



FPL Energy.

Duane Arnold Energy Center

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February 19, 2007

NG-07-0164
10 CFR 50.55a(a)(3)(ii)

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

Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49

Request to Extend the Third 10-Year Inservice Inspection (ISI) Interval for Reactor Vessel Welds: VLA-A001, VLA-A002, VLB-A001, VLB-A002, VLC-B001, VLC-B002, VLD-B001, VLD-B002, and VCB-C005

- References:
- 1) Letter, L. Raghavan (USNRC) to G. Van Middlesworth (FPL Energy), "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# MC7979)," dated April 4, 2006 (ML060400405)
 - 2) Letter, G. Van Middlesworth (NMC) to USNRC, "Request to Extend the Third 10-year Inservice Inspection (ISI) Interval for Reactor Vessel Welds VLA-A001 and VLA-A002," NG-05-0388, dated July 14, 2005 (ML052070659)

Pursuant to 10 CFR 50.55a(a)(3)(ii), FPL Energy Duane Arnold requests NRC authorization of an alternative that extends the third ten-year interval for the examination of Duane Arnold Energy Center (DAEC) reactor pressure vessel (RPV) welds. The DAEC is currently in its fourth ten-year In-Service Inspection (ISI) interval, which began November 1, 2006. Extension of the interval for the subject welds is requested until either:

- the completion of refuel outage (RFO) 21, currently scheduled to begin in January of 2009; or,
- until the current inspection procedure is certified by the Electric Power Research Institute (EPRI) through the Performance Demonstration Initiative (PDI); or,

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- the American Society of Mechanical Engineers (ASME) Code Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," is revised and accompanying interpretation is approved to allow equivalence evaluation of cables and connectors as "essential variables" pursuant to Supplement 1 to Appendix VIII,

whichever comes first.

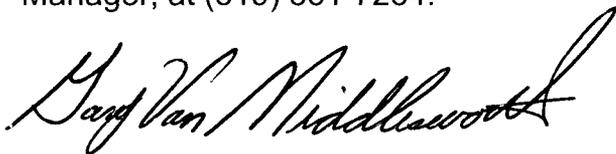
Ultrasonic (UT) examinations of almost all of the subject welds were performed as part of the ten-year vessel examinations conducted from the inside diameter of the vessel during Refueling Outage (RFO) 19 in April of 2005 and the remaining two welds are being completed during the current outage (RFO20), as allowed by the Reference 1 relief request. While the examinations of the previously-inspected welds were successfully performed, with no indications, issues have been raised within the last week by Region III inspectors regarding the conformance of the inspection procedure used to perform these exams with Appendix VIII of Section XI of the ASME Code, as described in more detail in the enclosed request.

There are no practical alternatives to the requested relief at this point in time, given that the examination of the RPV welds previously conducted during RFO19 were not granted schedule deferral, as it was believed at the time of the previous relief request (Reference 2), that those exams had been conducted in accordance with the Code. Hence, re-performance of the examinations during the current RFO would be outside the DAEC third 10-year interval for those exams. More importantly, re-performance of all the subject exams during the current RFO, using a fully certified inspection procedure, would present a hardship to FPL Energy Duane Arnold without a commensurate increase in either quality or safety, as doing so would unnecessarily extend the duration of the current RFO and incur additional radiation dose to the examiners.

To remain in conformance with the DAEC Technical Requirements Manual (TRM) Section 3.7.3 (Structural Integrity). FPL Energy Duane Arnold requests approval of this request prior to conducting the ASME Code Class I leak test of the RPV, currently scheduled for February 23, 2007.

This letter contains no new commitments and no revisions to existing commitments.

Questions regarding this matter should be directed to Steve Catron, Licensing Manager, at (319) 851-7234.



Gary Van Middlesworth
Site Vice President, Duane Arnold Energy Center
FPL Energy Duane Arnold

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Enclosure

cc: Administrator, Region III, USNRC
Project Manager, DAEC, USNRC
Resident Inspector, DAEC, USNRC

Request to Extend the Third 10-Year Inservice Inspection (ISI) Interval for Reactor Vessel Welds: VLA-A001, VLA-A002, VLB-A001, VLB-A002, VLC-B001, VLC-B002, VLD-B001, VLD-B002, and VCB-C005

1.0 ASME Code Component(s) Affected

Code Class:	1
References:	IWA-2430(a) and (d) IWB-2500(a) and Table IWB-2500-1
Examination Categories:	B-A
Item Number:	B1.12, B1.30
Description:	Reactor Pressure Vessel (RPV) Longitudinal Shell Welds and Shell-to-Flange Weld
Component Numbers:	VLA-A001, VLA-A002, VLB-A001, VLB-A002, VLC-B001, VLC-B002, VLD-B001, VLD-B002, and VCB-C005

2.0 Applicable Code Edition and Addenda

ASME Section XI 1989 Edition/No Addenda.

3.0 Applicable Code Requirement

IWB-2500(a) requires components to be examined as specified in Table IWB-2500-1.

Table IWB-2500-1 Category B-A, Items B1.12 and B1.30 require examination of applicable Class 1 pressure retaining welds, which includes essentially 100% of weld length once during the ten year interval.

IWA-2430(a) requires that the inservice examinations required by IWB shall be completed during each of the inspection intervals for the service lifetime of the power unit.

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.

4.0 Reason for Request

In 1995, ISwT (then Southwest Research Institute) qualified procedures ISwT-PDI-AUT1 and ISwT-PDI-AUT2, Revision 0, for inside surface examination of pressurized water reactor vessel shell welds at the Electric Power Research Institute (EPRI) under the Performance Demonstration Initiative (PDI). This qualification included the type of cabling, cable length, and number of connectors used in the actual demonstration, along with the active components, such as scanners, receivers, and search units.

In 2001, ISwT began using a scanner whose size and function were capable of accessing the inside surface of welds in a Boiling Water Reactor (BWR) vessel. Because of the small size and restricted areas of operation in a BWR vessel annulus region, the type of search unit cable used for the initial procedure qualifications for ISwT-PDI-AUT1 and ISwT-PDI-AUT2 Revision 0 in 1995 was not feasible for use with this tool.

ISwT performed a system equivalency comparison between the PDI essential variable cable configuration and the cable configuration listed in the new procedure for BWR vessels. The comparison used a "worst case" BWR cable configuration that could be necessary if the data acquisition system was physically located outside of the reactor building. This "worst case" configuration consisted of 1,350 feet of RG58 coaxial cable, plus 230 feet of RG174 coaxial cable, plus 5 feet of "Micro Cable," with a total of 20 connectors. The equivalency demonstration was performed in accordance with Appendix VIII, Supplement 1, of the ASME Code, with the exception that a steel reference block was used in lieu of the glass block recommended in Supplement 1. All aspects of the procedure were held constant and the system center frequency and bandwidth were measured for both cable configurations and each type of probe specified in the procedures. The comparison identified that the center frequency and bandwidth of the total system were within the acceptance criteria contained in Appendix VIII. The measurements were within the acceptance criteria of Section VIII-4110(h)(4) for systems with bandwidths greater than 30%.

The above assessment was viewed as being a "bounding configuration" and that other alternative configurations were allowed, so long as they included the same cable types and used shorter cable lengths and total numbers of connectors.

The following cable configurations were used when performing the examinations of the RPV welds at the DAEC:

Refueling Outage 19 (2005)

Cable Type	Maximum Length	Number of Connectors
RG174	230 feet	6
Micro Cable	5 feet	

Refueling Outage 20 (2007)

Cable Type	Maximum Length	Number of Connectors
RG174	230 feet	6

As shown in the tables above, the maximum length of cable that was used in 2005 and 2007 is greater than that demonstrated for cable type RG174. However, the total cable length actually used for DAEC examinations (235 feet in 2005 and 230 feet in 2007) is significantly less than the total cable length originally qualified (1098 feet). In addition, an empirical cable demonstration was performed at the DAEC which demonstrated signal amplitude is slightly improved when using the typical BWR cable configuration (235 feet) compared to the original cable configuration and that signal to noise ratios are relatively consistent between either cable configuration.

During an NRC Region III inspection of the current DAEC ISI program, issues with the above qualification of the equipment being used to conduct these RPV weld examinations at the DAEC were raised. Specifically, the concern is that the current equipment configuration (coaxial cable sizes and lengths and associated number of connections) is different from that in the ISwT's documentation of the as-tested/as-qualified PDI configuration. Although an equivalence evaluation is permitted by the ASME Code, Appendix VIII, Supplement 1, for substituting certain active components used to conduct the examinations, such as pulsers, receivers, and search units, from the PDI configuration, the Code is silent as to whether such an allowance extends to passive circuit components, such as the associated cabling, in lieu of actual testing. The existing Code allowance to substitute active components, which are viewed as more-critical to the conduct of quality examinations, has led the industry into believing, heretofore, that use of alternative cable arrangements could be justified by evaluation in lieu of actual demonstration testing, under Appendix VIII, Supplement 1, of the Code.

Because of the imminent nature of this issue, i.e., after the beginning of RFO20, FPL Energy Duane Arnold could not have foreseen the need for such relief in a timelier manner.

There are no practical alternatives to the requested relief at this point in time, given that the examination of the RPV welds previously conducted during RFO19 were not granted schedule deferral, as it was believed at the time of the previous relief request (Reference 2 of the cover letter), that those exams had been conducted in accordance with the Code. Hence, re-performance of the examinations during the current RFO would be outside the DAEC third 10-year interval for those exams. More importantly, re-performance of all the subject RPV exams during the current RFO, using a PDI-certified inspection procedure, would present a hardship to FPL Energy Duane Arnold without a commensurate increase in either quality or safety, as doing so would unnecessarily extend the duration of the current RFO and incur additional radiation dose to the examiners.

5.0 Proposed Alternative and Basis for Use

FPL Energy Duane Arnold requests NRC authorization of an alternative to extend the third ten-year interval for the examination of RPV welds: VLA-A001, VLA-A002, VLB-A001, VLB-A002, VLC-B001, VLC-B002, VLD-B001, VLD-B002, and VCB-C005 until the end of RFO 21. RFO 21 is currently scheduled to begin in January of 2009. This alternative allows time for the PDI qualification of the inspection procedure used to examine these welds, or alternatively, to seek a Code revision allowing an equivalence evaluation of cabling and connectors, pursuant to Appendix VIII, Supplement 1 of the Code; or, failing the above, re-performance of all the RPV weld exams using the original PDI qualified procedure during the next refuel outage, i.e., RFO21.

Pursuant to 10 CFR 50.55a(a)(3)(ii), FPL Energy Duane Arnold requests this alternative on the basis that requiring examination of these welds prior to the end of the third ten year ISI interval (October 31, 2006) presents a hardship without compensating increase in level of quality or safety. Based upon finding no indications in the weld examinations for those RPV welds conducted in 2005, FPL Energy Duane Arnold concludes that the third 10-year inspection interval can be extended for the subject welds, pending resolution of the identified concerns with the inspection procedure, while providing an acceptable level of quality and safety.

6.0 Duration of Proposed Alternative

The interval for examination of welds VLA-A001, VLA-A002, VLB-A001, VLB-A002, VLC-B001, VLC-B002, VLD-B001, VLD-B002, and VCB-C005 will be extended until either:

- the current inspection procedure is certified by EPRI through the PDI; or,
- ASME Code Section XI is revised and accompanying interpretation is approved to allow equivalence evaluation of cables and connectors as "essential variables" pursuant to Supplement 1 to Appendix VIII; or,
- the end of RFO 21, currently scheduled to begin in January, 2009, to allow re-performance of the RPV weld exams using a PDI qualified procedure,

whichever occurs first.