James A. Spina
Vice President

Calvert Cliffs Nuclear Power Plant, Inc.
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657
410.495.4455
410.495.3500 Fax

Constellation Energy
Generation Group

June 12, 2006

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 1; Docket No. 50-317
Flaw Evaluation of Dissimilar Metal Weld Flaws Identified by Ultrasonic Testing - Response to Questions

REFERENCE: (a) Letter from Mr. J. A. Spina (CCNPP) to Document Control Desk (NRC), dated May 31, 2006, ASME Code Section XI Flaw Evaluation of Dissimilar Metal Weld Flaws Identified by Ultrasonic Testing

Calvert Cliffs Nuclear Power Plant staff conducted a conference call with the U.S. Nuclear Regulatory Commission (NRC) staff on March 21, 2006. The purpose of this conference call was to review the results of Alloy 600 Dissimilar Metal weld examinations performed during the Unit 1 refueling outage in-progress. The responses to the NRC staff questions are attached (Attachment 1).

The results of the flaw evaluations subject to NRC approval were forwarded in a separate submittal, dated May 31, 2006 (Reference a). While these results were subject to NRC approval in accordance with American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Article IWB-3640, the mitigation technique used (Mechanical Stress Improvement Process) has been under separate NRC review via MRP-139, Primary System Piping Butt Weld Inspection and Evaluation Guideline. The responses included herein are relevant to both the NRC review of the Calvert Cliffs Nuclear Power Plant flaw evaluation and the review of MRP-139. For this reason, this response was not included with the ASME Section XI Code required flaw evaluation submittal.

Should you have questions regarding this matter, please contact Mr. L. S. Larragoite at (410) 495-4922.

Very truly yours,

JAS/MJY/bjd

Attachment: (1) Response to NRC Questions Re: CCNPP Flaw Evaluation of Dissimilar Metal Welds Identified by Ultrasonic Testing

A047

cc: P. D. Milano, NRC
S. J. Collins, NRC
Resident Inspector, NRC
R. I. McLean, DNR

ATTACHMENT (1)

RESPONSE TO NRC QUESTIONS RE:

CCNPP FLAW EVALUATION OF DISSIMILAR METAL WELDS

IDENTIFIED BY ULTRASONIC TESTING

Calvert Cliffs Nuclear Power Plant, Inc.
June 12, 2006

ATTACHMENT (1)

RESPONSE TO NRC QUESTIONS RE: CCNPP FLAW EVALUATION OF DISSIMILAR METAL WELDS IDENTIFIED BY ULTRASONIC TESTING

NRC Question:

(1) Provide details of sample expansion at Unit 1 and discuss the extent of condition for both units (Units 1 and 2).

CCNPP Response:

Per the pre-planned weld expansion list, one additional dissimilar metal (DM) weld examination and three additional surge line weld examinations were performed. No additional indications were identified as a result of the expanded scope. All high temperature DM welds were included in the Base Plan for the Unit 1 Refueling Outage. Evaluation showed all indications to be acceptable in size by American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code acceptance standard or ASME B&PV Code evaluation criteria. A number of DM welds were examined on Unit 2 during the 2005 refueling outage. These results provide reasonable assurance that there are no conditions on the Unit 2 DM welds that exceed ASME B&PV Code criteria. All high temperature DM welds are planned to be examined during the Unit 2 2007 refueling outage.

NRC Question:

(2) Discuss the quality of UT [ultrasonic examination] inspection including whether all UT examinations performed were PDI [Performance Demonstration Initiative] qualified and the uncertainties in sizing.

CCNPP Response:

All ultrasonic tests (UT) were performed by PDI qualified personnel and procedures. The sizing procedure is also PDI qualified, which requires demonstrating that sizing meets the acceptance criteria of ASME B&PV Code, Section XI, Appendix VIII.

NRC Question:

(3) Discuss your future inspection schedule for dissimilar metal welds (both flawed and not flawed welds) and the successive examination of the flawed welds. If RI-ISI [Risk Informed/Inservice Inspection] program is implemented at Calvert Cliffs, how would the program be revised to ensure timely detection of such cracking in susceptible welds.

CCNPP Response:

The DM weld examinations must meet both ASME Section XI and MRP-139 requirements. The DM weld examination schedule is principally governed by MRP-139 requirements. In-Service Inspection and Corrective Action Program inspection requirements will be satisfied as well. Flawed welds found to be acceptable by Analytical Evaluation will be examined during the next three inspection periods to satisfy the requirements of ASME B&PV Code Section XI IWB-3132.3. Additionally, MRP-139, Table 6.1 Category G examination requirements will apply to successive examinations of flawed welds. The Risk Informed In-Service Inspection Program for Calvert Cliffs is being revised to add all two-inch and greater DM welds in the examination sample to ensure timely detection of cracking in susceptible welds.

NRC Question:

(4) Discuss the root cause of the observed cracking.

CCNPP Response:

Due to the proximity of the flaws to the inner (wetted) surface of the weld, combined with the relatively high operating temperature of these nozzles, and the absence of fabrication radiograph testing or baseline exam indications, it was conservatively assumed the flaws in all three welds were the result of primary water stress corrosion cracking. The two circumferential indications may be the result of original fabrication defects but the lack of construction radiography indications and pre-service or prior in-service ultrasonic indications can not substantiate this.

NRC Question:

(5) Provide and discuss the results of the previous inspections (both RT [radiograph testing] and UT) performed on the flawed welds.

CCNPP Response:

Original radiograph and Pre-Service Inspection/Inservice Inspection UT data on the Unit 1 welds containing indications were reviewed. No indications were recorded which correlate to the indications identified in this recent examination. The ultrasonic examination of these welds during the 2006 refueling outage was the first examination of these welds utilizing PDI qualified examiners and procedures.

NRC Question:

(6) Provide the results of post-MSIP [Mechanical Stress Improvement Process] UT examinations of flawed welds and discuss the reasons for not being able to see the circumferential flaws after MSIP. The licensee indicated that the small axial crack is still visible after MSIP. Would that indicate that the MSIP process did not produce enough compressive residual stresses at the crack tip to make the axial crack invisible? This may lead to the concern regarding the adequacy of the MSIP process.

CCNPP Response:

It is not uncommon to see indications disappear or remain in the weld after MSIP. Post-MSIP UT examinations were performed on every weld receiving the treatment.

Post-MSIP UT examinations revealed no response that could be discerned as the original pre-MSIP indication in the two welds containing circumferential flaws [12CC2-1001(W13) and 2CC9-1007(W1)].

The post-MSIP UT of the indication in the weld containing the axial flaw [4CC10-1006(W1)] did reveal the original pre-MSIP indication although, generally speaking, the amplitude of the return from the reflector had decreased. Sizing of the indication produced the same results as expected. The MSIP will have no effect on the size of the flaws. In our discussion with the Electric Power Research Institute we have learned that they have experienced flawed demonstration specimens compressed to the point that detection is not possible.