

James H. Lash
Site Vice President

724-682-5234
Fax: 724-643-8069

October 5, 2006
L-06-146

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

**Subject: Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
Supplemental Information Regarding Proposed Alternative to American
Society of Mechanical Engineers Code Section XI Repair Requirements
(Request No. BV2-PZR-01)**

By letter dated March 31, 2006 (L-06-038), the FirstEnergy Nuclear Operating Company (FENOC) requested Nuclear Regulatory Commission (NRC) approval of a proposed alternative to American Society of Mechanical Engineers (ASME) Code Section XI requirements, in support of weld overlay repairs for Beaver Valley Power Station (BVPS) Unit No. 2 pressurizer nozzles. The overlay design does not include any new or different approaches that are considered first of a kind or are inconsistent with previous applications. Each overlay is designed as a full structural overlay in accordance with ASME Code Case N-504-2 and Section XI, Nonmandatory Appendix Q.

After review, the NRC provided a Request for Additional Information (RAI) by letter dated July 26, 2006. FENOC responded to the RAI by letter dated August 8, 2006 (L-06-123). Subsequently, the NRC communicated the need for supplemental information by electronic mail and follow-up teleconference on September 21, 2006. FENOC provided the supplemental information by letter dated September 27, 2006 (L-06-142).

During a teleconference on October 2, 2006, the NRC requested additional detail relating to the responses provided in FENOC's September 27, 2006 letter. Specifically, the NRC staff requested additional technical detail justifying proposed ultrasonic testing (UT) acceptance criteria, as well as clarification of commitments for reporting UT examination results. Attachment 1 includes the requested supplemental information as part of a complete response to the questions provided by the NRC on September 21, 2006, and is intended to replace, in its entirety, the supplemental information provided on September 27, 2006.

Additionally, the revised commitment regarding the inclusion of the pressurizer weld overlays in the BVPS Unit No. 2 Inservice Inspection Plan supersedes the commitment included in the March 31, 2006 letter. Regulatory commitments submitted with this letter are listed in Attachment 2.

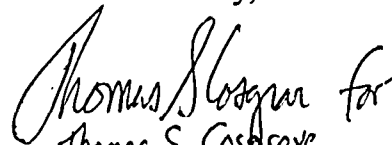
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As stated in the March 31, 2006 letter, FENOC requests approval of the relief request to support the subject weld overlay repairs, scheduled to begin on October 5, 2006.

If there are any questions or if additional information is required, please contact Mr. Gregory A. Dunn, Manager FENOC Fleet Licensing at (330) 315-7243.

Sincerely,


Thomas S. Costgrove
James H. Lash

Attachments:

1. Supplemental Information for Relief Request No. BV2-PZR-01.
2. Regulatory Commitments.

cc: Mr. T. G. Colburn, NRR Senior Project Manager
Mr. P. C. Cataldo, NRC Senior Resident Inspector
Mr. S. J. Collins, NRC Region I Administrator
Mr. D. A. Allard, Director BRP/DEP
Mr. L. E. Ryan (BRP/DEP)

SUPPLEMENTAL INFORMATION FOR
RELIEF REQUEST NO. BV2-PZR-01
BEAVER VALLEY POWER STATION, UNIT NO. 2
FIRSTENERGY NUCLEAR OPERATING COMPANY
DOCKET NO. 50-412

- 1. Identify the UT acceptance criteria that will be used for the complete full structural weld overlay and heat affected zone beneath the weld overlay. If the acceptance criteria to be used are not consistent with the respective positions stated in Regulatory Guide 1.147, Rev. 14, for the applicable code cases, provide the technical bases for its use.**

Response:

Pre-service ultrasonic examinations will be performed in accordance with Code Case N-504-2 and Q-4000 of Nonmandatory Appendix Q at least 48-hours after the completed overlay has returned to ambient temperature. The results will be evaluated in accordance with acceptance criteria of Code Case N-504-2, Paragraph (i), and Nonmandatory Appendix Q, Paragraph Q-4100(c), which invoke the acceptance criteria of ASME Section XI IWB-3514-2 and IWB-3514-3, in lieu of the acceptance criteria of NB-5330 of ASME Section III.

The acceptance criteria stated in the applicable code cases in relation to the respective positions contained in Regulatory Guide 1.147, Rev. 14 will not be utilized. The Section III criteria required by the condition imposed in Regulatory Guide 1.147 for the generic use of Code Case N-638-1 address concerns relating to deep cavity base material repairs that are not applicable to its use in weld overlay applications. Acceptance criteria of ASME Section XI Code Case N-504-2 and Nonmandatory Appendix Q in lieu of those of NB-5330 of ASME Section III are the most appropriate for weld overlay applications of Code Case N-638-1 and provide an acceptable level of quality and safety.

Code Case N-638-1 applies to any type of welding in which a temper bead technique is employed and is not specifically written for a weld overlay repair. For a weld overlay, any base material cracking would take place in the Heat Affected Zone directly below the weld overlay or in the underlying Alloy 82/182 weld deposit and not in the required band of material out beyond the overlay. Therefore, any cracking that occurs would be identified by the ultrasonic examination of the weld overlay in accordance with N-504-2 and Nonmandatory Appendix Q. The acceptance criteria required by Code Case N-504-2 and Nonmandatory Appendix Q are specifically tailored to the design and application of structural weld overlays to ensure that the overlay and underlying piping are capable of performing their design function, as specified in the design requirements of the Code Case and corresponding Appendix.

ASME Section XI pre-service acceptance standards, as specified in Appendix Q, are the appropriate standards for pre-service ultrasonic examinations of weld overlay repairs to nuclear plant components. These standards are consistent with the highly sensitive examination procedures being used, which are qualified in accordance with ASME Section XI, Appendix VIII, Supplement 11, as implemented via the EPRI Performance Demonstration Initiative (PDI). The post-repair inspection volume includes the full thickness

of the weld overlay plus 25% of the underlying base metal/weldment thickness. The specimen sets for PDI qualification of weld overlay examinations include construction type flaws in the overlays in addition to simulated service flaws in the underlying base metal and weldment. Therefore, use of PDI-qualified personnel and procedures will result in the reliable detection of construction type flaws.

The ASME Section XI flaw acceptance standards are based on fracture mechanics principles that evaluate the potential effect of flaw indications on the safe operation of a component. ASME Section III ultrasonic standards, on the other hand, are derived from radiographic standards in earlier construction codes and tend to be workmanship-based, addressing flaws occurring in the original construction process that are likely to be detected by radiography. The ASME Section III acceptance criteria do not allow the presence of any cracks or crack-like indications, regardless of their size, and are geared more towards construction-type welds. Many indications that are detectable by PDI qualified ultrasonic techniques, and thus require evaluation, would not be detected by the radiographic examinations required by the original construction code or Section III. It is therefore not reasonable, nor technically logical, to reject such indications based on out-dated, workmanship-based standards when found by much more sensitive examination techniques that are not required by the construction codes.

The Section XI pre-service examination standards were developed for exactly the above-stated reasons, and consider the materials in which the flaw indications are detected, the orientation and size of the indications, and ultimately their potential structural impact on the component. They are the logical choice for evaluation of potential flaw indications in post-overlay examinations, in which unnecessary repairs to the overlay would result in additional personnel radiation exposure without a compensating increase in safety and quality, and could potentially degrade the effectiveness of the overlays by affecting the favorable residual stress field they could produce.

- 2. Provide a commitment to submit within 14 days from completion of UT examination of the weld overlays, a report that summarizes the results of the examinations, consistent with the September 14, 2006 letter from Exelon to the NRC regarding Byron Station, Unit 1 Relief Request 13R-03.**

Response:

Acceptance of ultrasonic indications in weld overlay repairs using Section XI acceptance criteria has been approved by NRC in past weld overlay applications (References 1 and 2). Within 14 days of completion of the last ultrasonic examination of the 2R12 refueling outage, the following information will be submitted in a report that summarizes the examination results of the pressurizer spray nozzle, relief nozzle, three safety nozzles, and surge nozzle weld overlays for safe end-to-pipe and nozzle-to-safe end locations implemented during the 2R12 refueling outage:

- A listing of all indications detected,¹
- The disposition of all indications using the standards of ASME Section XI, IWB 3514-2 and/or IWB 3514-3 criteria, and, if possible,
- The type and nature of the indications.²

Also included in the results will be a discussion of any repairs to the overlay material and/or base metal and the reason for the repair.

Subsequent Inservice Examination of the structural weld overlays on pressurizer nozzles will be in accordance with ASME Section XI, Appendix Q, Q-4300. The installed weld overlays will be added to the Beaver Valley Unit No. 2 Inservice Inspection Plan in accordance with Subarticle Q-4300 of Nonmandatory Appendix Q.

References

1. Safety Evaluation by the Office of Nuclear Reactor Regulation related to Three Mile Island Nuclear Station, Unit 1 (TMI-1) Request for Relief from Flaw Removal, Heat Treatment and Non-Destructive Examination (NDE) Requirements for the Third 10-Year Inservice Inspection (ISI) Interval, Amergen Energy Company, LLC Docket No. 50-289, July 21, 2004.
2. Safety Evaluation by the Office of Nuclear Reactor Regulation Inservice Inspection Program Relief Request ISIR-17, Donald C. Cook Nuclear Plant, Unit 1 (DCCNP-1), Indiana Michigan Power, Docket No. 50-315, February 10, 2006.

¹ The recording criteria of the ultrasonic examination procedure to be used for the examination of the Beaver Valley Unit 2 pressurizer overlays (PDI-UT-8, Revision F) requires that all indications, regardless of amplitude, be investigated to the extent necessary to provide accurate characterization, identity, and location. Additionally, the procedure requires that all indications, regardless of amplitude, that cannot be clearly attributed to the geometry of the overlay configuration be considered flaw indications.

² Ultrasonic examination procedure PDI-UT-8, Revision F requires that all suspected flaw indications are to be plotted on a cross sectional drawing of the weld and that the plots should accurately identify the specific origin of the reflector.

REGULATORY COMMITMENTS

The following list identifies those actions committed to by FirstEnergy Nuclear Operating Company (FENOC) for Beaver Valley Power Station (BVPS) Unit No. 2 in this document. Any other actions discussed in the submittal represent intended or planned actions by FENOC. They are described only as information and are not regulatory commitments. Please notify Mr. Gregory A. Dunn, Manager, Fleet Licensing at 330-315-7243 of any questions regarding this document or associated regulatory commitments.

<u>Commitment</u>	<u>Due Date</u>
<p>The following information will be submitted in a report that summarizes the examination results of the pressurizer spray nozzle, relief nozzle, three safety nozzles, and surge nozzle weld overlays for safe end-to-pipe and nozzle-to-safe end locations implemented during the 2R12 refueling outage:</p> <ul style="list-style-type: none"> • A listing of all indications detected, ¹ • The disposition of all indications using the standards of ASME Section XI, IWB 3514-2 and/or IWB 3514-3 criteria, and, if possible, • The type and nature of the indications. ² <p>Included in the results will be a discussion of any repairs to the overlay material and/or base metal and the reason for the repair. The report will be submitted within 14 days of completion of the last ultrasonic examination of the 2R12 refueling outage.</p>	<p>Within 14 days of completion of the last ultrasonic examination of the 2R12 refueling outage.</p>
<p>The installed weld overlay will be added to the Beaver Valley Unit No. 2 Inservice Inspection Plan in accordance with Subarticle Q-4300 of Nonmandatory Appendix Q.</p>	<p>Within one year following installation.</p>

¹ The recording criteria of the ultrasonic examination procedure to be used for the examination of the Beaver Valley Unit 2 pressurizer overlays (PDI-UT-8, Revision F) requires that all indications, regardless of amplitude, be investigated to the extent necessary to provide accurate characterization, identity, and location. Additionally, the procedure requires that all indications, regardless of amplitude, that cannot be clearly attributed to the geometry of the overlay configuration be considered flaw indications.

² Ultrasonic examination procedure PDI-UT-8, Revision F requires that all suspected flaw indications are to be plotted on a cross sectional drawing of the weld and that the plots should accurately identify the specific origin of the reflector