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10 CFR 50.54(f)

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

SUBJECT:
Beaver Valley Power Station, Unit Nos. 1 and 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
Response to NRC Staff Request for Additional Information Regarding Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems" (TAC Nos. MD7795 and MD7796)

By letter dated April 11, 2008, as supplemented by letters dated October 14, 2008 and August 18, 2009, FirstEnergy Nuclear Operating Company submitted its response to Generic Letter (GL) 2008-01 for the Beaver Valley Power Station, Unit Nos. 1 and 2. In a letter dated December 3, 2009, the Nuclear Regulatory Commission (NRC) provided a request for additional information (RAI) related to GL 2008-01. Clarification of the RAI was provided by the NRC staff during a telephone conference conducted on November 19, 2009. The response to the RAI is provided in Attachment 1.

The regulatory commitment identified in Attachment 2 supersedes a commitment made in the letter dated October 14, 2008. If there are any questions or if additional information is required, please contact Mr. Thomas A. Lentz, Manager - Fleet Licensing, at (330) 761-6071.

I declare under penalty of perjury that the foregoing is true and correct. Executed on January 29, 2010.

Sincerely,

Paul A. Harden

Attachments:
1. Response to NRC RAI on Generic Letter 2008-01 for Beaver Valley Power Station
2. Regulatory Commitment List

A134
NRR

cc: NRC Region I Administrator
NRC Resident Inspector
NRC Project Manager
Director BRP/DEP
Site BRP/DEP Representative

**Response to NRC RAI on Generic Letter 2008-01 For
Beaver Valley Power Station**

The NRC staff requested additional information regarding the FirstEnergy Nuclear Operating Company (FENOC) response to Generic Letter (GL) 2008-01. The NRC staff requests are presented below in bold type, followed by the FENOC response. In the following NRC staff requests and FENOC responses, Reference 3 is referring to GL 2008-01 (Accession No. ML072910759), and Reference 4 is referring to the nine month response to GL 2008-01 dated October 14, 2008 (Accession No. ML082900492).

1. **In Reference 4, it is noted that the licensee was going to monitor the status of the Technical Specification Task Force (TSTF) traveler. Clarify the schedule for evaluating the TSTF traveler and if necessary, submitting a license amendment.**

Response

The regulatory commitment regarding evaluation of industry-developed generic Technical Specification (TS) changes that was included in the nine month response is being revised. The following commitment supersedes the previous commitment in its entirety:

> FirstEnergy Nuclear Operating Company (FENOC) is continuing to support the industry Gas Accumulation Management Team (GAT) and Technical Specification Task Force (TSTF) activities regarding the resolution of generic Technical Specification changes via the TSTF Traveler process. Within 180 days after NRC approval of the Traveler, FENOC will complete an evaluation and determine whether to adopt the Traveler at Beaver Valley Power Station (BVPS).

2. **The licensee noted in Reference 4 that, "at both units 1 and 2, at least two check valves in every pathway to the RCS [reactor coolant system] are periodically leak tested per the Inservice Testing Program to ensure leakage from the Reactor Coolant System to the Low Head Safety Injection does not occur." Discuss how often these valves are leak tested and what the actions would be if the valves were found to be leaking. Provide an assessment of the gas generation rate if the valves were leaking at their leak rate acceptance limits. Include void volumes that would be produced and contrast this to acceptance limits.**

Response

These valves are reactor coolant system (RCS) pressure isolation valves and are leak tested every refueling outage. If established leakage acceptance criteria are exceeded, existing programs require that the valves be repaired or replaced, and retested.

The configuration of the safety injection piping at BVPS Unit No. 1 (BVPS-1) and BVPS Unit No. 2 (BVPS-2) does not create a vulnerability to the accumulation of nitrogen gas from nitrogen saturated high pressure water. The safety injection paths that contain the check valves are on the discharge side of the low head safety injection (LHSI) pumps and connect directly to the RCS loops with no interconnection to the safety injection accumulator tanks (which contain a nitrogen gas volume above the water) or associated tank discharge piping. Therefore, the concerns identified in NRC Information Notice 97-40, "Potential Nitrogen Accumulation Resulting From Backleakage From Safety Injection Tanks," are not applicable to the subject piping.

Assuming one or more of these valves experience leakage, the potential for gas accumulation concerns are addressed for the following three scenarios.

1. If a pressure isolation check valve that is closer to the RCS loop (an inboard valve) is the only valve in a flow path that is leaking, it would pressurize the space between the isolation valves. Pressurization of the affected section of piping would prevent void formation caused by either flashing of the hot RCS fluid or desorption of dissolved gases.
2. If leakage were to occur past one or more of the second, outboard pressure isolation check valves from the RCS loop, but not the inboards, then no void formation will occur since there will be no source of water into the LHSI system with either a high temperature or dissolved gases.
3. If leakage were to occur past both pressure isolation check valves in any flowpath during operation, this would be indicated by the periodic RCS water inventory balance surveillance. Since leakage through the subject check valves would not collect in any of the monitored locations (pressurizer relief tank or primary drain tanks) used to calculate identified leakage, it would be classified as unidentified leakage. BVPS maintains low administrative limits for unidentified leakage relative to the Technical Specification limit of 1 gallon per minute (gpm), and leakage well below the check valve leakage acceptance criterion would trigger leakage investigations. For the cold leg injection portion of the LHSI systems at BVPS-1 and BVPS-2, operation with continued leakage from these check valves would be unlikely as this would result in the pressurization of lower pressure portions of systems resulting in the lifting of relief valves. For the hot leg injection paths, normally closed motor-operated isolation valves upstream of the check valves would stop leakage in the event the injection piping pressure was increased to the RCS pressure. This pressurization does not create a concern for the piping since it is rated for this service and the increased pressure would mitigate any void formation due to either flashing or desorption of dissolved gasses.

Based on the above discussion, it is unlikely that BVPS would operate in a configuration with continued leakage through the safety injection check valves and that such leakage could result in formation of voids in the associated piping. Therefore, no assessment of gas generation rates based on the leakage acceptance criteria is necessary.

3. Discuss the monitoring of the emergency core cooling, decay heat removal, and containment spray system pump operations in all modes and specialized monitoring of appropriate plant parameters during shutdown and mid-loop operation.

Response

Clarification of this RAI was provided by the NRC staff during a telephone conference conducted on November 19, 2009. The NRC staff indicated that monitoring of the overall system for evidence of gas voids, rather than just pump monitoring, was of interest. Since the in-scope BVPS piping systems are monitored for gas voids, addressing the monitoring of piping for gas voids would provide an acceptable response to this RAI.

At BVPS-1 and BVPS-2, monitoring of piping for gas voids is performed as described in the nine month response. Section A.3 of the nine month response (Reference 4) describes the void monitoring procedure and the periodic void monitoring that is performed on the subject piping.

The LHSI pumps do not normally operate in any mode except during periodic performance testing. The pumps and associated suction and discharge piping are maintained sufficiently full of water in Modes 1 through 4. Periodic monitoring of this piping for gas voids is performed at locations where gas accumulation is possible. The LHSI pumps at BVPS-1 take suction from the containment sump following switchover to safety injection recirculation mode. These pumps are monitored for cavitation following switchover in accordance with the emergency operating procedures. The BVPS-2 LHSI pumps do not operate in safety injection recirculation mode. The LHSI pumps are not credited with providing an ECCS function in Modes 5 or 6 and are therefore not required to operate in these modes to fulfill the ECCS function.

The high head safety injection (HHSI) pumps and the associated suction and discharge piping at BVPS-1 and BVPS-2 are maintained sufficiently full of water in Modes 1 through 4 as demonstrated by periodic monitoring of the piping for gas voids at locations where gas accumulation is possible. This includes suction piping to the refueling water storage tank (RWST), LHSI and recirculation spray (RS) pumps. The HHSI pumps also serve as charging pumps to provide makeup flow to the RCS and the reactor coolant pump seals during normal plant operation. However, only one of three charging pumps is normally in service. On the one train that operates to provide the charging function, alarms are provided to identify off-normal flow or pressure during pump operation. The HHSI pumps are not credited with providing an ECCS function in Modes 5 or 6 and are therefore not required to operate in these modes to fulfill the ECCS function.

Containment quench spray (QS) pumps do not normally operate in any mode except during periodic performance testing. They are standby pumps which actuate on a containment pressure signal. The QS pumps take suction from the RWST, with their associated suction piping and portions of the discharge piping being sufficiently full of water in all operating modes. Periodic monitoring of this piping for gas voids is performed at locations where gas accumulation is possible. The RS pumps and associated discharge and suction piping are normally dry and require no monitoring. The RS pumps, which draw only from the containment sump, are monitored for cavitation following actuation in accordance with the emergency operating procedures.

BVPS does not typically operate in a reduced RCS inventory or mid-loop configuration during shutdown due to the availability of RCS loop stop valves. However, the enhanced administrative controls required by NRC Generic Letter 88-17, "Loss of Decay Heat Removal," have been established for this mode of operation. The controlling operating procedures require reviews of planned and ongoing activities that could impact RCS level during the period of reduced inventory. These procedures also require increased monitoring of RCS level and temperature, and residual heat removal (RHR) system parameters such as flow, temperature, and pump motor current. The RHR system is filled and vented prior to being placed manually in service.

As discussed in the nine month response letter (Reference 4), the RHR systems at both BVPS-1 and BVPS-2 are not credited with accident mitigation and do not act as emergency core cooling systems. The RHR systems at BVPS have no automatic functions and receive no engineered safety feature start signals. Furthermore, the BVPS RHR systems are not the decay heat removal system credited with meeting General Design Criterion (GDC) 34 during accident conditions. In normal operating shutdowns and non-limiting design basis accidents, the decay heat removal function at the BVPS units can be provided by RHR if it is available.

4. Clarify the meaning of "accessible" and "inaccessible" as used in Reference 4. In the clarification, include a discussion of piping within containment, piping that requires scaffolding to reach, and piping in posted radiation areas.

Response

Accessible piping is piping that can be reached without physical obstruction (walked down) for elevation measurement or pipe modeling. Inaccessible piping is piping that cannot be reached (walked down) for elevation measurement or pipe modeling due to physical obstruction.

The LHSI pump suction piping embedded in the concrete mat of the BVPS-1 containment building is inaccessible. This piping was specifically evaluated as discussed in Sections 2a and 2g of the nine month response letter (Reference 4). Other

piping inside the BVPS-1 and BVPS-2 containment buildings is accessible. Elevation measurement using laser scanning was performed on accessible piping inside the containment buildings. Pipe modeling was used in locations where the ends of straight piping runs were available for a laser scan, but an obstruction prevented a laser scan of the entire piping run. Attachment 1, Section C.3 (Additional Actions), of the nine month response (Reference 4) refers to "currently inaccessible locations" in the BVPS-1 Containment that would not be accessible until the next refueling outage (1R19). During that next refueling outage (1R19), laser scanning was performed on the referenced piping.

Elevation measurement was performed using a relative elevation measurement system (zip level) outside of the containment buildings. Some piping located outside of the containment buildings was determined to be inaccessible because a zip level could not be used to evaluate the piping. These inaccessible locations include piping under floor plugs or grating, piping in pipe tunnels, insulated piping, and piping behind shielding. Piping was not excluded from walk downs (classified as inaccessible) because it was in a posted radiation area (dose concerns), or because scaffolding was needed to reach the piping.

5. Training was not identified in Reference 3, but is considered to be a necessary part of applying procedures and other activities when addressing the issues identified in the GL 2008-01. Provide a brief description of training.

Response

Beaver Valley Power Station training addressing gas accumulation issues identified in NRC and industry documents is an ongoing topic, as directed by the associated training curriculum review committees.

For engineering personnel, reviews of Significant Operating Experience Report (SOER) 97-01, "Potential Loss of High Pressure Injection and Charging Capability from Gas Intrusion," and the BVPS-specific Significant Event Notification (SEN) 179, "Long-Standing Design Weaknesses and Ineffective Corrective Actions Cause Gas Binding Failures of High Head Safety Injection Pumps," are included in both initial training and on a four-year rolling basis in continuing training. The engineering training review committee recently reviewed several gas voiding events that occurred at BVPS as well as an industry-developed computer based training package, and directed that these items be included in the continuing training for engineering personnel scheduled for March 2010.

Gas intrusion/voiding is included in various Operations training curricula as determined by the Operations Training Review Committee and/or Curriculum Review Committees. The above described SOER 97-01 and SEN 179 are part of licensed and non-licensed

operator initial training. Other gas voiding events have been presented in the past for both initial and continuing training, primarily as operating experience review topics.

Maintenance initial training programs include SOER 97-1 through the Nuclear Plant Systems course. Recently, the Maintenance Training Review Committee directed that training on gas management issues be incorporated into an additional course within the initial training program and into continuing training for both the maintenance technicians and supervisors.

As system fill and vent procedures and other station procedures related to gas management are updated, FENOC's procedure revision process defines when a formal training needs analysis should be performed. The established procedure approval and change management processes also address the need for personnel awareness or training on the revisions.

Monitoring of industry-sponsored gas accumulation training recommendations continues, since such input presents the opportunity to incorporate appropriate training into associated accredited training programs.

ATTACHMENT 2
L-10-002

Regulatory Commitment List
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The following list identifies a revised Regulatory Commitment for Beaver Valley Power Station. The original commitment was made in the nine month response to Generic Letter 2008-01, dated October 14, 2008 (Accession No. ML082900492). Any other actions discussed in this submittal represent intended or planned actions by FENOC, are described only for information, and are not Regulatory Commitments. Please notify Mr. Thomas A. Lentz, Manager – Fleet Licensing, at 330-761-6071 of any questions regarding this document or associated Regulatory Commitments.

Revised Regulatory Commitment	Due Date
FirstEnergy Nuclear Operating Company (FENOC) is continuing to support the industry Gas Accumulation Management Team (GAT) and Technical Specification Task Force (TSTF) activities regarding the resolution of generic Technical Specification changes via the TSTF Traveler process. FENOC will complete an evaluation and determine whether to adopt the Traveler at Beaver Valley Power Station.	Within 180 days after NRC approval of the Traveler.