

April 4, 2006

Mr. Gary Van Middlesworth
Vice President
Duane Arnold Energy Center
3277 DAEC Road
Palo, IA 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER - THIRD 10-YEAR INTERVAL
INSERVICE INSPECTION PROGRAM PLAN REQUEST FOR RELIEF TO
EXTEND THE THIRD 10 YEAR INSERVICE INSPECTION INTERVAL FOR
THE EXAMINATION OF WELDS VLA-001 VLA-002 (TAC NO. MC7979)

Dear Mr. Van Middlesworth:

By letter to the Nuclear Regulatory Commission (NRC) dated July 14, 2005, Nuclear Management Company, LLC (NMC) (the former licensee), for Duane Arnold Energy Center, submitted a request to extend the third 10-year inservice inspection (ISI) interval for reactor vessel welds VLA-A001 and VLA-A002 to the end of refueling outage 20. (On January 27, 2006, the NRC issued Amendment No. 260 that reflected the transfer of the license to FPL Energy Duane Arnold, LLC).

The NRC staff has completed its review of the submittal. Our safety evaluation (SE) concludes that compliance with the Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety. Furthermore, the NRC staff concludes that the examinations performed and the examinations that will be performed provide reasonable assurance of structural integrity of the welds. Therefore, your proposed alternative to extend the third 10-year ISI interval to the end of refueling outage 20 is authorized for the third 10-year interval, pursuant to 10 CFR 50.55a(a)(3)(ii). All other requirements of the American Society of Mechanical Engineering Code, Sections III and XI for which relief has not been specifically requested remain applicable, including a third party review by the Authorized Nuclear Inservice Inspector.

G. Van Middlesworth

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If you have any questions concerning this matter, please contact your project manager, Ms. D. Spaulding of my staff at (301)415-2928.

A copy of the SE is also enclosed.

Sincerely,

/RA/

L. Raghavan, Branch Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:
As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

NUCLEAR REACTOR REGULATION

DUANE ARNOLD ENERGY CENTER

FPL ENERGY DUANE ARNOLD, LLC

DOCKET NO. 50-331

1.0 INTRODUCTION

By letter to the Nuclear Regulatory Commission (NRC) dated July 14, 2005, Nuclear Management Company, LLC (NMC) (the former licensee,) for Duane Arnold Energy Center (DAEC), submitted a request to extend the third 10-year inservice inspection (ISI) interval for reactor vessel welds VLA-A001 and VLA-A002 to the end of refueling outage (RFO) 20. (On January 27, 2006, the NRC issued Amendment No. 260 that reflected the transfer of the license to FPL Energy Duane Arnold, LLC). These two welds are reactor pressure vessel (RPV) lower shell vertical welds. Ultrasonic (UT) examinations of these two welds were scheduled to be performed as part of the 10-year vessel examinations conducted from the inside diameter of the vessel during refueling outage (RFO) 19 in the spring of 2005. While examinations of the other six welds were performed successfully, these two welds were not examined due to access obstructions.

2.0 REGULATORY REQUIREMENTS

ISI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Code and applicable addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g), except where specific relief has been granted by the NRC pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) of 10 CFR states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if: (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 pre-service 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, 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), 12 months prior to the start of the 120-month interval, subject to

the limitations and modifications listed therein. The ASME Code of record for the DAEC third 10-year interval ISI program, which ends on October 31, 2006, is the 1989 Edition of Section XI of the ASME Code, with no addenda.

3.0 EVALUATION

ASME Code Component Identification:

ASME Code Class: 1
Examination Categories: B-A
Item Number: B1.12
Description: RPV Longitudinal Shell Welds
Component Numbers: VLA-A001, VLA-A002

ASME Code Requirements:

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-A, Item Number B1.12, requires volumetric examination of essentially 100 percent of the weld length of all longitudinal shell welds in accordance with the examination requirements illustrated in Figure IWB-2500-2.

ASME Code, Section XI, IWA-2430(a) requires that the inservice examinations required by IWB shall be completed during each of the inspection interval for the service life time of the power unit. The inspections shall be performed in accordance with the schedule of Inspection Program A of IWA-2431, or optionally Inspection Program B of IWA-2432. The licensee has selected to use Inspection Program B of IWA-2432.

ASME Code, Section XI, IWA-2430(d) requires that for components inspected under Program B, each of the inspection intervals may be extended or decreased by as much as 1 year. Adjustments shall not cause successive intervals to be altered by more than 1 year from the original pattern of intervals.

Licensees Basis for Relief Request (As stated in the submittal):

The DAEC's third 10-year interval RPV weld examinations were scheduled to be performed during RFO 19 (spring of 2005) from the inside diameter (ID) using an automated tool. Examination from the ID was planned rather than examination from the outside diameter (OD) in order to achieve significantly lower dose, as well as to maintain the ability to perform the examinations in parallel with refueling operations. Industry experience had indicated that examination coverage comparable to that obtained from the OD could be achieved.

Prior to RFO 19, a computer model of the vessel was developed to determine clearances, appurtenances and possible OD reflectors. While the jet pump restraining bracket guides had been identified as a potential access concern in the VLA-A001 and VLA-A002 weld region, the model indicated that greater than 90 percent examination coverage would be obtained for the two welds. It was believed that sufficient clearance existed for the examination tool to move around the obstructions and access the remainder of the weld from below the obstructions. During the RFO, while attempting to perform examinations of VLA-A001 and VLA-A002, it was determined that sufficient clearance for the automated equipment did not exist on the ID and performance of those examinations could not be completed from the ID as planned.

RFO 19 was the last refueling outage scheduled for the third 10-year interval. Extension of the third interval beyond 10 years would cause successive intervals to be altered by more than 1 year from the original pattern of intervals, since the second 10-year interval had been extended by 1 year in accordance with the ASME Code.

Licenses Proposed Alternative Examination (As stated in the submittal):

Nuclear Management Company (NMC) requests NRC authorization of an alternative to extend the third 10-year interval for the examination of RPV longitudinal welds VLA-A001-and-VLA-A002 until the end of RFO 20. RFO 20 is currently scheduled to begin in February of 2007. This alternative allows time for the development of a smaller inspection tool to be used to examine these welds from the ID during RFO 20.

Pursuant to 10 CFR 50.55a(a)(3)(ii), NMC requests this alternative on the basis that requiring examination of these two welds prior to the end of the third 10 year ISI interval (October 31, 2006) presents a hardship without compensating increase in level of quality or safety. Extending the interval for the examination of reactor vessel longitudinal welds VLA-A001 and VLA-A002 results in about 10 years and 4 months between the examinations of these welds. As discussed below, the last examinations of the welds were performed in November 1996.

Section 10 CFR 50.55a(g)(6)(ii)(A) contains an augmented examination requirement to perform a one-time volumetric examination of essentially 100 percent (greater than 90 percent) of all circumferential and axial RPV shell assembly welds. During RFO 14 in 1996, the DAEC performed the augmented weld examination of the reactor vessel using the General Electric Reactor Inspection System 2000 ultrasonic examination system. These examinations were performed from the vessel OD using a composite of automated and supplemental manual UT examination techniques. Longitudinal weld VLA-A001 received 96.6 percent coverage and weld VLA-A002 received 96.7 percent coverage. Examination results were acceptable to the requirements of ASME XI, 1980 Edition, Winter 1981 Addenda, Category B-A welds and NRC Regulatory Guide 1.150.

Also, during RFO 19 in spring of 2005, essentially 100 percent (greater than 90 percent) coverage was achieved on the remaining six RPV vertical welds (VLB-A001, VL8-A002, VLC- 8001, VLC-8002, VLD-B001 and VLD-B002) with no recordable indications.

Based on the 1996 examination results for VLA-A001 and VLA-A002, as well as the 2005 results for the remaining six RPV vertical welds, NMC concludes that the current inspection interval can be extended for VLA-A001 and VLA-A002, while providing an acceptable level of quality and safety.

Staff Evaluation:

The ASME Code, Section XI, Table IWB-2500-1, Examination Category B-A, Item No. B1.12, requires volumetric examination of essentially 100 percent of the weld length of all longitudinal shell welds and they are to be completed with each of the inspection intervals for the service life time of the power unit. Under the ASME Code, Section XI, IWA-2430(d) requires that for components inspected under Program B, each of the inspection intervals may be extended or decreased by as much as 1 year. Adjustments shall not cause successive

intervals to be altered by more than 1 year from the original pattern of intervals. The licensee noted that RFO 19 was the last refueling outage scheduled for the third 10-year interval and the extension of the third interval beyond 10 years would cause successive intervals to be altered by more than 1 year from the original pattern of intervals because the second 10-year interval had been extended by 1 year in accordance with the ASME Code. As an alternative to the ASME Code, Section XI, IWA-2430(d) requirement, the licensee has proposed to extend the third 10-year ISI interval beyond 1 year as allowed by the ASME Code. RFO 20 is currently scheduled to begin in February 2007. The licensee requires the extension to develop a tool to examine RPV longitudinal welds VLA-A001-and-VLA-A002 from the ID during RFO 20. The extension would result in about 10 years and 4 months between the examinations of the subject welds based on the last examinations performed in November 1996.

In order to reduce radiation exposure and to maintain the ability to perform the examinations in parallel with refueling operations, the licensee decided to perform the ASME Code, Section XI reactor vessel examinations from the ID instead of the OD during RFO 19. Prior to RFO 19 the licensee developed a computer model of the vessel to determine clearances, appurtenances and possible OD reflectors. The program showed that the jet pump restraining bracket guides had been identified as a potential access concern for the examination of the subject welds. The licensee found from the program that greater than 90 percent examination coverage could be obtained for the subject welds. However, during RFO 19, the licensee was unable to perform examinations of the subject welds due to obstructions inside the RPV.

During RFO 14 in 1996, the licensee performed the augmented reactor vessel weld examination as required by 10 CFR 50.55a(g)(6)(ii)(A). The examinations were performed from the vessel OD using automated and supplemental manual volumetric examination techniques. For longitudinal weld VLA-A001 the licensee obtained 96.6 percent volumetric coverage and obtained 96.7 percent volumetric coverage for weld VLA-A002. In addition, during RFO 19 in spring of 2005, essentially 100 percent coverage was achieved on the remaining six RPV vertical welds VLB-A001, VL8-A002, VLC- 8001, VLC-8002, VLD-B001, and VLD-B002. The licensee found no recordable indications during both examinations performed during RFO 14 and RFO 19.

The NRC staff determined that since the licensee's proposed alternative to extend the third 10-year ISI interval will result in about 10 years and 4 months between the examinations of the subject welds and that requiring the licensee to perform the subject examinations as scheduled in the ASME Code would result in hardship without a compensating increase in the level of quality and safety. Furthermore, the examinations performed and the examinations that will be performed by the smaller inspection tool from the ID during RFO 20 provides reasonable assurance of structural integrity of the subject welds.

4.0 CONCLUSION

The NRC staff has reviewed the licensee's submittal and based on the information provided, concludes that it has been shown that compliance with the Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality or safety. Furthermore, the staff concludes that the examinations performed and the examinations that will be performed from the ID during RFO 20 provides reasonable assurance of structural integrity of the subject welds. Therefore, the licensee's proposed alternative to extend the third 10-year ISI interval to the end of RFO 20 is authorized for the third 10-year interval, pursuant to

10 CFR 50.55a(a)(3)(ii). All other requirements of the ASME Code, Sections III and XI for which relief has not been specifically requested remain applicable, including a third party review by the Authorized Nuclear Inservice Inspector.

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Date: April 4, 2006

Duane Arnold Energy Center

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February 2006