May 7, 2001

Gary Van Middlesworth
Site General Manager
Duane Arnold Energy Center
Nuclear Management Company, LLC
3277 DAEC Road
Palo, Iowa 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER - SAFETY EVALUATION FOR THE PROPOSED ALTERNATIVE TO THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI REQUIREMENTS FOR USE OF CODE CASE N-516-1(TAC NO. MB1822)

Dear Mr. Van Middlesworth:

In a letter dated May 1, 2001, Nuclear Management Company, LLC (NMC), the licensee for the Duane Arnold Energy Center (DAEC), submitted relief request NDE-R042 for the use of ASME Code Case N-516-1 as a proposed alternative to ASME Section XI. The Nuclear Regulatory Commission (NRC) staff has reviewed the proposed alternative examination against the requirements of ASME Boiler and Pressure Vessel Code (the Code), Section XI, 1992 Edition Subsection IWA pursuant to Section 50.55a of Part 50 of Title 10 of the *Code of Federal Regulations*.

Based on the information provided in the relief request, the NRC staff concludes that Relief Request NDE-R042 for the proposed alternative to use the Code Case N-516-1 would result in an acceptable level of quality and safety. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i). The Code Case N-516-1 alternative that is authorized herein is acceptable for implementation for the third 10-year interval. The authorization of the alternative is based upon the fulfillment of a commitment made by NMC, in the basis for the proposed alternative. The use of Code Case N-516-1 with the commitment made by the licensee is authorized until such time as the code case is published in a future revision of Regulatory Guide (RG) 1.147. At that time, if the licensee intends to continue to implement Code Case N-516-1, the licensee is to follow all provisions in the code case with limitations or conditions specified in the RG 1.147, if any. The NRC staff's safety evaluation (SE) is enclosed.

If you have any questions regarding this issue or SE, please contact your Project Manager, Brenda L. Mozafari at 301-415-2020.

Sincerely,

/RA/

Claudia M. Craig, Chief, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure: Safety Evaluation

cc w/encl: See next page

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Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST NDE-R042 TO USE CODE CASE N-516-1 AS AN

ALTERNATIVE FROM THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

SECTION XI REQUIREMENTS

NUCLEAR MANAGEMENT COMPANY, LLC

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

1.0 INTRODUCTION

The inservice inspection of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Class 1, Class 2, and Class 3 components is to be performed in accordance with Section XI of the ASME Code and applicable editions and addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the Nuclear Regulatory Commission (NRC), if the licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, “Rules for Inservice Inspection of Nuclear Power Plant Components,” to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) on the date twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The inservice inspection (ISI) Code of record for Duane Arnold Energy Center (DAEC) for the third 10-year interval is the 1989 Edition of the ASME Code. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

ENCLOSURE

The NRC staff has reviewed the information submitted by the licensee, in a letter dated May 1, 2001, requesting relief from certain Code-required criteria. Specifically, the licensee's proposed alternative is to perform a weld repair underwater according to Code Case (CC) N-516-1 for the third 10-year ISI interval at DAEC.

2.0 RELIEF REQUEST NDE-R042, CODE CASE N-516-1, "UNDERWATER WELDING SECTION XI, DIVISION 1"

2.1 Code Requirement for which Relief is Requested

The licensee's repair and replacement code of record is the 1992 Edition with 1992 Addenda of Section XI of the ASME Code[1]. IWA-4000, "Repair and Replacement," requirements apply. However, Code is silent on underwater welding repairs.

2.2 Licensee's Proposed Alternative to Code

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed implementing the provisions of ASME CC N-516-1, "Underwater Welding," with the following limitation:

> "When welding is to be performed on high neutron fluence Class 1 material, then a mockup, using material with similar fluence levels, should be welded to verify that adequate crack prevention measures were used."

The proposal is for the third 10-year ISI interval.

2.3 Licensee's Bases for Alternative (as stated)

> "ASME Section XI, IWA-4000 (1992 edition with the 1992 addenda), does not address the requirements for welded repair or installation of replacement items by welding on ASME Class 1, 2, 3 and MC pressure boundary components when welding is performed underwater. To address this issue, ASME Section XI, has issued Code Case N-516-1, "Underwater Welding." Code Case N-516-1 provides welding methods and requirements that may be used when welding for a repair, or replacement activity is performed underwater.
>
> Code Case N-516-1 was approved by the ASME Boiler and Pressure Vessel Code Committee on December 31, 1996, but is not yet endorsed in the most recent listing of NRC-approved code cases provided in Regulatory Guide (RG) 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1." The previous version of the Code Case N-516 is endorsed in Revision 12 of RG 1.147. However, this version of the subject Code Case is only applicable for use on P-No. 8 and P-No.

[1]The NRC authorized use of the 1992 Edition with 1992 Addenda for IWA-4000 at DAEC in a letter dated October 19, 1999.

4X materials. Revision 1 of the Code Case extends the applicability to underwater repairs and replacements made on components made of P-No.1, carbon steel materials as well. Code Case N-516-1 was incorporated into ASME Section XI in the 1996 Addenda which has been approved in 10 CFR 50.55a. Authorization to utilize the guidance provided in Revision 1 of the subject Code Case will allow the DAEC to control the performance of underwater welding in accordance with an appropriate industry standard.

The DAEC considers the requirements for underwater welding provided in Code Case N-516-1 to be an improvement over existing requirements and as such, will enhance the performance of repairs, replacements, and modifications of the safety related components.

The Code Case will provide appropriate controls over the welding processes that are needed to implement such repairs, replacements, and modifications in a safe and effective manner. The DAEC therefore regards these requirements as providing an acceptable level of quality and safety."

2.4 Evaluation

The NRC staff is currently reviewing Code Case N-516-1 for inclusion in RG 1.147, Revision 13. Code Case N-516-1 provides guidelines for underwater welding of P-1, P-8 and P-4X materials. The Code does not address underwater welding until the 1996 Addenda, that is when Code Case N-516 was accepted into Code. The NRC staff reviewed the 1996 Addenda in the process of updating 10 CFR 50.55a to incorporate by reference, the 1995 Edition with the 1996 Addenda of the ASME Code. In the May 1, 2001, letter, the licensee made the following new NRC commitment in Alternative Testing Number NDE-R042:

> "DAEC will use Code Case 516-1 in its entirety with the following added limitation: when welding is to be performed on high neutron fluence Class 1 material, then a mockup, using similar fluence levels, should be welded to verify that adequate crack prevention measures were used."

The Code Case N-516-1 adds welding of carbon steel to the code case. Carbon steels are easier to weld than the austenitic steels already approved in the rule. Therefore, the NRC staff has determined that the use of Code Case N-516-1 as implemented by the licensee for underwater welding adequately assures weld integrity.

3.0 CONCLUSION

Based on the discussion above, the NRC staff has concluded that the proposed alternative NDE-R042 for the third 10-year interval will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the staff authorizes the proposed alternative for the third 10-year interval. Code Case N-516-1 has not been endorsed in the current revision of RG 1.147, "Inservice Inspection

Code Case Acceptability, ASME Section XI, Division 1." The use of Code Case N-516-1 with the commitment made by the licensee, is authorized until such time as the code case is published in a future revision of RG 1.147. At that time, if the licensee intends to continue to implement Code Case N-516-1, the licensee is to follow all provisions in the code case with limitations or conditions specified in the RG 1.147, if any.

Principal Contributor: D. Naujock

Dated: May 7, 2001