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

Subject: Beaver Valley Power Station (BVPS), Unit No. 1 and No. 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
Updated Reply to Request for Additional Information Regarding Risk-Informed Inservice Inspection Program Relief Request

References:

1) FirstEnergy Nuclear Operating Company (FENOC) submittal of a relief request to allow implementation of a Risk-Informed Inservice Inspection (ISI) Program as an alternative to the current ASME Section XI requirements for piping at BVPS Unit 1 and Unit 2 (letter L-02-066 dated July 24, 2002)
2) NRC Request for Additional Information (RAI) (Questions #1 - 16) dated December 30, 2002
3) FENOC response to RAI (Questions #1 - 16) (letter L-03-016 dated February 18, 2003)
4) NRC RAI (Question #17) dated February 6, 2003
5) FENOC response to RAI (Question #17) (letter L-03-037 dated May 14, 2003)

On May 14, 2003, FENOC submitted a response (Reference 5) to an NRC RAI (Reference 4) regarding the FENOC submittal of a relief request to allow implementation of a Risk-Informed ISI Program at BVPS (Reference 1). Our response indicated that a more detailed response to RAI Question #17 would be provided, once the generic issue was addressed by the Westinghouse Owners Group (WOG) and the NRC.

Based on a conference call between BVPS personnel and the NRC staff held on July 11, 2003, the generic issue concerning RAI Question #17 was discussed and clarified. As a result, an updated response to that item is being provided as Enclosure 1 to this submittal.

The NRC also indicated in the conference call that the initial BVPS response (Reference 3) to RAI Question #7, associated with multiple size piping in the same segments (Reference 2), should be further clarified. As discussed during the conference call, this also is a generic issue being addressed by the WOG; however, additional site-

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specific information to fully respond to Question #7 is under development and is targeted for completion and submittal by October 29, 2003.

There are no new regulatory commitments identified in this document. If there are any questions concerning this matter, please contact Mr. Larry R. Freeland, Manager, Regulatory Affairs/Performance Improvement at 724-682-5284.

Sincerely,

L. William Pearce

Enclosure

c: Mr. T. G. Colburn, NRR Senior Project Manager
Mr. D. M. Kern, NRC Sr. Resident Inspector
Mr. H. J. Miller, NRC Region I Administrator

Enclosure 1

Reply to Request for Additional Information
Regarding Beaver Valley Power Station (BVPS) Units 1 and 2
Risk-Informed Inservice Inspection (RI-ISI) Program Relief Request

The Request for Information, dated February 6, 2003, provided the following additional item to be addressed:

A. UNITS 1 AND 2

17. *In the enclosure to the July 24, 2002, application, Table 3.7-1 indicates that the expert panel moved a number of piping segments that have risk reduction worth (RRW) values greater than 1.005 from high safety significant (HSS) to low safety significant (LSS) based on their judgement. For example, in Unit 1, Table 3.7-1 reports that the charging (CH) system has 26 segments with RRW greater than 1.005. The table also reports that, in the CH system, 7 segments with RRW between 1.005 and 1.001 were placed in HSS. This indicates that the total number of HSS segments is expected to be 26 plus 7, or 33 segments. However, the total number of HSS segments in the CH system is reported as 28. In the same table, the safety injection (SI) system is reported to have 34 segments with RRWs greater than 1.005 but a final of 30 Segments are defined as HSS. Similar examples can be identified in Table 3.7-1 for Unit 2.*

The NRC staff recognizes that Topical Report, WCAP-14572, Revision 1-NP-A, allows the expert panel to use deterministic information to place segments with RRW values greater than 1.005 in the LSS category; however, page 143 of the topical report states that HSS "segments should not be classified lower by the expert panel without sufficient justification that is documented as part of the [RI-ISI] program. The expert panel should be focused primarily on adding piping to the higher classification." Justification for the reclassification of HSS segments to LSS should include a description of the specific characteristics that support the expert panel's decision that the safety-significance of the segment is lower than the results of the quantitative evaluation and guidelines indicate. Sufficient detail is also needed such that the impact of future plant modifications on the characteristics selected by the expert panel when determining the safety-significance can be systematically evaluated to ensure continued applicability of the assigned classification.

Based on a review of previous submittals, there are two types of results from the quantitative analysis that expert panels have modified in order to reclassify segments from HSS to LSS. These results involve: 1) human actions responding to the pipe failure; and, 2) material and operation characteristics of the segment. In order to expedite the review of the July 24, 2002, application, the type of information required to support the NRC staff review is provided below.

Reclassifying a HSS segment as LSS is often based on discarding a "without human action" RRW when that RRW is the only RRW that is greater than 1.005. This reclassification is based on a high degree of confidence by the expert panel that the operators could appropriately recover from the event. A basis for the decision would include a description of the information available to the operators to identify the failed functions, systems or component caused by the pipe failure; the procedures the operator would follow; the time available for the operator to recover; the time required by the operator to diagnose and recover the failed functions; and the equipment available to recover from or mitigate the failures. Note that the ASME Standard for Probabilistic Risk Assessment (PRA) for Nuclear Power Plant Applications only discusses proceduralized actions and non-proceduralized, skill-of-the-craft actions for use in PRA.

Reclassifying a HSS segment to a LSS segment is often based on discarding the pipe frequency estimate that is, in turn, based on material or operational characteristics input into the Structural Reliability and Risk Assessment code. A basis for the decision should include an identification of those properties that resulted in the original HSS designation, the change in those properties that the expert panel determined more appropriately characterize the actual state of the structure, system, or component, and a discussion why the properties the expert panel developed are expected to reduce the safety-significance of the segments from HSS to LSS.

Therefore:

(a) Clarify if the expert panel reclassified segments from HSS to LSS and, if so, identify how many segments were reclassified from HSS to LSS.

(b) Provide the justification documented as part of your RI-ISI program for each segment (or group of segments if the justification may be grouped) that was reclassified from HSS to LSS. For example, some documentation should be in the expert panel's meeting minutes. If the documented justification does not include the information discussed above, please provide the level of justification discussed above.

Updated Response:

The expert panel reclassified a total of 35 segments at BVPS (18 at BV1 and 17 at BV2) from HSS (high safety significant) to LSS (low safety significant). The expert panel also reclassified 46 BV1 segments and 40 BV2 segments from LSS/MSS (medium safety significant) to HSS.

Two (2) of the 35 segments, CH-043 (BV1) and CHS-051 (BV2) were originally presented to the expert panel as quantitatively HSS. The expert panel identified conservatism in the SRRA failure probability associated with these segments. Based on the revised failure probability, these two segments were no longer quantitatively HSS.

Fifteen (15) segments, initially downgraded from HSS to LSS by the Expert Panel, have been reclassified as HSS. The primary reasons for these changes were the lack of BV1 Low Head Safety Injection train separation and the resulting difficulty in discerning which train had failed from the Control Room and the lack of specific documentation quantifying the response time available to mitigate potential segment failures. The specific 15 segments are:

BV1	SI-032	SI-035	SI-037A	CH-134
	SI-033	SI-036A	SI-037B	
	SI-034	SI-036B	SI-086A	
BV2	BDG-005	SIS-056C	SIS-097B	
	SIS-056B	SIS-057C		

The BV1 and BV2 Perdue and change-in-risk evaluations have been revisited due to the reclassification of the 15 segments to HSS. Based on the Perdue evaluations, 2 BV1 NDE examinations have been added to the inspection scope for segments SI-036A and SI-037A. The other 13 reclassified segments do not require a Perdue model analysis because these segments are two inch nominal diameter or less and contain socket welded piping and therefore are not candidates for non-destructive examination. These 13 segments will retain the current VT-2 examinations, but the examinations will be performed on an increased frequency as required by WCAP-14572. The change-in-risk evaluations for the identified revisions resulted in no additional examinations. Two (2) BV1 examinations that were previously required to meet the change-in-risk criteria are now required because the associated segments are HSS.

The table below identifies the remaining 18 HSS segments that were moved to LSS with additional clarification as requested. The additional clarification will be added to the Expert Panel documentation.

The time available for the operators to respond is based on the time that exists to prevent the loss of a system, train, etc. as identified by the without and with operator action consequences. For all of these segments, the operator action prevents the consequence of loss of the RWST. The time available to the operators to respond is

calculated by dividing the volume of the RWST that can be lost (without causing a consequence of loss of the RWST) by the flow rate out of the piping failure.

BV1 OPERATOR ACTION		
SEGMENT ID	DESCRIPTION	EXPERT PANEL RISK BASIS
CH-023 CH-024 CH-025	1" & 3/4" lines off from HHSI/ charging pump CH-P-1A(1B)(1C) to pressure instrument PI-CH-151 (152)(153), drain line to valve CH-293 (294)(295) (NSA closed) and to sampling line.	Credible detection and resulting operator action.
ADDITIONAL CLARIFICATION		
A leak in this segment would result in an airborne radiation alarm in the Control Room for the PAB area and would also cause the Charging Pump cubicle sump alarm to actuate in the Control Room. Also, changes in charging flow indicators, along with VCT and Pressurizer level changes would be evident in the Control Room. The Operator would follow Annunciator Response Procedures (ARP) on all Control Room Annunciator actuations. Based on the radiation monitor and sump level alarms, along with the ARP guidance, the operator would quickly determine the location of the leak and take appropriate procedurally directed actions. If the leak were large enough to cause a loss of Charging, AOP 1.7.1, Loss of Charging or Letdown, would direct the Operator to isolate the leaking train and start the stand-by Pump. If the leak did not result in a loss of Charging, normal operations procedures would direct the Operator to start the stand-by Pump. Operator action to identify the leak is 1 to 5 minutes; to isolate the leak and restore charging is estimated to be approximately 5 to 10 minutes. The estimated time available for the Operators to respond is over 8 hours.		

CH-116	3" normal seal injection line off from isolation valve MOV-CH-370 (NSA open) to seal injection valve HCV-CH-186 (NSA throttle), locate outside Cnmt.	Operator action.
A leak in this segment would cause a Low Flow Seal Injection alarm in the Control Room. Airborne radiation alarms and the PAB North Sump High Level alarm would also actuate in the Control Room. Based on the loss of seal injection alarm, the Operator would follow AOP 1.6.8, Abnormal Reactor Coolant Pump Operation. This procedure would direct the Operator to take appropriate actions depending on the extent of the leakage. MOV-1CH-370 would be closed to isolate the leak. Operator action to identify and isolate the leak is estimated to be approximately 5 minutes. Recovery of the function of this line could not occur without leak repair. A plant shutdown would be initiated per controlled shutdown procedures. The estimated time available for the Operators to respond is over 8 hours.		

SI-030A SI-031A	10" line from LHSI pump SI-P-1A (1B) to check valve SI-6 (-7) and to 2" line to check valve SI-29 (-28).	Credible operator action to resolve risk concern. Risk ranking results.
A leak in this segment would result in an airborne radiation alarm in the Control Room for the Safeguards area and would also cause the Safeguards Sump high level alarm to actuate in the Control Room. Discharge flow indicators for the Safety Injection Pumps, located in the Control Room would indicate flow anomalies. The Annunciator Response Procedures for the sump and airborne alarms would direct the Operator to monitor for leakage. If the pump tripped due to high flow or spray on the motor, the Operator would be alerted immediately by SI pump auto stop alarm. The Operator would locate and then isolate the leak from the RWST and containment sump by closing valves MOV-SI-860A(B) and -862A(B). The segment containing the leak is isolated from the opposite train by the discharge check valve. Operator action to identify the leak is 1 to 3 minutes; to isolate the leak is estimated to be less than 10 minutes. The estimated time available for the Operators to respond is over 1 hour.		

SI-065	3" line outside containment from MOV-SI-869A to containment penetration 7.	Credible operator action to resolve risk concern. Risk ranking results. Size.
A leak in this segment would result in an airborne radiation alarm in the Control Room for the Safeguards area and would also cause the Tunnel Sump high level alarm to actuate in the Control Room. Discharge flow indicators for the High Head Safety Injection Pumps, located in the Control Room would indicate flow anomalies. The Annunciator Response Procedures for the sump and airborne alarms would direct the Operator to monitor for leakage. Closing MOV-SI-869A and stopping the associated pump would isolate the leak. The problem would be identified within 1 to 3 minutes as the High Head Safety Injection Pump began to run-out. The Operator would secure the pump to prevent damage and isolate the leak within 3 to 10 minutes. The redundant train is isolated from this leak. The estimated time available for the Operators to respond is over 3 hours.		

Enclosure 1 (continued)

BV2 OPERATOR ACTION		
SEGMENT ID	DESCRIPTION	EXPERT PANEL RISK BASIS
SIS-025A SIS-026A	10" Train A LHSI pump discharge from LHSI Pump P21A(B) to check valve 2SIS-6(7) and to check valve 2SIS-894(5).	Operator actions credible. Quickly identify and resolve. Risk ranking results for 'with operator action'.
ADDITIONAL CLARIFICATION		
A leak in this segment would result in an airborne radiation alarm in the Control Room for the Safeguards area and would also cause the Safeguards sump alarm to actuate in the Control Room. The BV2 Safeguards design of train separation allows quick train identification and isolation. Discharge flow indicators for the Safety Injection Pumps, located in the Control Room would indicate flow anomalies. The Annunciator Response Procedures for the sump and airborne alarms would direct the Operator to monitor for leakage. If the pump tripped due to high flow or spray on the motor, the Operator would be alerted immediately by the SIS pump auto stop alarm. Emergency Operating Procedures would direct the Operator to monitor pump flow and performance. Based on the sump and radiation alarms, the Operator would locate and then isolate the leak from the RWST by closing valve 2SIS-MOV-8809A(B). The segment containing the leak is isolated from the opposite train by the discharge check valve. Operator action to identify and isolate leak is estimated to be less than 5 minutes. The estimated time available for the Operators to respond is over 1.5 hours.		

SIS-027A SIS-028A	4" line from check valve 2SIS-894(5) to 2SIS-MOV-8890A(B).	Operator actions credible. Quickly identify and resolve. Risk ranking results for 'with operator action'.
A leak in this segment would result in an airborne radiation alarm in the Control Room for the Safeguards area and would also cause the Safeguards sump alarm to actuate in the Control Room. The BV2 Safeguards design of train separation allows quick train identification and isolation. Discharge flow indicators for the Safety Injection Pumps, located in the Control Room would indicate flow anomalies. The Annunciator Response Procedures for the sump and airborne alarms would direct the Operator to monitor for leakage. Emergency Operating Procedures would direct the Operator to monitor pump flow and performance. Based on the sump and radiation alarms, the Operator would locate and then isolate the leak from the RWST by closing valve 2SIS-MOV-8809A(B). Initially both trains could feed the leak depending on its size. However, Operator action to identify and isolate the leak is estimated to be less than 5 minutes. The estimated time available for the Operators to respond is over 2.5 hours.		

SIS-029A	4" lines from 2SIS-MOV-8890A and 2SIS-MOV-8890B to 8" line to RWST.	Loss of both recirculation trains manageable. Operator action highly credible.
A leak in this segment would result in an airborne radiation alarm in the Control Room for the Safeguards area and would also cause the Safeguards sump alarm to actuate in the Control Room. Discharge flow indicators for the Safety Injection Pumps, located in the Control Room would indicate flow anomalies during the injection phase. This segment would be isolated during the recirc phase. The Annunciator Response Procedures for the sump and airborne alarms would direct the Operator to monitor for leakage. Emergency Operating Procedures would direct the Operator to monitor pump flow and performance. Based on sump and radiation alarms, the Operator would locate and then isolate the leak by closing valve 2SIS-MOV-8890A(B). Initially, during the injection phase, both trains would feed the leak. However, Operator action to identify and isolate the leak is estimated to be less than 5 minutes. The estimated time available for the Operators to respond is over 2.5 hours.		

SIS-030A SIS-031A	10" line from check valve 2SIS-6(7) to 2SIS-MOV-8888A(B) and 2SIS-MOV-8887A(B) and 2SIS-MOV-863A(B) and check valve 2SIS-47(46).	Operator actions credible. Quickly identify and resolve. Risk ranking results for 'with operator action'.
SIS-030B SIS-031B	2" drain line from 10" line to closed valve 2SIS-319 (318). 2" vent line from 10" line to closed valve 2SIS-902 (901). 2" drain line from 10" line to closed valve 2SIS-328 (356).	Risk ranking results. Size
A leak in this segment would result in an airborne radiation alarm in the Control Room for the Safeguards area and would cause the Safeguards sump alarm to actuate in the Control Room. The BV2 Safeguards design of train separation allows quick train identification and isolation. Discharge flow indicators for the Safety Injection Pumps, located in the Control Room would indicate flow anomalies during the injection phase. The redundant train would be isolated from the leak during the recirc phase. The Annunciator Response Procedures for the sump and airborne alarms would direct the Operator to monitor for leakage. Emergency Operating Procedures would direct the Operator to monitor pump flow and performance. Based on the sump and radiation alarms, the Operator would locate and then isolate the leak by closing the associated train's MOV's. Initially, during the injection phase, both trains would feed the leak for the SIS-030A and -031A segments. However, Operator action to identify and isolate leak is estimated to be less than 5 minutes. The estimated time available for the Operators to respond is over 1.5 hours for the 10" portion of these segments and longer yet for the 2" portion.		

SIS-039 SIS-040	10" line outside containment from 2SIS-MOV-8888A(B) to containment penetration X-62 (-60).	Operator actions credible. Quickly identify and resolve. Risk ranking results for with operator action.
A leak in this segment would result in an airborne radiation alarm in the Control Room for the Safeguards area and would also cause the Safeguards sump alarm to actuate in the Control Room. The BV2 Safeguards design of train separation allows quick train identification and isolation. Discharge flow indicators for the Safety Injection Pumps, located in the Control Room would indicate flow anomalies during the injection phase. The redundant train would be isolated from the leak during the recirc phase. The Annunciator Response Procedures for the sump and airborne alarms would direct the Operator to monitor for leakage. Emergency Operating Procedures would direct the Operator to monitor pump flow and performance. Based on the sump and radiation alarms, the Operator would locate and then isolate the leak by closing valve 2SIS-MOV-8888A(B). Initially, during the injection phase, both trains would feed the leak. However, Operator action to identify and isolate the leak is estimated to be less than 5 minutes. The estimated time available for the Operators to respond is over 1.5 hours.		