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10 CFR 50.55a

5928-05-20279
September 26, 2005

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Three Mile Island, Unit 1
Facility Operating License No. DPR-50
NRC Docket No. 50-289

Subject: Response to Request for Additional Information
Request for Relief to Utilize Code Case N-638-1, Similar and Dissimilar Metal Welding Using Ambient Temperature Machine GTAW Temper Bead Technique, Section XI, Division 1

Reference: Letter from P. B. Cowan (AmerGen Energy Company, LLC) to U. S. Nuclear Regulatory Commission, dated August 16, 2005

In the referenced letter, AmerGen Energy Company, LLC (AmerGen) requested relief from American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," on the basis that the proposed alternative provides an acceptable level of quality and safety. Specifically, this proposed alternative concerns the use of Code Case N-638-1.

We requested your review and approval by October 15, 2005, in order to support modifications planned for the upcoming Three Mile Island, Unit 1 refueling outage.

Attached is our response to questions discussed with the U.S. Nuclear Regulatory Commission in a conference call dated September 14, 2005.

If you have any questions, please contact Mr. Thomas R. Loomis (610-765-5510).

Respectfully,

Pamela B. Cowan
Director, Licensing & Regulatory Affairs
AmerGen Energy Company, LLC

Attachments: 1) Response to Request for Additional Information
2) Revised Relief Request

cc: S. J. Collins, Regional Administrator, Region I, USNRC
D. M. Kern, USNRC Senior Resident Inspector, TMI
P. S. Tam, Senior Project Manager, USNRC
File No. 05056

ATTACHMENT 1

Response to Request for Additional Information

Question 1:

"On page 2 of the relief request, AmerGen states, "AmerGen Energy Company, LLC (AmerGen) will implement the requirements of ASME Code Case N-638-1 for applicable Class 1 components. N-638-1 will be utilized for, but not limited to, a pressurizer vent nozzle modification scheduled for the upcoming refueling outage in Fall 2005." The relief request also states, "TMI, Unit 1 is requesting the use of the Code Case in its entirety, for the remainder of the interval for all Class 1 components, as specified in the Code Case." The relief request must state the specific conditions under which it may be used, such as is shown in Attachment 2 to the relief request. All other requests for relief shall be made on a case-by-case basis."

Response:

This code case will be limited to the identified modification discussed in the relief request. Attached is the relief request which has been solely revised to reflect this limitation.

Question 2:

"Item b) on Page 1 of Attachment 2, "Description of the Modification" states, "A portion of the existing Alloy 600 nozzle outside the pressurizer head and the original NiCrFe weld pad surrounding the vent nozzle will be removed." It is unclear whether this original NiCrFe weld pad is inside the pressurizer or outside the pressurizer, since it does not appear that there was any original weld on the outside of the pressurizer, but the sentence above leads one to believe that this weld is outside the pressurizer. Please clarify this statement."

Response:

The "original NiCrFe weld pad" is on the outside of the pressurizer, and was included as part of the pressurizer design as a contingency repair location. The original pressure boundary weld is the J-Groove weld on the inside of the pressurizer. An etching process will be performed that will validate the removal of the existing pad on the outside.

Question 3:

"Item c) on Page 1 of Attachment 2, "Description of the Modification" states, "A weld buildup (i.e. - weld pad) will be deposited at the outer surface of the pressurizer head centered at the vent nozzle opening. The weld pad will be deposited using the Machine Gas Tungsten Arc Welding (GTAW) ambient

temperature temper bead process and austenitic stainless steel filler metal." Is the austenitic stainless steel filler metal compatible with the pressurizer head carbon steel base material? That is, how will the licensee prevent decarburization and the resulting loss of fracture toughness in the carbon steel base material? Also, how will the licensee prevent dilution of the austenitic stainless steel filler metal and the resultant potentially brittle weld from chromium dilution?"

Response:

The weld build-up (i.e., weld pad) will be performed using the GTAW temper bead welding process and 309L filler metal for the initial layer. The 309L filler metal has a high enough chromium content to prevent a potentially brittle weld through chromium dilution. The welding procedure for this modification has been qualified in accordance with ASME. This qualification includes demonstration of acceptable tension and side bend results of the weld and Heat Affected Zone (HAZ), and acceptable Charpy V-Notch (CVN) tests of the HAZ. The acceptable CVN tests of the HAZ demonstrate no loss of fracture toughness in the carbon steel pressurizer to stainless steel filler metal HAZ interface, thus there are no concerns associated with base material decarburization.

ATTACHMENT 2

Revised Relief Request

THREE MILE ISLAND, UNIT 1
RELIEF REQUEST
RR-00-22

ASME Code Components Affected

ASME Class 1 components

Applicable Code Edition and Addenda

Three Mile Island, Unit 1 Inservice Inspection Program complies with the ASME Code Section XI, 1995 Edition, 1996 Addenda. The third ten-year interval began on April 20, 2001, and is scheduled to conclude on April 19, 2011.

Applicable Code Requirement

As required by ASME Boiler and Pressure Vessel Code (Code), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1995 Edition, through the 1996 Addenda:

1. IWA-4600(b)(1), "Alternative Welding Methods", states – "The welding methods of IWA-4620, IWA-4630, or IWA-4640 may be used in lieu of the welding and nondestructive examination requirements of the Construction Code or Section III, provided the requirements of IWA-4610 are met."

As required by ASME Code Section XI, 1995 Edition, through 1996 Addenda:

1. IWA-4610(a), "General Requirements For All Materials", states in part – "The area to be welded plus a band around the area of at least 1-1/2 times the component thickness or 5 in., whichever is less, shall be preheated and maintained at a minimum temperature of .... 300°F for the GTAW process during welding."

2. IWA-4633.2(d), "Gas Tungsten-Arc Welding", which is a subsection to IWA-4630 ("Dissimilar Materials") states in part – " After at least 3/16 in. of weld metal has been deposited, the weld area shall be maintained at a minimum temperature of 300°F for a minimum of 2 hr in P-No. 1 materials."

Reason for Request

In accordance with 10CFR50.55a(a)(3)(i), Three Mile Island (TMI), Unit 1 is requesting relief from IWA-4610 and 4633.2 with regards to the use of preheat or postweld heat treatment.

In lieu of these requirements, TMI, Unit 1 proposes to utilize Code Case N-638-1, "Similar and Dissimilar Metal Welding Using Ambient Temperature Machine GTAW

Temper Bead Technique, Section XI, Division 1". Specifically, TMI, Unit 1 is proposing to perform a portion of the modification with a remotely operated weld tool, utilizing the machine Gas Tungsten Arc Welding (GTAW) process and the ambient temperature temper bead method with 50°F minimum preheat temperature, as described in Code Case N-638-1. TMI, Unit 1 is requesting the use of the Code Case in its entirety.

Proposed Alternative and Basis for Use

AmerGen Energy Company, LLC (AmerGen) will implement N-638-1 for the pressurizer vent nozzle modification scheduled for the upcoming refueling outage in Fall 2005.

Currently, Regulatory Guide 1.147, Revision 13, "Inservice Inspection Code Case Acceptability, ASME, Section XI, Division 1", dated January 2004, lists Code Case N-638 as an acceptable Section XI Code Case for use. TMI, Unit 1 proposes to use Revision 1 to Code Case N-638 as part of the pressurizer vent nozzle modification during the upcoming Fall 2005 refueling outage. Code Case N-638-1 was included in proposed Revision 14 to Regulatory Guide 1.147 as discussed in Federal Register Notice FR 46597, dated August 3, 2004 (issued as Draft Regulatory Guide DG-1125, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1", dated April 2004). Revision 14 has not yet been formally approved by the NRC.

Current plans are to utilize Code Case N-638-1 to perform modifications of the 1-inch vent nozzle located on the top of the pressurizer. As discussed in a conference call with the NRC on July 7, 2005, TMI, Unit 1 has embarked on an extensive mitigation strategy for Alloy 82/182/600 pressurizer welds. Of the 16 pressurizer penetrations containing Alloy 82/182/600 that were identified in our July 27, 2004 response to Bulletin 2004-01 (Reference 2), current plans have been established to mitigate the identified welds during the upcoming outages. These plans include mitigation of seven (7) locations in the upcoming fall of 2005 refueling outage (T1R16) which include the 1-inch vent nozzle located on the top of the pressurizer. This line is identified in Figure 2A of our response to Bulletin 2004-01 (Reference 2).

Current Code requirements require a 300°F minimum preheat temperature when welding on the pressurizer head base material including maintenance thereof for two (2) hours after completion of the 3/16 inch of weld deposit. In order to perform this treatment on the 1-inch vent nozzle weld pad, an additional radiation dose of 700 mRem to 1 Rem is expected. TMI, Unit 1 will avoid this additional dose through the use of Code Case N-638-1, in its entirety. TMI, Unit 1 will also comply with the additional condition specified in the draft Revision 14 to Regulatory Guide 1.147 concerning UT examinations as stated below:

> "UT volumetric examinations shall be performed with personnel and procedures qualified for the repaired volume and qualified by demonstration using representative samples which contain construction type flaws. The acceptance criteria of NB-5330 in the 1998 Edition through 2000 Addenda of Section III apply to all flaws identified within the repaired volume."

Framatome ANP, the modification vendor, will be developing the appropriate techniques to address this additional condition.

Performing the heat treatments is also expected to add 36 additional hours to the modification.

As discussed in the "Reply" section of Code Case N-638, this Code Case can be applied "...without the specific preheat or post weld heat treatment of the Construction Code, when it is impractical, for operational or radiological reasons, to drain the component..." Code Case N-638 would not be applicable to the modification of the 1-inch line because the preheat and post weld heat treatment does not require the draining of the component (i.e., the pressurizer).

The applicability of this Code Case was revised in the "Reply" section of Code Case N-638-1 such that this revision of the Code Case can be applied to the 1-inch vent nozzle modification. The "Reply" section was revised to state that this Code Case can be applied "...without the specific preheat or postweld heat treatment of the Construction Code, when it is impractical to drain the component *or impractical for radiological reasons.*"

This administrative clarification provided in Code Case N-638-1 extends the impracticality to draining the component *or impractical for radiological reasons*. The previous version (Code Case N-638) was only applicable to the impracticality associated with the draining of the component, and the radiological consequences involved in draining the component.

Therefore, Code Case N-638-1 would be applicable to the 1-inch vent nozzle modification because, as stated previously, performing the modification in accordance with the ASME Code requirements would result in an additional radiation dose of 700 mRem to 1 Rem, which is a provision described in Code Case N-638-1. TMI, Unit 1 will avoid this additional dose through the use of Code Case N-638-1, in its entirety, and the application of the additional condition specified in the draft Regulatory Guide 1.147, Revision 14.

The technical content of the code cases remain essentially the same.

Based on the previous NRC acceptance of Code Case N-638, and the administrative clarification provided in the "Reply" section of N-638-1, use of Code Case N-638-1 with the additional draft Regulatory Guide 1.147, Revision 14 condition will provide an acceptable level of quality and safety.

A "Description of the Modification" that will be used for the vent nozzle modification, including a discussion of the modification, the procedure qualification and weld quality, is contained in Reference 3.

Duration of Proposed Alternative

TMI, Unit 1 is requesting the use of the Code Case in its entirety, as specified in the Code Case.

References

1) NRC Bulletin 2004-01, "Inspection of Alloy 82/182/600 Materials Used in the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors," dated May 28, 2004

2) Letter from K. Jury (Exelon Generation Company, LLC and AmerGen Energy Company, LLC) to U. S. Nuclear Regulatory Commission, dated July 27, 2004

3) Letter from P. B. Cowan (AmerGen Energy Company, LLC) to U. S. Nuclear Regulatory Commission, dated August 16, 2005