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

January 25, 2001
LIC-01-0007

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Mail Station PI-137
Washington, D.C. 20555

References:
1. Docket No. 50-285
2. Letter from OPPD (W.G. Gates) to NRC (Document Control Desk) Ref. LIC-96-0172, "Response to NRC Generic Letter 96-05, *Periodic Verification of Design Basis Capability of Safety Related Motor Operated Valves*," dated November 15, 1996
3. Letter from NRC (L. Raynard Wharton) to OPPD (S. K. Gambhir) "Fort Calhoun Station, Unit No. 1 – Request for Additional Information Related to Generic Letter 96-05, "*Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves*"(TAC No. M97049)," dated December 13, 2000

SUBJECT: Response to Request for Additional Information Related to Generic Letter 96-05

In response to the NRC's request for additional information (Reference 3) to supplement the information contained in the Omaha Public Power District (OPPD) response to Generic Letter 96-05 (Reference 2), OPPD submits the information requested in the attachment to this letter.

NRR Project Manager, L. R. Wharton, approved extension of the 30-day response period from January 13, 2001 to January 25, 2001, in order to incorporate the outcome of OPPD discussions recently conducted with T. G. Scarbrough of the NRC Staff.

Should you have any questions, please contact me at (402) 533-7210.

Sincerely,

R L Phelps 1-25-01

R. L. Phelps
Division Manager
Nuclear Engineering

A073

RLP/RLJ/rlj

c: E. W. Merschoff, NRC Regional Administrator, Region IV
L. R. Wharton, NRC Project Manager
W. C. Walker, NRC Senior Resident Inspector
Winston & Strawn

Response to NRC Request for Additional Information

This attachment contains the Fort Calhoun Station response to nine questions presented in the letter from NRC (L. Raynard Wharton) to OPPD (S. K. Gambhir) "Fort Calhoun Station, Unit No. 1 – Request for Additional Information Related to Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves"(TAC No. M97049)," dated December 13, 2000.

1. Omaha Public Power District (OPPD) letter dated November 15, 1996, stated that the pressurizer power operated relief valve (PORV) block valves, HCV-150 and HCV-151, are two-stage approach valves, as defined in GL 89-10, due to the inability to dynamically test the valves. Switch settings are based on the results of a prototype valve tested under full design conditions. Periodic verification will consist of static tests every five years or three refueling outages to ensure switch setting maintenance and to monitor for motor-operated valve (MOV) degradation.

   Discuss the margin between actuator capability and the required thrust (torque) for the valves to operate during design conditions and your plan for accommodating potential valve factor degradation.

   Response:

   The value used for valve factor in the valve calculations is 0.3 based on the prototype testing performed on these valves. The prototype testing performed full design flow verification of the valve capabilities. This testing verified design basis condition functionality; therefore, the two-stage approach is being applied to the capability verification of the installed valves.

   The PORV block valves HCV-150 and HCV-151 thrust margins determined during testing in 1999 were as follows. During static testing in the open direction the margins were 177 percent and 105 percent respectively. In the close direction the margins were 1.2 percent and 9.5 percent. These lower than expected values resulted from actuator refurbishment with the torque switches set to the low end of the adjustment band. The final review, completed in accordance with Fort Calhoun Station (FCS) procedure, PED-SEI-10, "Evaluation of MOV In-Situ Test Results," determined there was less than 10 percent margin for these valves. As a result, both of these valves are scheduled for re-testing during the 2001 refueling outage to adjust torque switches to increase this margin. The values recorded following static testing in 1995 were 188 percent opening and 37.8 percent closing for HCV-150 and were 365 percent opening and 40.6 percent closing for HCV-151.

   To accommodate potential valve factor degradation on two-stage approach valves, additional attention is directed to monitoring of other parameters, which can act as precursors to valve factor degradation. Changing factors such as packing friction, motor current, and variations in running loads are monitored and evaluated for cumulative valve effects. Valve stem cleaning and lubrication is performed every

refueling outage on all GL-89-10 program valves. Operator lubricant sampling and analysis and operator inspections are performed every third refueling outage. Information received from dynamic testing of other GL-89-10 program valves is also evaluated for applicability to the two-stage approach valves. Although these valves are not exactly the same design, they operate in similar conditions and environments. Due to the low population of motor operated valves at Fort Calhoun Station, it is difficult to trend similar valves; therefore, industry information notices, operating experiences and industry work group notices are reviewed and information is included in the FCS program as applicable. The two-stage approach valves at FCS do not operate to control process conditions. HCV-150 and HCV-151 are stroke tested quarterly as a requirement of the station IST program. HCV-150 and HCV-151 are also tested as required by the GL-89-10 program every third refueling cycle. The low number of cycles per year and the lack of design basis conditions do not promote high levels of wear in these valves as indicated by test and inspection results.

2. OPPD letter dated November 15, 1996, stated that the shutdown cooling isolation valves, HCV-347 and HCV-348, are two-stage approach valves, as defined in GL 89-10, "Safety Related Motor-Operated Valve Testing and Surveillance," due to their inability to achieve greater than 50 percent full flow design conditions during testing. Switch settings are based on partial flow differential pressure testing and the KEIGATE Program. Periodic verification will consist of static tests and partial flow differential pressure testing every five years or three refueling outages. NRC's Inspection Report (IR) 50-285/94-05 states that a minimum valve factor of 0.5 is assumed in calculations when the two-stage approach is used.

   Discuss the margin between actuator capability and the required thrust (torque) for the valves to operate during design conditions and your plan for accommodating potential valve factor degradation.

   Response:

   The shutdown cooling isolation valves, HCV-347 and HCV-348, use a minimum valve factor of 0.5 in calculations as stated in NRC IR 50-285/94-05.

   HCV-347 thrust margins determined during static testing in 1999 were 614 percent in the open direction and 229 percent in the close direction.

   HCV-348 thrust margins determined during static testing in 1999 were 195.6 percent in the open direction and 28.7 percent in the close direction.

   These margins indicate adequate actuator capability to operate under design conditions.

   To accommodate potential valve factor degradation on two-stage approach valves, additional attention is directed to monitoring of other parameters which can act as

precursors to valve factor degradation. Changing factors such as packing friction, motor current, and variations in running loads are monitored and evaluated for cumulative valve effects. Valve stem cleaning and lubrication is performed every refueling outage on all GL-89-10 program valves. Operator lubricant sampling and analysis and operator inspections are performed every third refueling outage. Information received from dynamic testing of other GL-89-10 program valves is also evaluated for applicability to the two-stage approach valves. Although these valves are not of exactly the same design, they operate in similar conditions and environments. Due to the low population of motor operated valves at Fort Calhoun Station, it is difficult to trend similar valves; therefore, industry information notices, operating experiences and industry work group notices are reviewed, and information is included in the FCS program as applicable. The two-stage approach valves at FCS do not operate to control process conditions. HCV-347 and HCV-348 are stroke tested every refueling outage as a requirement of the station IST program. Both of the valves are then tested as required by the GL-89-10 program every third refueling cycle. The low number of cycles per year and the lack of design basis conditions do not promote high levels of wear in these valves as indicated by test and inspection results.

3. OPPD letter dated November 15, 1996, stated that the volume control tank outlet valve, HCV-218-2, is a two-stage approach valve, as defined in GL 89-10, due to the inability to achieve greater than 18.5 percent full flow design conditions during testing. Switch settings are based on the KEIGATE Program. Periodic verification will consist of static tests every five years or three refueling outages. NRC IR 94-05 states that a minimum valve factor of 0.5 is assumed in calculations when the two-stage approach is used.

   Discuss the margin between actuator capability and the required thrust (torque) for the valve to operate during design conditions and your plan for accommodating potential valve factor degradation.

   Response:

   A minimum valve factor of 0.5 is used in calculations as stated in NRC IR 50-285/94-05.

   HCV-218-2 thrust margin was determined during testing in 1999 and found to be 143 percent in the close direction under static conditions. This margin indicates adequate actuator capability to operate under design conditions.

   To accommodate potential valve factor degradation on two-stage approach valves, additional attention is directed to monitoring of other parameters that can act as precursors to valve factor degradation. Changing factors such as packing friction, motor current, and variations in running loads are monitored and evaluated for cumulative valve effects. Valve stem cleaning and lubrication is performed every

refueling outage on all GL-89-10 program valves. Operator lubricant sampling and analysis and operator inspections are performed every third refueling outage. Information received from dynamic testing of other GL-89-10 program valves is also evaluated for applicability to the two-stage approach valves. Although these valves are not of exactly the same design, they operate in similar conditions and environments. Due to the low population of motor operated valves at Fort Calhoun Station, it is difficult to trend similar valves; therefore, industry information notices, operating experiences and industry work group notices are reviewed and information included in the FCS program as applicable. The two-stage approach valves at FCS do not operate to control process conditions. HCV-218-2 is stroke tested every refueling outage as a requirement of the station IST program. The valve is then tested as required by the GL-89-10 program every third refueling cycle. The low number of cycles per year and the lack of design basis conditions do not promote high levels of wear in these valves as indicated by test and inspection results.

4. Discuss if safety-related MOVs are included in the Fort Calhoun GL 96-05 program that are assumed to be capable of returning to their safety position when placed in a position during a test (surveillance) that prevents the system (train) from performing its safety function and the system or train is not declared inoperable when the MOVs are in their nonsafety position.

   Response:

   A total of 18 GL-89-10 program valves are cycled on a quarterly basis to verify stroke times per IST requirements. These valves are not declared inoperable unless the valve fails to exhibit the required change in valve stem or disc position or exceeds its limiting value of full stroke time. A review of the associated procedures indicated the PORVs are declared inoperable when HCV-150 or HCV-151 are closed. All of the valves, which are stroke tested on a quarterly basis, have been analyzed and tested to prove their capability to reposition.

5. In Technical Update 98-01 and its Supplement 1, Limitorque Corporation provided updated guidance for predicting the torque output of its ac-powered motor actuators. Describe the corrective action taken for ensuring adequate ac MOV motor actuator output capability in response to the guidance in Limitorque Technical Update 98-01 and its Supplement 1.

   Response:

   In response to Technical Update 98-01 and its Supplement 1, all related calculations were reviewed to ensure pullout efficiency was used as opposed to run efficiency. As a result, the motors were changed out on valves LCV-218-2 and HCV-1384. In addition, the calculations for valves HCV-1385 and HCV-1386 were revised. All other valve calculations were reviewed with acceptable results.

6. Clarify if there are any dc-powered MOVs in the Fort Calhoun GL 96-05 program. If applicable, describe any corrective action or planned corrective action for ensuring adequate dc MOV motor actuator output capability.

   Response:

   There are no DC powered MOVs in the Fort Calhoun Station program.

7. IR 94-05 states that you were in the final stages of developing a program to address tracking and trending of MOV failures, corrective actions, maintenance activities, and test data, and planned to complete implementation of the program in 1994. Discuss the quantitative and qualitative parameters that are presently used to trend MOV performance at Fort Calhoun.

   Response:

   Key MOV parameters are trended to identify unusual and adverse trends that may affect the operability of MOVs. Parameters trended include but are not limited to:
   - Available thrust and torque
   - Torque and thrust at Control Switch Trip (CST)
   - Total thrust and torque
   - Run motor current
   - End motor current (Motor current at end of stroke)
   - Stem coefficient of friction at CST
   - Thrust required to overcome differential pressure (D/P)
   - Torque required to overcome D/P
   - Torque switch setting

   These requirements are listed in Station Engineering Instruction PED-SEI-17, "MOV Program And Administrative Guidelines," and are documented by completing "MOV Trending Review Form," PED-SEI-17.2. These parameters are entered onto graphs for each valve to visually gauge the changes from each test interval. Any change is evaluated by the MOV Engineer to determine acceptability.

   In addition, procedure PED-SEI-10, "Evaluation of MOV In-Situ Test Results," requires individual test results to be evaluated against specific requirements that require capability review if values are not met. These values include maximum allowable thrust and torque, CST value verses degraded voltage stall values, thrust margin, measured verses calculated packing load, stem/stem nut coefficient of friction, and stroke time. This information is recorded on Forms PED-SEI-10.1 through PED-SEI-10.7. The station condition reporting (CR) system is utilized to document problems or discrepancies and to track the resolution of identified issues. The CR system is also used to track the actions taken in response to operating experience items which are found to be applicable to the station.

8. OPPD letter dated November 15, 1996, stated that two groups of valves were formed when developing the Fort Calhoun periodic verification program. The first group includes eight high pressure safety (HPSI) valves and the second group includes four low pressure safety injection (LPSI) valves. Three of the HPSI valves and two of the LPSI valves with the lowest open thrust margin will be dynamically tested every five years or three refueling outages.

   Clarify if the same 3 HPSI valves (HCV-312, HCV-320, and HCV-321) and the 2 LPSI valves (HCV-327 and HCV-329) will be tested every 5 years or 3 refueling outages or if alternate HPSI and LHSI valves in each group would be dynamically tested.

   Response:

   These 5 valves (HPSI valves HCV-312, HCV-320, HCV-321, and LPSI valves (HCV-327 and HCV-329) will always be tested every 5 years or 3 refueling outages, both statically and dynamically, for trending purposes. These valves were selected as having the lowest thrust margins based on test results of all valves up to 1993. In the event test results indicate a potential common valve problem, additional testing would be warranted on the remaining valves in this group. The remaining valves (HPSI valves HCV-311, 314, 317, 315, 318 and LPSI valves HCV-331, 333) will be tested statically every 5 years or 3 refueling outages. These valves will also be dynamically tested in the event maintenance is performed on these valves, which could potentially affect dynamic performance.

9. OPPD letter dated November 15, 1996, stated that the containment sump isolation valves, HCV-383-3 and HCV-383-4, are two-stage approach valves, as defined in GL 89-10, and that a hydrostatic test pump will be used to verify the ability of each butterfly valve to operate at design basis differential pressure every five years or three refueling outages. Switch settings are based on the KEIGATE Program which indicates that unseating torque is greater than dynamic torque.

   Clarify how hydrostatic test pump testing of HCV-383-3 and HCV-383-4 accommodates potential aging increases in hydrodynamic force.

   Response:

   Worst case scenario is based on open torque requirements. The opening forces due to valve degradation are estimated to be greater than hydrodynamic bearing friction loads produced for all required operating conditions. This was supported by the Kalsi Report (referenced below) which was based on the KEIGATE Program. In all proposed situations, the opening torque requirements bound the predicted worst case hydrodynamic bearing friction; therefore, this friction is not monitored.

Reference: Kalsi Engineering Document No. 2086C, Rev 0, dated November 15, 1999, titled: "Updated Thrust And Torque Requirements Under Design Basis Conditions For GL 89-10 MOVs At Fort Calhoun Station – Unit 1"