November 3, 2000

MEMORANDUM TO: Stuart A. Richards, Director
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

FROM: Leonard N. Olshan, Project Manager, Section 1
Project Directorate II ***/RA by Stephen Dembek for/***
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF MEETING WITH EPRI TO DISCUSS ADDENDUM 2 TO TOPICAL REPORT ON MOTOR-OPERATED VALVE PERFORMANCE PREDICTION PROGRAM (TAC NO. MA6484)

On September 20, 2000, the Nuclear Regulatory Commission (NRC) and the Electric Power Research Institute (EPRI) met in Rockville, Maryland to discuss Addendum 2, "Thrust Uncertainty Method," to Topical Report TR-103237-R2, "EPRI Motor-Operated Valve Performance Prediction Program." Attachment 1 is a list of the attendees. The handouts provided during the meeting are available under ADAMS accession number ML003754425. These handouts include the meeting agenda provided by EPRI, a description of the thrust uncertainty method provided by the EPRI contractor, and a list of questions provided by the NRC.

At the onset of the meeting, the NEI representative provided an overview of the purpose of the meeting. In particular, NEI suggested that the meeting establish a clear understanding of NRC staff comments on the thrust uncertainty method such that EPRI could prepare timely written responses that would be acceptable to the staff. Following staff review of EPRI responses to the comments, NEI requested that the NRC staff prepare a supplement to the March 15, 1996, safety evaluation on EPRI Topical Report TR-103237-R2 describing the EPRI motor-operated valve (MOV) performance prediction program (PPM).

During the meeting, the EPRI contractor provided a brief description of the thrust uncertainty method. In summary, the thrust uncertainty method attempts to establish the average conservatism in the thrust required to operate gate valves predicted by the EPRI MOV PPM. The thrust uncertainty method then treats the conservatism as a random uncertainty that is statistically combined with other uncertainties. In accomplishing this effort, the method compares the EPRI MOV PPM thrust prediction to the EPRI flow loop test results, and calculates an average prediction ratio for applicable gate valves under either cold or hot water conditions. This method uses this average prediction ratio to reduce the EPRI PPM thrust prediction for a specific valve to a nominal thrust prediction. A thrust prediction uncertainty is then determined from the EPRI MOV PPM thrust prediction and the nominal thrust prediction obtained from the thrust uncertainty method. Finally, the thrust uncertainty method establishes a minimum required thrust to be provided at the control switch trip based on the nominal thrust prediction combined with bias and random uncertainties (including the thrust prediction

uncertainty). EPRI applied data from 19 strokes of 12 valves tested as part of the EPRI MOV PPM in its validation effort for the thrust uncertainty method.

During the meeting, the NRC staff provided a list of questions to EPRI regarding the thrust uncertainty method. The NRC staff and EPRI discussed each of the staff comments and the initial response by EPRI to those comments. Following the discussion of the comments, the staff described the three major issues regarding the acceptability of the thrust uncertainty method. First, if the valves used in calculating the conservatism of the EPRI MOV PPM as part of the thrust uncertainty method were not fully preconditioned, the thrust required to operate the valves might increase with age. If so, the thrust uncertainty method might become inadequate to ensure the capability of those valves over time and service. Second, since the EPRI MOV PPM was developed as a first-principles model rather that a statistical database model, it is not clear that sufficient test data are available to determine a reliable prediction of the conservatism of the EPRI MOV PPM for a wide range of valve types and conditions. The staff noted that the results of the EPRI separate-effects tests studying the friction coefficient of the Stellite material used on valve seating surfaces might help support the conservatism of the EPRI MOV PPM. Third, the validation of the thrust uncertainty method as described in Addendum 2 to the EPRI topical report did not provide a clear indication that the valves included in the validation effort would continue to be able to perform acceptably if their torque switches were set using the thrust uncertainty method. For example, the application of the rate-of-loading margin determined from all of the EPRI MOV PPM gate valve test data might not be appropriate for the selected valves used in the validation of the thrust uncertainty method. The staff also noted the comparison of the prediction ratio for the torque switch thrust determined by the thrust uncertainty method to prediction ratio for the dynamic thrust requirement determined by the EPRI MOV PPM did not provide adequate support for the continued capability of the valves used in the validation of the thrust uncertainty method. At the conclusion of the meeting, the NRC staff and EPRI agreed that the meeting was successful in providing a clear understanding of the NRC staff comments on the thrust uncertainty method.

Over the next few weeks, EPRI will prepare written responses to the NRC staff's questions on the thrust uncertainty method. EPRI will provide those responses to NEI in late October so that the staff can prepare a safety evaluation accepting the thrust uncertainty method with appropriate conditions and limitations. As part of that review, the staff will determine whether any follow-up discussions are necessary with NEI and EPRI.

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Attachment: List of Meeting Attendees

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MEETING TO DISCUSS ADDENDUM 2 TO EPRI TOPICAL REPORT TR-103237

SEPTEMBER 20, 2000

MEETING ATTENDEES

NRC

J. Jackson
M. Marshall
T. Scarbrough
D. Terao

EPRI

J. Hosler

OTHER

J. Riley, NEI
J. Watkins, INEEL
P. Damerell, MPR Associates
T. Walker, MPR Associates