

May 1, 2008

Mr. Richard L. Anderson  
Vice President  
Duane Arnold Energy Center  
3277 DAEC Road  
Palo, IA 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER – SAFETY EVALUATION FOR REQUEST FOR RELIEF FROM IWB-2500 AND IWC-2500 REQUIREMENTS TO ALLOW PERFORMANCE OF LIMITED EXAMINATIONS OF VARIOUS WELDS FOR THE THIRD 10-YEAR INTERVAL OF THE INSERVICE INSPECTION PROGRAM (TAC NO. MD5669)

Dear Mr. Anderson:

In a letter to the Nuclear Regulatory Commission (NRC) dated May 18, 2007, Agencywide Documents Access and Management System (ADAMS) Accession No. ML071510076, as supplemented by a letter dated November 7, 2007, ADAMS Accession No. ML073130049, you requested relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI (1989 Edition, no Addenda), Subarticle IWB-2500 requirement to examine and test components as specified in Table IWB-2500-1, and the Subarticle IWC-2500 requirement to examine and test components as specified in Table IWC-2500-1. The relief was requested for the Third 10-year Interval of the Inservice Inspection Program for the Duane Arnold Energy Center (DAEC), which ended on October 31, 2006.

Based on the information provided in the Request for Relief and the responses to the NRC staff's request for additional information (RAI), the NRC staff concludes that ASME Code examination requirements are impractical for the subject components listed in the licensee's Request for Relief. It is further concluded that, if significant service-induced degradation were to occur, there is reasonable assurance that evidence of the degradation would have been detected by the examinations performed by the licensee. For these reasons, in accordance with 10 CFR 50.55a(g)(6)(i), the subject Request for Relief is granted for the third Inservice Inspection interval at Duane Arnold Energy Center.

The NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) for the Request for Relief is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject Request for Relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

R. Anderson

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If you have any questions regarding this matter, please contact Karl Feintuch at (301) 415-3079.

Sincerely,

*/RA/*

Lois James, Chief  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:  
Safety Evaluation

cc w/encl: See next page

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Last revised March 20, 2008

# SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

## ON THE THIRD 10-YEAR INTERVAL INSERVICE INSPECTION

### REQUEST FOR RELIEF

FPL ENERGY DUANE ARNOLD, LLC

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

## 1.0 INTRODUCTION

The Nuclear Regulatory Commission (NRC) staff, with technical assistance from its contractor, the Pacific Northwest National Laboratory (PNNL), has reviewed and evaluated the information provided by FPL Energy Duane Arnold, LLC (the licensee) in its letter dated May 18, 2007, Agencywide Documents Access and Management System (ADAMS) Accession No. ML071510076, which proposed its third 10-Year Interval Inservice Inspection (ISI) Program Plan Request for Relief for Duane Arnold Energy Center (DAEC). In response to an NRC request for additional information (RAI), the licensee submitted further information in a letter dated November 7, 2007 (ML073130049). The NRC staff adopts the evaluations and recommendations for granting relief contained in PNNL's Technical Letter Report (TLR) which has been incorporated into this safety evaluation (SE). Table 1 to this SE, located after Section 4.0, lists each relief request and the status of approval.

## 2.0 REGULATORY REQUIREMENTS

Inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (the 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 Commission pursuant to 10 CFR 50.55a(g)(6)(i). The regulation at 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the 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, 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, which was 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 ended on October 31, 2006, was the 1989 Edition of Section XI of the ASME Boiler and Pressure Vessel Code, with no addenda.

### 3.0 EVALUATION

The information provided by the licensee in support of the Request for Relief from ASME Code requirements has been evaluated, and the basis for disposition is documented below. For clarity, the request has been evaluated in several parts according to ASME Code Examination Category and Item Number, where applicable.

#### 3.1 Request for Relief, Examination Category B-D, Item B3.90 Full Penetration Welded Nozzles in Vessels

##### 3.1.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-D, Item B3.90, requires 100 percent volumetric examination, as defined by Figures IWB-2500-7(a) through (d), as applicable, of full penetration Class 1 nozzle-to-vessel welds on the reactor pressure vessel (RPV). The required examination volume includes the full weld and adjacent base material for a distance equal to ½ of the vessel wall thickness. ASME Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds*, as an alternative approved for use by the NRC in Regulatory Guide 1.147, Revision 14, *Inservice Inspection Code Case Acceptability* (RG 1.147), states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent, i.e., greater than 90 percent examination coverage is obtained.

##### 3.1.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required 100 percent volumetric examination for the RPV nozzle-to-shell welds listed in Table 3.1.1 below.

<b>Component Number</b>	<b>Description</b>	<b>Volumetric Coverage Obtained</b>
MSC-D001	Main steam nozzle-to-vessel weld	56.8%
MSD-D001	Main steam nozzle-to-vessel weld	56.8%
FWB-D001	Feedwater nozzle-to-vessel weld	56.7%
FWC-D001	Feedwater nozzle-to-vessel weld	56.7%
FWD-D001	Feedwater nozzle-to-vessel weld	56.7%
RRG-D001	Recirculation riser nozzle-to-vessel weld	53.7%
JPB-D001	Jet pump instrumentation nozzle-to-vessel weld	53.5%
LCA-D001	Standby liquid control nozzle-to-vessel weld	50.7%
VIB-D001	Vessel instrumentation nozzle-to-vessel weld	57.5%

### 3.1.3 Licensee's Basis for Relief Request

As stated by the licensee, the nozzle-to-vessel welds are accessible from the vessel side, but examination cannot be performed from the nozzle side because of forging curvature. In addition to component configuration, certain nozzle-to-vessel weld examinations are further limited by reactor pressure vessel design obstructions.

According to the licensee, the Nondestructive Examination (NDE) procedures used at DAEC incorporate examination techniques qualified under Appendix VIII of the ASME Section XI Code by the Performance Demonstration Initiative (PDI) for examination of the subject nozzle-to-vessel shell welds. Further, the NRC staff notes the licensee's statement that DAEC's effort to develop and qualify Ultrasonic Test (UT) examination techniques for the nozzle inner corner regions and nozzle-to-vessel shell welds was assisted by an Electric Power Research Institute (EPRI) computer modeling effort<sup>1</sup>.

According to the licensee, the examinations were performed using a manual contact method from the nozzle outside blend radius and vessel shell surfaces, as stated in DAEC procedures. The NRC staff notes the licensee's statement that the UT scanning methodology modeled in the EPRI modeling report was applicable to the coverage for the inner 15 percent volume of the nozzle-to-vessel shell welds when scanning parallel to the weld. Further, according to the licensee, the examination of the remaining outer 85 percent volume of the nozzle-to-vessel shell welds was based on a separate PDI qualified technique and procedure which, did not require use of the EPRI computer modeling effort to validate.

### 3.1.4 Licensee's Proposed Alternative Examination (as stated)

DAEC performed qualified examinations that achieved the maximum practical amount of coverage obtainable within the limitations imposed by the design of the components. Additionally, for the [ASME Code, Section XI,] Class 1, Examination Category B-P components, VT-2 [visual] examinations are performed on the subject components of the Reactor Coolant Pressure Boundary during system pressure tests on a refueling outage frequency. Those examinations were completed during the 2007 refueling outage and no evidence of leakage was identified for these components.

### 3.1.5 Response to Request for Additional Information (as stated)

The examination of all nozzle-to-vessel welds is limited by the nozzle forging curvature. For nozzle LCA-D001, the examination is additionally limited by the proximity of the weld attaching the skirt knuckle to the RPV bottom head. The distance from the bottom of LCA-D001 weld to the skirt is approximately six inches. For nozzle JPB-D001, the examination is additionally limited due to an insulation bracket welded on the vessel. Removal of this bracket is not feasible due to the fact that it supports the lower ring of RPV insulation.

The total number of [ASME Code,] Category B-D welds at the DAEC is 34 of which one is inaccessible due to the CRD [control rod drive] array (the inaccessible nozzle is the

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<sup>1</sup> The EPRI computer modeling report, documenting EPRI's computer modeling effort on behalf of DAEC, was referenced in the licensee's submittal but was not needed nor used to prepare the NRC staff's Safety Evaluation.

bottom head drain). There have been no unacceptable flaws identified during the examinations of the listed welds.

### 3.1.6 NRC Staff Evaluation

The ASME Code requires 100 percent volumetric examination of the subject ASME Code, Class 1 full penetration welded nozzles in the RPV. However, complete examinations of these nozzles are restricted by their geometric configuration and the proximity of other RPV appurtenances. These conditions severely limit volumetric coverage for the subject nozzle-to-vessel welds. To allow full ASME Code examination coverage to be obtained, the RPV shell-to-nozzle configurations would require design modifications. Imposing this requirement would place a significant burden on the licensee, therefore, the ASME Code-required 100 percent volumetric examinations are impractical.

As shown on the sketches and technical descriptions<sup>2</sup> included in the licensee's submittal, examinations of the subject nozzle-to-vessel welds have been performed to the extent practical, with the licensee obtaining cumulative volumetric coverage of approximately 51 to 58 percent of the ASME Code-required volumes (see Table 3.1.1). For all of the subject welds, the outside diameter (OD) surface curvature caused by nozzle-to-vessel transition areas on the nozzle forgings do not allow for adequate placement of transducers on the nozzle side of the weld to examine the full volume required by the ASME Code. Thus, examinations are limited to the RPV shell side of the welds only. Additionally, on nozzle Welds LCA-D001 and JPB-D001, shell side ultrasonic examinations are further restricted by the close proximity of the RPV support skirt weld and a welded insulation bracket, respectively.

While the cumulative volumetric coverage (including both axial and circumferential scans) is listed at approximately 55 percent, a review of the licensee's cross-sectional sketches indicates that a substantial level of volumetric coverage (greater than 70 percent) was obtained for ultrasonic scans performed from the RPV shell side and oriented perpendicular to the welds (to detect circumferentially-oriented flaws). Perpendicular scan coverage generally included the weld and base materials near the inside surface of the vessel, which are the regions of highest stress and where one would expect degradations to be manifested, should they occur. Circumferentially-oriented flaws typically present the highest structural challenge at these nozzle-to-vessel welds. Recent studies such as Programme for Inspection of Steel Components I, II and III, and others, have found that inspections conducted through carbon steel are equally effective whether the ultrasonic waves have only to propagate through the base metal, or have to also propagate through the carbon steel weldment<sup>3</sup>. Therefore, it is expected that the 60-degree refracted longitudinal wave methods employed by the licensee would detect circumferentially-oriented flaws that might occur on either side of the subject welds and base materials due to their fine-grained low alloy steel microstructures. The methods employed by the licensee have been qualified through the industry's PDI administered by the EPRI. No ultrasonic indications were detected during the performance of UT on the subject welds. The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject RPV nozzle-to-vessel welds due to

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2 Sketches and technical descriptions provided by the licensee are not reproduced in this Safety Evaluation.

3 Heasler, P. G. and S. R. Doctor, 1996. *Piping Inspection Round Robin*, NUREG/CR-5068, PNNL-10475, U. S. Nuclear Regulatory Commission, Washington, DC.



their design configurations, which limit ultrasonic scanning to the shell side. Based on the volumetric coverage obtained during the examinations, and considering the low alloy steel materials and ultrasonic methods applied (as discussed above), it is concluded that if significant service-induced degradation were occurring in the subject welds, there is reasonable assurance that evidence of degradation would have been detected by the examinations that were performed.

### 3.2 Request for Relief, Examination Category B-D, Item B3.100, Full Penetration Welded Nozzles in Vessels

#### 3.2.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-D, Item B3.100 requires 100 percent volumetric examination, as defined by Figures IWB-2500-7(a) through (d), as applicable, of nozzle inside radius sections for Class 1 nozzles on the RPV. ASME Code Case N-460 as an alternative approved for use by the NRC in RG 1.147, Revision 14, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent, i.e., greater than 90 percent examination coverage is obtained.

#### 3.2.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required 100 percent volumetric examination of the nozzle inside radius section on Standby Liquid Control Nozzle LCA-D001.

#### 3.2.3 Licensee's Basis for Relief Request (as stated)

As stated by the licensee, the proximity of the vessel skirt weld obstructed access for performing the Standby Liquid Control Nozzle Inner Radius examination.

According to the licensee, the NDE procedures used at DAEC incorporate examination techniques qualified under Appendix VIII of the ASME [Code,] Section XI by the PDI for examination of the subject nozzle inner radius. Further, the NRC staff notes the licensee's statement concerning DAEC's development and qualification of Ultrasonic Test (UT) examination techniques for the nozzle inner corner regions.

According to the licensee, the examinations were performed using a manual contact method from the nozzle outside blend radius and vessel shell surfaces as stated in DAEC procedures. The NRC staff notes the licensee's statement that the UT scanning methodology modeled in the EPRI report<sup>4</sup> was applicable to the coverage for the inner corner regions volume of the shell nozzle when scanning parallel to the weld. Further, according to the licensee, the examination of the remaining outer 85 percent volume of the nozzle inner radius was based on a separate PDI qualified technique and procedure, which did not require use of the EPRI computer modeling effort to validate.

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4 The EPRI computer modeling report, documenting EPRI's computer modeling effort on behalf of DAEC, was referenced in the licensee's submittal but was not needed nor used to prepare the NRC staff's Safety Evaluation.

### 3.2.4 Licensee's Proposed Alternative Examination

No alternative examination was proposed. Instead, the licensee proposed to use the limited volumetric coverage obtained (71.7 percent) for the inner radius section of Standby Liquid Control Nozzle LCA-D001.

### 3.2.5 NRC Staff Evaluation

The ASME Code requires 100 percent volumetric examination of the subject ASME Code, Class 1 RPV nozzle inside radius section. However, complete examination of this region is restricted by the proximity of the RPV vessel skirt weld and geometric configuration of the nozzle. These conditions limit volumetric coverage for the subject inside radius section on Standby Liquid Control Nozzle LCA-D001. To allow full ASME Code examination coverage to be obtained, the RPV shell-to-nozzle configuration and support skirt weld would require design modifications. Imposing this requirement would place a significant burden on the licensee therefore, the ASME Code-required 100 percent volumetric examination is impractical.

As shown on the sketches and technical descriptions<sup>5</sup> included in the licensee's submittal, examination of the subject nozzle inside radius section has been performed to the extent practical, with the licensee obtaining substantial volumetric coverage of approximately 72 percent of the ASME Code-required volume. The RPV support skirt weld is located within 6 inches of the LCA-D001 nozzle weld and impacts the licensee's ability to place ultrasonic transducers in the correct area of the RPV shell to fully examine the volume of the inside radius section. No ultrasonic indications were detected during the performance of UT on this inside radius section. The subject nozzle inside radius section is one of 34 other nozzle inside radius sections that are required to be examined during each inspection interval.

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject nozzle inside radius section due to proximity of the RPV support skirt weld and the design configuration of the nozzle. Based on the volumetric coverage obtained during the examination, and considering the examination of many similar areas in other RPV nozzles, it is concluded that if significant service-induced degradation were occurring in the subject inside radius section, there is reasonable assurance that evidence of degradation would have been detected by the examination that was performed.

## 3.3 Request for Relief, Examination Category B-J, Item B9.11, Pressure Retaining Welds in Piping

### 3.3.1 ASME Code Requirement

ASME Code, Section XI, Examination Category B-J, Item B9.11, requires surface and volumetric examination, as defined by Figure IWB-2500-8, of essentially 100 percent of the length of Class 1 circumferential butt welds in piping equal to or greater than 4-inch nominal pipe size (NPS) in diameter. "Essentially 100 percent," as clarified by ASME Code Case N-460 is greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 has been approved for use by the NRC in RG 1.147, Revision 14.

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5 Sketches and technical descriptions provided by the licensee are not reproduced in this safety evaluation.

### 3.3.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required 100 percent volumetric examination of Class 1 circumferential piping butt Weld RBB-J001 on the DAEC Recirculation System.

### 3.3.3 Licensee's Basis for Relief Request (as stated)

This weld is the branch connection of the recirculation bypass line to the recirculation discharge line. The weld-o-let side is not accessible for scanning due to geometry.

### 3.3.4 Licensee's Proposed Alternative Examination:

No alternative examination was proposed. Instead, the licensee proposed to use the limited volumetric coverage obtained (35.6 percent) for circumferential piping butt Weld RBB-J001 on the DAEC Recirculation System.

### 3.3.5 Response to RAI dated November 7, 2007 (as stated)

The weld RBB-J001 is a branch connection of the recirculation bypass line to the recirculation discharge line. The weld-o-let side of the weld is not accessible for scanning. The PDI qualified procedure is not qualified for "detection or length sizing of circumferentially-oriented flaw indications when only single side access is available and the flaw is located on the far side of the weld." Because of this, [a maximum of] only 50 percent coverage can be claimed. The examination of this weld is further limited by the existing weld crown.

### 3.3.6 NRC Staff Evaluation

The ASME Code requires 100 percent volumetric examination of selected ASME Code, Class 1 circumferential piping welds. In addition, the ASME Code requires that the volumetric examination be conducted from both sides of these pressure-retaining circumferential welds. However, the geometric configuration of Weld RBB-J001, and the presence of a weld crown limit ultrasonic scanning to the pipe side of the weld only. For the licensee to achieve 100 percent volumetric coverage, the subject weld would have to be redesigned and modified. This would place a significant burden on the licensee, thus, the ASME Code-required 100 percent volumetric examination is impractical.

Weld RBB-J001 is the first circumferential butt weld joining a branch connection weld-o-let on the main recirculation system to 4-inch NPS outer diameter (OD) recirculation bypass piping. Both the weld-o-let and bypass piping are constructed of Type 304 austenitic stainless steel. As shown by the cross-sectional drawing<sup>6</sup> in the licensee's submittal, the OD curvature of the branch connection weld-o-let does not allow the licensee to couple ultrasonic transducers on the branch connection side. This condition, in combination with the existing crown on the subject weld limits ultrasonic scanning to the pipe side only. The weld was examined with 45- and 70-degree shear waves, which resulted in approximately 36 percent of the ASME Code-required volume being achieved. The licensee examines several other recirculation system welds as part of the normal ISI program and augmented examination requirements specified in NRC Generic

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6 The licensee's drawing is not reproduced in this Safety Evaluation.

Letter (GL) 88-01, Revision 1, dated February 4, 1992, "NRC Position On Intergranular Stress Corrosion Cracking (IGSCC) In BWR Austenitic Stainless Steel Piping (GL-88-01)."

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject piping weld due to the OD surface configuration. Based on the volumetric coverage obtained for the subject weld, and considering examinations conducted on other ASME Code, Class 1 piping welds, it is reasonable to conclude that if significant service-induced degradation were occurring, evidence of degradation would have been detected by the examination that was performed.

### 3.4 Request for Relief, Examination Category C-A, Item C1.20, Pressure Retaining Welds in Pressure Vessels

#### 3.4.1 ASME Code Requirement

ASME Code, Section XI, Examination Category C-A, Item C1.20 requires essentially 100 percent volumetric examination, as defined by Figure IWC-2500-1, of the length of head circumferential welds on Class 2 vessels. "Essentially 100 percent," as clarified by ASME Code Case N-460, is greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 has been approved for use by the NRC in RG 1.147, Revision 14.

#### 3.4.2 Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required 100 percent volumetric examination coverage requirements for circumferential head-to-shell Weld HEA-CA-05 on the Residual Heat Removal heat exchanger.

#### 3.4.3 Licensee's Basis for Relief Request (as stated)

The heat exchanger tie-down brackets obstruct access to the head-to-shell weld, limiting examination coverage.

#### 3.4.4 Licensee's Proposed Alternative Examination

No alternative examination was proposed. Instead, the licensee proposed to use the limited volumetric coverage obtained (78.1 percent) for head-to-shell Weld HEA-CA-05 on the Residual Heat Removal heat exchanger.

#### 3.4.5 NRC Staff Evaluation

The ASME Code requires 100 percent volumetric examination of selected head and shell welds on ASME Code, Class 2 heat exchanger. However, bolted tie-down stabilizer brackets located in close proximity to the subject weld limit ultrasonic scans. For the licensee to achieve 100 percent volumetric coverage, the vessel and integral stabilizer brackets would have to be redesigned and modified. This would place a significant burden on the licensee, thus the ASME Code-required 100 percent volumetric examination is impractical.

Residual Heat Removal heat exchanger "A" at DAEC has a vertically-oriented, tube and cylindrical shell design. Weld HEA-CA-05 is a full penetration circumferential butt weld joining the upper head to the shell, both of which are SA-516-70 low alloy steel. Four stabilizer tie-down brackets are welded to the shell at 90-degree locations around the circumference. These brackets are attached by bolting to structural steel components which restrain the heat exchanger during periods of dynamic loading. The brackets and bolted steel components cover portions of the weld and scan areas, limiting the examination to approximately 78 percent of the entire weld length and associated ASME Code-required volume. Two other full penetration welds were also examined on this heat exchanger, for which the licensee was able to obtain the full ASME Code-required coverage.

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject heat exchanger weld due to the proximity of integrally welded stabilizer brackets. Based on the volumetric coverage obtained for the subject weld, and considering full ASME Code-required examinations conducted on other Class 2 welds on the Residual Heat Removal heat exchanger, it is reasonable to conclude that if significant service-induced degradation occurred, evidence of degradation would have been detected by the examination that was performed.

#### 4.0 NRC STAFF CONCLUSIONS

NRC staff has reviewed the licensee's submittal and concludes that ASME Code examination requirements are impractical for the subject components listed in the licensee's Request for Relief. It is further concluded that, if significant service-induced degradation were to occur, there is reasonable assurance that evidence of degradation would have been detected by the examinations performed by the licensee. For these reasons, in accordance with 10 CFR 50.55a(g)(6)(i), the subject Request for Relief is granted for the third inservice inspection interval at DAEC.

The NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) for the Request for Relief is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject Request for Relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

<p style="text-align: center;"><b>TABLE 1</b>  <b>DUANE ARNOLD ENERGY CENTER</b>  <b>SUMMARY REQUEST FOR RELIEF</b>  <b>Third 10-Year ISI Interval</b></p>								
<p>RR = Request for Relief                      SE = Safety Evaluation</p>								
RR Number	RR SE Section	System or Component	Examination Category	Item Number	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Disposition
No number assigned	3.1	RPV Nozzle to Vessel Welds	B-D	B3.90	100% of full penetration RPV nozzle-to-vessel welds	Volumetric	Use volumetric coverage(s) achieved	Granted 10 CFR 50.55a(g)(6)(i)
No number assigned	3.2	RPV Nozzle Inside Radius	B-D	B3.100	100% of RPV nozzle inside radius sections	Volumetric	Use achieved 71.7% volumetric coverage	Granted 10 CFR 50.55a(g)(6)(i)
No number assigned	3.3	Class 1 Piping Weld	B-J	B9.11	Essentially 100% of selected full penetration piping welds	Volumetric and Surface	Use achieved 35.6% volumetric coverage	Granted 10 CFR 50.55a(g)(6)(i)
No number assigned	3.4	Class 2 Vessel Weld	C-A	C1.20	Essentially 100% of head-to-shell welds	Volumetric	Use achieved 78.1% volumetric coverage	Granted 10 CFR 50.55a(g)(6)(i)

Principal Contributors: Thomas K. McLellan  
 Donald Naujock

Date: May 1, 2008