request for Updated Safety Analysis Report Clarification of Operator Action During Loss of Main Feedwater Event" (TAC No. MC7524) (NRC-06-00018)

SUBJECT: Response to Human Factors Request for Additional Information on Fort Calhoun Station Unit No. 1 License Amendment Request, "Updated Safety Analysis Report Clarification of Operator Action during Loss of Main Feedwater Event" (TAC No. MC7524)

The Omaha Public Power District (OPPD) previously submitted an update to the Updated Safety Analysis Report in accordance with 10 CFR 50.90 to clarify existing operator actions during a Loss of Main Feedwater event (Reference 2). This letter provides the response to the NRC's additional questions presented in Reference 4 related to human factors aspects of this USAR revision and corrects the designation for the steam generator blowdown valves provided in Reference 3.

No commitments to the NRC are made in this letter. I declare under penalty of perjury that the foregoing is true and correct. (Executed February 16, 2006)

If you require additional information, please contact Thomas C. Matthews at (402) 533-6938.

Sincerely,

S. K. Gambhir
Division Manager
Nuclear Projects

SKG/rlj

Attachment:

OPPD Responses to Human Factors Request for Additional Information (RAI) on Fort Calhoun Station Unit No. 1 License Amendment Request, "Updated Safety Analysis Report Clarification of Operator Action during Loss of Main Feedwater Event"

cc: Director of Consumer Health Services, Department of Regulation and Licensure, Nebraska Health and Human Services, State of Nebraska

OPPD Responses to Human Factors Request for Additional Information (RAI) On Fort Calhoun Station Unit No. 1 License Amendment Request "Updated Safety Analysis Report Clarification of Operator Action during Loss of Main Feedwater Event"

Correction: The RAI response letter from OPPD (R. T. Ridenoure) to NRC (Document Control Desk), dated November 15, 2005 (Reference 3), incorrectly referred to the steam generator blowdown isolation valves as HCV-1386A/B and HCV-1387A/B. HCV-1387A/B and HCV-1388A/B are the correct designations.

NRC Question 1: *What actions for the two discrete manipulations are performed by the operator for this LMFW event? Do the actions include the operator closing the SG blowdown isolation valves by means of control switches in the control room? Are there any actions taken locally that must be completed within the 8 minute time limit?*

OPPD Response to Question 1: Step 13.1 of Emergency Operating Procedure EOP-00, "Standard Post Trip Actions," directs the operator to isolate steam generator blowdown by closing the two sets of blowdown isolation valves HCV-1387A/B for steam generator RC-2A and blowdown isolation valves HCV-1388A/B for steam generator RC-2B. Each set of blowdown isolation valves consists of two valves in series, one on each side of the containment penetration. Closure of either valve "A" or "B" isolates the SG blowdown. Although four manipulations are routinely accomplished, only two manipulations, one for each steam generator, are required for blowdown isolation. The manipulations are the closing of isolation valves HCV-1387A or HCV-1387B, and HCV-1388A or HCV-1388B by turning the respective switches located on control room control board CB–10. The criterion in ANSI, N18.2-1973, "Nuclear Safety Criteria for the Design of Station Pressurized Water Reactor Plants," for "Operator Action Time Delay" of 5 minutes is satisfied for both two or four manipulations. The change in valve position can be verified by the operator by the position indicator lights on the control board CB-10.

No actions outside the control room are required. These are the only actions necessary to complete the isolation of blowdown from both steam generators to be consistent with the fifteen minutes credited in the LMFW safety analysis for SG blowdown isolation. There is not an "8 minute time limit" for any action, either from the control room or locally, associated with the AREVA analysis. Eight minutes is however the bounding operator response time to isolate the blowdown valves in the simulator control room after a reactor trip following a LMFW as observed during the simulator training.

NRC Question 2: *What are the other operator manual actions, if any, to be performed during the LMFW event prior to isolating the SG blowdown valves? How were these actions considered in the facility's conclusion that "FCS operators complete this action (manual isolation of SG blowdown) within 8 minutes following reactor trip?"*

OPPD Response to Question 2: Operator manual actions in a LMFW event would include verification that the turbine has tripped and reporting of that action to the control room supervisor following a reactivity report from the primary operator. Each operator would then walk down his/her panels with operator aids verifying system response, acknowledging annunciators, and taking contingency actions as necessary. With no main feedwater available the expected contingency would be to isolate blowdown. This could happen before the control room supervisor begins going through EOP-00 with the board operators. If not, the control room supervisor should arrive at Step 13 within 8 minutes and direct the operator to isolate blowdown.

NRC Question 3: *How was the simulator modeled to accurately attain a plant response to a LMFW event? Are the 8 minutes for completion of the operator actions and subsequent system response on the "simulator training observations" representative of an actual LMFW event, including operating crew response?*

OPPD Response to Question 3: The analysis model (AREVA model) of the LMFW event establishes the bounding time within which operator action is required to isolate steam generator blowdown thereby protecting the reactor core limits. The simulator model of the LMFW is a best estimate model of the plant response that remains within the bounds of the analysis provided that the EOP-00 operator action to isolate steam generator blowdown is performed in less than 15 minutes following the reactor trip. The observation of 8 minutes for the completion of the operator actions to isolate steam generator blowdown during simulator training is conservative since it is within the bounds of the analysis. The initiating event of the simulator LMFW may not have been identical to the AREVA analysis; however, the observations are accurate and reproducible. The loss of LMFW may be the result of an electrical problem, or a different initiating event. Regardless of initiating event, operators are trained to use EOP-00 consistently and remain within the bounds of the analysis.

NRC Question 4: *How was the training conducted to capture the 8 minutes completion time of manual actions after the reactor trip for the LMFW event? What was the composition of the crews that performed this exercise? Were these evaluation scenarios run by crews with no prior knowledge of the simulated LMFW event(s) or were the training scenarios run with crews knowledgeable regarding the LMFW training scenario event(s)? Did the simulator training observation scenarios that resulted in SG blowdown isolation "within 8 minutes following reactor trip" involve loss of AC power as the initiating event for the LMFW event? Please describe the factors that were used to provide a worst case scenario in obtaining the 8 minute mark for being able to generalize that all crews can perform the required actions in the available time. Additionally, what other factors or hindrances to the operators could be in place to possibly extend this 8 minute completion time up to 15 minutes?*

OPPD Response to Question 4: The observations of the 8-minute completion time of the steam generator blowdown isolation after the reactor trip following the LMFW event were conducted during plant operating crew training on their training week. The observations on specific actions were made without the operating crew's prior knowledge that they were being observed on the execution time of specific actions.

The composition of the operating crew during a training week consists of operators as well as senior operators. Factors or hindrances to the operators which could compound or delay operator actions would be the failure of the reactor to trip manually or automatically and failure of the turbine or generator to trip. Both these failures in conjunction with the LMFW event are beyond the design basis of the Fort Calhoun Station. Even though these failures would require the operator's attention, they would not prevent performance of EOP-00 actions and completion of the blowdown isolation step within 8 minutes.

The loss of all AC power would actually increase the minimum time allowable for steam generator blowdown isolation due to the following:

- The loss of reactor coolant pump heat addition into the reactor coolant as a result of the loss of AC power, would reduce the rate of loss of steam generator water inventory for the removal of reactor coolant heat thereby allowing more time for the operator to isolate steam generator blowdown.

- The LMFW analysis assumes that the low steam generator water level setpoint trips the reactor at 25.55 seconds into the event. The LMFW with loss of all AC will initiate an immediate reactor trip. At this reactor trip, the steam generator water inventory will be larger than the inventory assumed in the LMFW analysis. Additionally, 25.55 seconds of full power will not be generated as a result of the immediate reactor trip. Therefore, during the loss of all AC event, the operator will have more time to isolate blowdown because of the larger steam generator inventory at the time of the reactor trip and the fact that the full power generation is reduced by 25.55 seconds.

The failure of offsite power would require the operator's attention and would not prevent performance of EOP-00 actions and completion of the blowdown isolation step within 8 minutes even though the operator will have more than 15 minutes to perform this function.