June 3, 2008

Mr. James H. Riley, Director
Engineering
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RE: NUCLEAR ENERGY INSTITUTE (NEI) TOPICAL REPORT (TR) – 103237, "EPRI [EPRI POWER RESEARCH INSTITUTE] MOV [MOTOR-OPERATED VALVE] PERFORMANCE PREDICTION PROGRAM – TOPICAL REPORT" (TAC NO. MD3236)

Dear Mr. Riley:

By letter dated June 8, 2004 (Agencywide Documents Access and Management System Accession No. ML041700093), as supplemented by letter dated January 6, 2006 (ADAMS Accession No. ML060060564), the NEI submitted for U.S. Nuclear Regulatory Commission (NRC) staff review Addenda 3, 4, 5, 6, and 7 to EPRI TR-103237, "EPRI MOV Performance Prediction Program – Topical Report." By letter dated April 23, 2007, the NRC staff issued a Request for Additional Information (RAI) to the NEI. In the letter transmitting the RAI questions, the NRC staff discussed how an additional set of RAI questions might be issued as the review progressed. By letter dated September 27, 2007, the NEI submitted its RAI response (ADAMS Accession Nos. ML072740037 and ML072740038). As the review has progressed, the NRC staff has determined that additional information is needed to complete the review.

On May 30, 2008, Mike Melton, NEI, Senior Project Manager, and I agreed that the NRC staff will receive your response to the enclosed RAI questions by June 30, 2008. If you have any questions regarding the enclosed RAI questions, please contact me at 301-415-3610.

Sincerely,

/RA/

Vanice A. Perin, Project Manager
Special Projects Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 689

Enclosure: RAI questions

cc w/encl: See next page

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Enclosure: RAI questions
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ADAMS ACCESSION NO.: ML081130133 ***concurrence obtained** **NRR-106**

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Project No. 689
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REQUEST FOR ADDITIONAL INFORMATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

TOPICAL REPORT (TR) – 103237, "EPRI [EPRI POWER RESEARCH INSTITUTE]

MOV [MOTOR-OPERATED VALVE] PERFORMANCE PREDICTION PROGRAM

TOPICAL REPORT"

NUCLEAR ENERGY INSTITUTE

PROJECT NO. 689

All section, paragraph, page, table, or figure numbers in the questions below refer to items in TR-103237, unless otherwise specified.

1. Eight-inch and 16-inch gate valve models were developed for Versions 2, 3.1, 3.2, and 3.3 of the performance prediction methodology (PPM) software. Versions 3.1, 3.2, and 3.3 of the software were able to produce identical estimates provided the default body rail misalignment calculations were not used and identical values were entered. However, some of the results were different between Version 2 and the various Versions 3.1, 3.2, and 3.3. The calculated system conditions were identical and the opening thrust values were nearly identical for both the 8-inch and the 16-inch models, as was the closing thrust for the 16-inch model. The closing thrust for each of the Version 3 predictions were identical when using the 8-inch valve model. However, the closing thrust for each of the Version 3 predictions for the 8-inch valve model was about 10 percent lower than the closing thrust for each of the Version 2 predictions. Please provide additional justification for using any of the Version 3 software in light of the nonconservative closing thrust estimates.

2. If the gate valve input is changed from an open and close stroke direction to a close only stroke direction using Versions 3.1, 3.2, or 3.3 of the PPM software, the maximum allowable closing thrust and the actuator opening capability are grayed out, implying that they are no longer. However, when the prediction is performed, the previously entered values for these two parameters are displayed in the output. This could be very misleading to anyone reviewing the calculations, as well as allowing input variables that may not have been verified (as they were grayed out) to potentially be used by others. Please provide additional justification for displaying these grayed out values in the printed output.

3. The body rail misalignment calculation for Version 3.1 of the PPM software appears to display the correct calculated value in the input section after the prediction has been run; however, the value displayed in the report has reversed the sign of the positive offset term. Please provide additional justification for displaying the positive offset term with a reversed sign.

4. Implementation of the inverted guide model in Versions 2.0, 3.1, and 3.2 requires the user to replace selected conventional valve parameters with inverted guide parameter values. The parameters that need to be revised and the procedure to revise them are discussed in Electric Power Research Institute (EPRI) Technical Report 1011290, "Method for Evaluating Gate

ENCLOSURE

Valves with Inverted Guides," dated February 2005. These parameters are summarized in Table 2-2 of EPRI Report 1011290 and include the body rail angular misalignment (degree), the disk slot angular misalignment (degree), and the disk slot misalignment (inches). While all the parameters that were required to be revised were found in the Version 2.0 software, these three parameters could not be found in Versions 3.1 or 3.2. Please discuss how these parameters are to be applied when implementing the inverted guide model in Versions 3.1 and 3.2 of the PPM software.

5. Version 3.3 of the PPM software was used to compare closing thrust values for an 8-inch gate valve with and without inverted guides. In this case, the closing thrusts values for the inverted guide gate valve were 2-3 percent lower than the closing thrust values for the conventional gate valve. The same comparisons were also made for the same 8-inch gate valve using Version 2 of the PPM software. The Version 2 comparisons also showed a 2-3 percent decrease in closing thrust for the inverted gate valve. Please provide additional information discussing the supporting data used to validate/confirm the reduced closing thrust demands associated with an inverted guide gate valve versus a conventional gate valve.

6. The inverted guide gate valve model was developed in 1995; however, the EPRI Report 1011290, published in 2005, states under the "EPRI Perspective" section of the "Product Description" that the method must be considered a "best available" methodology until the model is validated against test results. Please discuss any plans to obtain the necessary test results to benchmark the methodology. If valve testing is not anticipated, please discuss the reasons for not benchmarking the methodology against test results and whether additional margin should be applied to the computed estimates in order to have confidence that the results bound actual valve behavior.

7. For Versions 3.1, 3.2, or 3.3 of the PPM software, if the entry for the butterfly valve inlet diameter is empty, the calculate box is checked, and the user is viewing any screen other than Valve Data (1), an error will be generated when attempting to perform a prediction. The error will continually be generated until the Valve Data (1) screen is visible, at which time the prediction will be performed correctly. Although the resulting value for the inlet diameter is correct, please provide additional justification for requiring the user to be viewing the Valve Data (1) input screen in order to perform a prediction.

8. The Version 2 input conversion feature of either Version 3.1 or 3.2 of the PPM software resulted in an error being generated in the WinPPM module that would terminate the PPM software. Version 3.3 of the PPM software successfully converted a Version 2 input file. Please provide additional justification and insight on how to use these features, and discuss how users of the PPM software will be informed of this additional insight.

9. None of the versions of the PPM software will operate on a machine with the Vista operating system. While the various versions of the software are not advertised to be Vista compatible, consideration should be given to ensuring that future versions of the software will be Vista compatible as the new operating system will become more prominent in the future. Please provide additional insight to future Vista compatibility of the current and future versions of the PPM software.

ENCLOSURE

General NRC Staff Comments – No response is required.

1. The globe valve prediction report for Versions 3.2 and 3.3 report the inputted “upstream” pipe inertias as “downstream” pipe inertias and the inputted “downstream” pipe inertias as “upstream” pipe inertias.

If the air operated valve (AOV) or hydraulic operated valve (HOV) option is selected in either Versions 3.1, 3.2, or 3.3 of the PPM software, the following unexpected software responses were observed:

- MOV specific input information such as the stem type, stem pitch, stem lead are not grayed out.
- The actuator overall ratio and the motor speed are not grayed out unless the option to calculate the stroke time is unchecked.
- The prediction will produce an error if the stroke time is not entered and the “calculate the stroke time” option is checked.
- If the stroke time is entered and the “calculate the stroke time” option is checked, the stroke time will be recalculated and possibly changed based on the various input parameters to the stroke time calculation, even though these input parameters and the resulting calculation are specific to MOVs only.
- The output report has N/A's for the stem pitch and the stem lead, but values are displayed for the stem type, actuator overall ratio and the motor speed. This could be very misleading to anyone reviewing the calculations, as well as allowing input variables that may not have been verified to potentially be used by others.

It is not clear how the AOV or HOV actuator options for Versions 3.1, 3.2, or 3.3 of the PPM software are to be used. For gate valves, it appears that the only inputs relevant to these actuators are the maximum wedging and maximum unwedging. For a valve operating in the opening direction, these values are pertinent since the maximum opening thrust for a gate valve is near unwedging. For a valve operating in the closing direction, the values may not be relevant. In particular, if the actuators are operating on their emergency backup pressure tanks, the pressure could be decreasing throughout the stroke. Since the maximum thrust demands of a gate valve being closed are near closure, the pressure and hence the maximum available thrust, may be less than the maximum actuator thrust specified.