FENOC
FirstEnergy Nuclear Operating Company

Beaver Valley Power Station
P.O. Box 4
Shippingport, PA 15077

Raymond A. Lieb
Director, Site Operations

724-682-7773
Fax: 724-682-1840

August 18, 2009
L-09-188

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 (BVPS-1) and 2 (BVPS-2)
BVPS-1 Docket No. 50-334, License No. DPR-66
BVPS-2 Docket No. 50-412, License No. NPF-73
Ninety Day Post-Outage Supplemental Response to Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems" (TAC No. MD7795 and MD7796)

The Beaver Valley Power Station nine month response to Generic Letter 2008-01 was submitted by letter dated October 14, 2008 (Accession No. ML082900492). The response included a commitment to develop a summary of evaluations of those BVPS-1 in-field piping verifications that had not yet been completed, and submit it within 90 days after the next refueling outage. The attachment to this letter provides the summary of those evaluations, along with updates to the enhancement actions described in the nine month response. The new evaluations did not identify the need for additional corrective actions.

These activities have not changed the conclusion that the emergency core cooling and containment depressurization systems at BVPS-1 and BVPS-2 are capable of performing their intended safety function, and that for BVPS, FirstEnergy Nuclear Operating Company is in compliance with 10 CFR 50 Appendix B, Criteria III, V, XI, XVI and XVII, with respect to the concerns in Generic Letter 2008-01.

There are no regulatory commitments contained in this submittal. 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 August 18, 2009.

Sincerely,

Raymond A. Lieb

A134
NRR

Attachment: Ninety Day Post-Outage Supplemental Response to Generic Letter 2008-01

cc: Nuclear Regulatory Commission (NRC) Region I Administrator
NRC Resident Inspector
NRC Project Manager
Director, BRP/DEP
Site BRP/DEP Representative

Ninety Day Post-Outage Supplemental Response to Generic Letter 2008-01

This attachment provides the Beaver Valley Power Station Unit No. 1 (BVPS-1) 90 day post-outage supplemental response to Generic Letter (GL) 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," dated January 11, 2008. This supplements information provided in the nine month response letter dated October 14, 2008 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML082900492). This attachment also provides information regarding the status of BVPS-1 and Beaver Valley Power Station Unit No. 2 (BVPS-2) enhancement actions described in the nine month response. The necessary BVPS-2 in-field verifications for GL 2008-01 were previously completed, and were summarized in the nine month response.

The following paragraphs describe the specific information provided in each section of this attachment. The evaluation conclusion is provided following Section B.

Section A A summary of the recently completed evaluations for those BVPS-1 in-field piping verifications that had not yet been completed at the time of the nine month response. This summary satisfies a commitment in the nine month response and includes information on void acceptance criteria changes and corrective actions.

Section B Updates to the BVPS-1 and BVPS-2 corrective actions described in the nine month response, including any schedule change and the basis for the change.

A. EVALUATION RESULTS

1. Design Basis Documents/Acceptance Criteria

FirstEnergy Nuclear Operating Company (FENOC) continues to employ void evaluation methods and acceptance criteria at BVPS that are consistent with industry guidelines and those identified in the nine month response. Additional guidance regarding void acceptance criteria has recently been made available by the Nuclear Regulatory Commission (NRC) and the industry. This guidance was considered and the acceptance criteria utilized for the suction and discharge portions of the subject systems at BVPS did not require revision. The void acceptance criteria remains as discussed in the nine month response, except as noted in the paragraph below.

The specific acceptance criteria for voids are contained in periodic surveillance test procedure 3BVT01.11.04, "Void Monitoring." Recent performances of this periodic surveillance test resulted in generation of a design basis document that established acceptance criteria for a void in the BVPS-1 quench spray pump discharge piping, where void acceptance criteria had not yet been established. Void acceptance criteria was developed for this location and included in the void monitoring program. The void at this location was vented and reduced to an acceptable size.

2. Confirmatory In-Field Piping Verifications

During the spring 2009 refueling outage for BVPS-1 (1R19), a laser scanning technique was employed on the previously unverified emergency core cooling system (ECCS) discharge piping inside containment to obtain accurate measurements of changes in the pipe slope. The scanning results were compiled into pipe slope reports that were reviewed and found to be acceptable for the discharge side piping.

Areas that are susceptible to air/gas accumulation were considered during the review of the scanning results. FENOC confirmed that locations having the potential to collect air voids are included in the flow paths for the low head safety injection pump and high head safety injection pump full flow tests, and have Froude numbers during full flow tests that exceed those required to flush voids from the discharge piping.

During 1R19, the BVPS-1 ECCS piping was vented following maintenance. The low head safety injection and high head safety injection full flow tests were run to remove any remaining air pockets in this ECCS discharge side piping. Once the systems were returned to service, the void monitoring program verified that this ECCS piping was full of water prior to startup from the refueling outage. These results confirm that full flow testing is sufficient to sweep voids from the discharge piping.

The evaluation of BVPS-1 in-field piping verifications was completed as described above and this summary satisfies the commitment in the nine month response.

3. Vent Valves

During the GL 2008-01 investigation, two sections of piping from the containment building sump to the suction of the BVPS-1 low head safety injection pumps were discovered to have voids by ultrasonic testing conducted on September 23, 2008. Attachment 1 of the nine month GL response discussed these voids. During 1R19 two vent valves were installed in the Train A and B pump suction piping flow paths from the containment sump. Though the piping could be vented prior to the installation of the new vent valves, the vent valves improve the method for removing gas voids.

The evaluation of 1R19 in-field piping verifications did not identify the need for additional vent valves.

4. Procedure Changes or Other Additional Corrective Actions

The void monitoring program has been revised since the nine month response to GL 2008-01. The revision added locations for ultrasonic examination of the low head safety injection pumps suction piping from the containment sump at BVPS-1 and high and low head safety injection pump discharge piping to the reactor coolant

system hot and cold legs at BVPS-1 and BVPS-2. The revision added locations for ultrasonic examinations of quench spray pump suction and discharge piping at BVPS-1 and BVPS-2.

Operations procedures have been reviewed and enhanced to address GL 2008-01. Section B, Updates to Previously Identified Corrective Actions, provides information describing enhancements made to the procedures.

Review of maintenance procedures against industry best practices is discussed in Section B, Updates to Previously Identified Corrective Actions, Item 11.

The evaluation of 1R19 in-field piping verifications did not identify the need for additional procedure changes or corrective actions.

B. UPDATES TO PREVIOUSLY IDENTIFIED CORRECTIVE ACTIONS

The actions in the table below were listed in the nine month response. The table is updated with a brief summary of results achieved. The sections identified in the table are from the nine month response.

The changes listed in the table below have been recommended to improve management of gas accumulation. Because practices for managing gas accumulation have been determined to be effective at maintaining system operability with respect to voids, and none of these actions are required for compliance with existing regulatory requirements, these actions are considered enhancements.

	DESCRIPTION
Findings Identified During the Section 2a Design Basis Document Review	
1.	Action: Complete evaluation of gas voids identified at the Unit 1 containment sump suction to the low head safety injection (LHSI) pumps 1SI-P-1A/B. Current Status: The evaluation and its associated corrective actions have been completed.

	DESCRIPTION
Findings Identified During the Section 2b Acceptance Criteria Review	
2.	Action: Incorporate the void size in the final version of the Pressurized Water Reactor Owners Group (PWROG) reactor coolant system (RCS) Allowable Gas Intrusion report into the BVPS Void Acceptance Criteria design calculations for the relevant analysis, for use in future design evaluations. Current Status: The current void acceptance criteria for the ECCS pump suction piping is based on maintaining a maximum 5 percent void fraction entering the pump. This is consistent with the March 2009 NRC Draft criteria for transient gas movement in pump suction lines, and the 5 percent criterion is applied for the entire range of pump flows. The PWROG RCS Allowable Gas Intrusion report conservatively evaluated the impact of gas volumes, which are much higher than that allowed using the pump suction criteria, on the core. The report states > The gas volumes chosen in the tables above are based on gas void quantities which are larger than the anticipated gas volume in the ECCS under any circumstance. There are several considerations which would limit the void size in ECCS piping to values much less than those provided in the tables. For instance, if the gas voids are located in the suction of the ECCS pumps, stringent criteria regarding the allowable gas volume fractions at the pump inlet will restrict the void sizes to much lower values than what is listed here. This statement is applicable to BVPS. The allowable gas volumes in the pump suction piping are much less than those evaluated. No explicit acceptance criteria have been developed for the ECCS pump discharge piping since it has been shown that the dynamic venting process performed during refueling outages is effective at removing any gas from these lines. Any gas flushed into the reactor coolant system during these tests is then removed prior to plant startup. Therefore, the void volumes evaluated in the PWROG RCS Allowable Gas Intrusion report do not need to be incorporated into BVPS void acceptance criteria.
Findings Identified During the Section 2c Drawing Review	
3.	Action: Identify ultrasonic examination locations for 1R19 for currently inaccessible locations associated with the discharge side of the ECCS in Containment for BVPS-1. Current Status: Ultrasonic examination locations for 1R19 were identified and added to test procedure 3BVT 01.11.04, "Void Monitoring," prior to the start of 1R19.

	DESCRIPTION
Findings Identified During the Section 2d Fill and Vent Review	
4.	Action: 1OM-50.4.L, "Plant Heatup from Mode 6 to Mode 3," instructions to fill and vent the Reactor Coolant Pump seal leak-off lines need revised to require three of the valves in the flow path (MOV-1CH-378, MOV-1CH-381 and 1CH-214) to be verified open or to be opened in other sections of the procedure. Current Status: The changes described above were incorporated into procedure 1OM-50.4.L, "Plant Heatup from Mode 6 to Mode 3."
5.	Action: Revise 1OM-7.4.AA, "Fill and Vent the Chemical and Volume Control System," and 1OM-7.4.AN, "Returning a Charging Pump to Service Following Mechanical Maintenance," to have fill and vents of the 6 inch and 8 inch charging (high head safety injection [HHSI]) pump suction headers performed first instead of last as currently performed. Current Status: The changes described above were incorporated into procedures 1OM-7.4.AA, "Fill and Vent the Chemical and Volume Control System," and 1OM-7.4.AN, "Returning a Charging Pump to Service Following Mechanical Maintenance."
6.	Regarding the Safety Injection System Fill & Vent Procedures: Action: Write a procedure similar to 1OM-11.4.W, "Filling and Venting The [1SI-P-1A] LHSI Pump After Maintenance," for pump 1SI-P-1B. Current Status: Procedure 1OM-11.4.W, "Filling and Venting The [1SI-P-1A] LHSI Pump After Maintenance," was revised to include instructions for filling and venting LHSI pump 1SI-P-1B.. Action: During the performance of Part B, C, and D of 1OM-11.4.V, "Filling and Venting the Hydro Test Pump and Safety Injection Accumulators," the sample line is valved in at 1SI-75, 76, and 77, but not purged of air at the primary sample panel. Revise procedure to purge air. Current Status: The changes described above were incorporated into procedure 1OM-11.4.V, "Filling and Venting the Hydro Test Pump and Safety Injection Accumulators." Action: The following issues need addressed for 1OM-11.4.J, "Filling and Venting the Safety Injection System", Revision 17: • LHSI venting sequence starts downstream of the pumps and then the pumps are vented. • LHSI pumps are bumped with no discharge flow path, mini flow shut, no path to sweep gas to the refueling water storage tank (RWST). • Part L, the very last step of the procedure refers to Attachment 2 for

	DESCRIPTION
	manual venting; this attachment is a good list of the available ECCS vents. Need a caution to ensure before venting from any of the listed vent valves to ensure that there is a pressure source flow path aligned for makeup. If Attachment 2 is performed as written it could easily cause voiding/draining to occur when the intent is to fill and vent. Current Status: The changes described below were incorporated into procedure 1OM-11.4.J, "Filling and Venting the Safety Injection System," to address the three items listed above. Vent valve 1SI-166 is located in the LHSI pump 1SI-P-1A discharge pipe line, and vent valve 1SI-167 is located in the LHSI pump 1SI-P-1B discharge pipe line. Vent valve 1SI-314 is located downstream of valve 1SI-166 in the LHSI pump 1SI-P-1A supply pipe line to the HHSI pump suction. Vent valve 1SI-305 is located downstream of valve 1SI-167 in the LHSI pump 1SI-P-1B supply pipe line to the HHSI pump suction. The LHSI venting sequence starts downstream of the pumps and then the pumps are vented. This is the correct sequence. A note was added to the procedure to explain that vent valve 1SI-314 and 1SI-305 will be used to vent before the respective upstream vent valves 1SI-166 and 1SI-167. Valves 1SI-314 and 1SI-305 are located at a lower elevation than vent valves 1SI-166 and 1SI-167. Venting at either valve 1SI-314 or 1SI-305 after venting at the valve 1SI-166 or 1SI-167, respectively, would cause voiding in the respective LHSI pump discharge pipe line. A step was added to open the LHSI pump minimum flow isolation valves MOV-1SI-885A and D (for LHSI pump 1SI-P-1A) or valves MOV-1SI-885B and C (for LHSI pump 1SI-P-1B) prior to bumping the respective LHSI pump. This will provide a flow path to sweep any potential gas to the RWST. A caution was added to the procedure stating that if a pressurized make-up water source is not available, air can enter the vent valve when it is opened and piping could be voided.

	DESCRIPTION
7.	Action: The following issues should be addressed for 2OM-11.4.H, "Filling and Venting the Safety Injection System": • LHSI venting sequence starts downstream of the pumps and then the pumps are vented. • The vacuum fill option does not vent at valve 2SIS-325. • Revise procedure to address that the section of high head safety injection (HHSI) piping to the RCS is filled with an LHSI pump running. The piping is associated with the HHSI discharge to cold leg injection valves (2SIS-HCV868A and B) and the HHSI pump to cold leg injection isolation valve (2SIS-MOV840). Current Status: Procedure 2OM-11.4.H, steps B and C, "Fill and Vent Train A and B LHSI Piping with Vacuum Assist Rig," were not changed to vent the LHSI pump casings before the downstream piping. The vacuum assist method requires that a void exit the piping to allow the vacuum to be established without drawing water into the vacuum pump or eductor. Once the maximum vacuum is established, the inlet isolation valve to the LHSI pump is throttled open to fill the void. The pump cannot be filled and vented before the vacuum is established because the pump's inlet isolation valve must be closed first. Procedure 2OM-11.4.H, steps D and E, "Fill and Vent Train A and B LHSI Piping without Vacuum Assist Rig," were revised to vent the LHSI pump casings before the downstream piping was filled and vented. The vacuum fill option does not vent at 2SIS-325, because the piping is sufficiently filled without venting at 2SIS-325. Prior to startup, the Void Monitoring procedure verifies the piping is sufficiently full of water. Procedure 2OM-11.4.H, Steps G and H, "Fill HHSI Piping To RCS Loops With [2SIS*P21A,B] LHSI Pump," were revised to fill and vent the piping associated with the HHSI pump discharge to cold leg injection valves 2SIS-HCV868A and 2SIS-HCV868B, and the HHSI pump to cold leg injection isolation valve 2SIS-MOV840 with the LHSI pump running.

	DESCRIPTION
8.	Action: For 2OM-13.4.J, "Quench Spray Pump and Line Fill and Vent," revise procedure to vent the pump first and then verify the discharge piping is sufficiently full. Current Status: The proposed procedure revision is not needed. Procedure 2OM-13.4.J is written to open the suction and discharge isolation valves for the quench spray pump. After 15 minutes of filling the system, the system is considered to be at equilibrium. An ultrasonic test is performed to verify that the quench spray pump discharge piping is filled from the pump to the quench spray pump discharge isolation valve. The pump is then vented. Since the system is static at this time, a gas void in the pump casing would not move from the pump to the discharge piping. Therefore, the procedure is considered adequate and does not need to be changed.
Findings Identified During the Section 2g System In-Field Verifications	
9.	Action: Analyze laser scanning results for piping that was scanned outside of the BVPS-1 and BVPS-2 containment buildings. Current Status: The piping under the scope of this corrective action was previously analyzed using a zip level as discussed in the nine month response. As these piping sections were previously evaluated, this enhancement action will not be completed. Evaluation of the scanning results is not necessary for the response to GL 2008-01, since the evaluation of zip level readings was determined adequate for identifying the areas of concern.
Findings Identified During the Section 3 Testing Evaluation	
10.	Action: To ensure that the piping on the suction and the discharge side of the systems within the scope of GL 2008-01 remain sufficiently full of water, locations considered to be vulnerable to air entrapment will be included within the site Void Monitoring procedure. Current Status: New ultrasonic examination locations identified in response to GL 2008-01 were included in procedure 3BVT01.11.04, "Void Monitoring," prior to the start of 1R19. The new ultrasonic examination locations were examined except for those inside the BVPS-2 containment. The new examination locations inside the BVPS-2 containment are scheduled to be examined during the fall 2009 refueling outage. Piping at the new ultrasonic examination locations that was examined, was found to be acceptable.

	DESCRIPTION
11.	Action: Further guidance is expected from the Nuclear Energy Institute (NEI) in the form of good practices for instrument isolation and restoration action. This information may prove to be useful to enhance the existing (currently acceptable) procedures. If the industry information proves valuable, review BVPS-1 instrument and control maintenance procedures beginning on April 30, 2009 and finishing by July 30, 2009. Similarly, review the BVPS-2 instrument and control maintenance procedures beginning November 13, 2009 and finishing by February 13, 2010. The procedures captured in the corrective action program will be reviewed against these good practices. Current Status: A search was made of available NEI publications regarding good fill and vent practices. No additional guidance was found that was not already available. Procedure reviews for BVPS-1 described in the action above concluded that the fill and vent methods used during BVPS-1 maintenance procedure performance has minimal to no contribution to gas intrusion into the ECCS and containment depressurization systems. The completion date listed above for the BVPS-2 enhancement action is the anticipated completion date.

CONCLUSION

The emergency core cooling and containment depressurization systems, including the previously unevaluated portions, have been evaluated and determined to be capable of performing their intended safety function, and for BVPS, FENOC is currently in compliance with 10 CFR 50 Appendix B, Criteria III, V, XI, XVI and XVII, with respect to the concerns outlined in GL 2008-01.