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IES UTILITIES

April 26, 1996
NG-96-0809

Mr. William T. Russell, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-37
Washington, DC 20555-0001

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Third 10-Year Inservice Inspection Plan

Reference: 10 CFR 50.55a

File: A-100, A-286

Dear Mr. Russell:

The Duane Arnold Energy Center (DAEC) will begin its third 10-year inspection interval on November 1, 1996. This interval will continue through November 1, 2005. Pursuant to the requirements of 10 CFR 50.55a(g)(4)(ii) and 50.55a(g)(5)(i), IES Utilities herewith submits the DAEC inservice inspection (ISI) plan for this upcoming interval (Attachment 1).

We intend to use this plan to perform inservice inspections during the upcoming refueling outage (RFO) 14. As discussed in the plan, we will be completing the second 10-year interval inspections during RFO 14, as well as beginning the third ten-year interval inspections. (See relief request NDE-R024.) The relief requests which require approval prior to these RFO 14 inspections are included in Attachment 2. We request approval of these relief requests and the plan by October 10, 1996.

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Should you have any questions regarding this submittal, please contact me.

Sincerely,

John F. Franz,
Vice President, Nuclear

JFF/CJR/cjr
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Attachments: 1) Third Ten-Year Inspection Interval Inservice Inspection Plan for Duane Arnold Energy Center, Palo, Iowa
2) Relief Requests

cc: C. Rushworth (w/o)
L. Liu (w/o)
G. Kelly (NRC-NRR)
H. Miller (Region III)
NRC Resident Office
W. Johnson (State of Iowa)
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IES UTILITIES INC.
DUANE ARNOLD ENERGY CENTER
2ND 10-YEAR INTERVAL
REQUEST FOR RELIEF NO. HT-014

I SYSTEM/COMPONENT(S) FOR WHICH RELIEF IS REQUESTED

Class 2 Pressure Retaining Piping and Components in the High Pressure Coolant Injection System (water side) downstream of MO-2321 and MO-2300, extending to MO-2312, CV-2315, and MO-2318.

EXAMINATION CATEGORY C-H, ITEM(S) C7.40, C7.80

II CODE REQUIREMENT

The pressure retaining components within each system boundary shall be subject to the system pressure test and visually examined by the method specified in table IWC-25 0-1 (ie. IWC-5222), Examination Category C-H.

(1) A system hydrostatic pressure test in accordance with IWA-5211 (d) conducted during a plant shutdown at a pressure above nominal operating pressure or system pressure for which overpressure protection is provided.

III CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

Hydrostatic pressure tests can be difficult to perform, often requiring complicated or abnormal valve line-ups in order to properly vent, fill and isolate the systems requiring testing (ref. Code Case N498)

It is also impossible to operate this system at the Code required pressure and temperature for the required 4 hour test condition "hold time" in accordance with IWA-5213 without increasing the torus temperature to an undesirable temperature.

IV BASIS FOR RELIEF

Elevated pressure hydrostatic tests are difficult to perform and often represent a true hardship. Some of the difficulties associated with elevated pressure testing include the following:

- Hydrostatic testing often requires complicated or abnormal valve line-ups in order to properly vent, fill, and isolate the component requiring testing.

- Relief valves with setpoints lower than the hydrostatic test pressure must be gagged or removed and blind flanged. This process requires the draining and refilling of the system.

- Valves that are not normally used for isolation (e.g., normally open pump discharge valves) are often required to provide pressure isolation for an elevated pressure hydrostatic test. These valves frequently require time consuming seat maintenance in order to allow for pressurization.

- The radiation exposure required to perform a hydrostatic pressure test is high (in comparison to operational pressure testing) due to the large amount of time required to prepare the volume for testing (i.e., installing relief valve gags, performing appropriate valve line-ups, etc).

- In order to isolate some portions of systems, freeze seals may be required.

The difficulties encountered in performing a hydrostatic pressure test are prohibitive when weighed against the benefits. Industry experience, which is corroborated by IES's experience, shows that most through wall leakage is detected during system operation as opposed to during elevated pressure tests such as ten-year system hydrostatic test.

Little benefit is gained from the added challenge to the piping system provided by an elevated pressure hydrostatic test (when compared to an operational test), especially when one considers that the piping stress experienced during a hydrostatic test does not include the significant stresses affiliated with the thermal growth and dynamic loading associated with design basis events. As an industry, it has been historically documented that leakage will occur and be detected at nominal operating pressures of a system. Elevating pressure 10-25% has no meaningful impact.

These arguments are also supported by NRC endorsement of Code Case N-498, "Alternative Rules for 10 Year Hydrostatic Pressure Testing for Class 1 and 2 Systems, Section XI, Division 1". This relief request is a logical extension of that Code Case.

V ALTERNATE EXAMINATIONS

IES Utilities Inc. proposes to perform pressure testing on the High Pressure Coolant Injection System in accordance with the requirements of ASME Section XI Code Case N-498-1. This Code Case offers an acceptable alternative to Section XI requirements. This test shall consist of performing the required visual (VT-2) inspections in conjunction with a periodic HPCI turbine test performed in accordance with the ASME Section XI Inservice Testing Program. This test shall be performed once per period rather than once per interval. The Test Hold Time shall be a minimum of 20 minutes starting when the tech. spec. flow and pressure requirements have been met.

VI JUSTIFICATION FOR THE GRANTING OF RELIEF

With the pressures currently required by Section XI, elevated pressure hydrostatic tests do not offer a commensurate increase in safety with cost benefit and places undue burden upon a licensee to perform these tests. Use of Code Case N-498-1 with a 20 minute hold-time rather than a 4 hour hold-time and performing this test every period rather than every interval will not jeopardize the public health and safety.

VII IMPLEMENTATION SCHEDULE

This relief request will be implemented during the third period of the 2nd Ten Year Interval.

IES UTILITIES INC.
DUANE ARNOLD ENERGY CENTER
2ND 10-YEAR INTERVAL
REQUEST FOR RELIEF NO. NDE-019

I SYSTEM/COMPONENT(S) FOR WHICH RELIEF IS REQUESTED

Reactor Vessel Closure Head Nuts

EXAMINATION CATEGORY B-G-1,ITEM(S) B6.10

II CODE REQUIREMENT

Section XI (1980 W81 ADD), Table IWB-2500-1 Category B-G-1, Item B6.10 requires a surface examination of all Reactor Vessel Closure Head Nuts once during the ten year interval.

III CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

Relief is requested from performing the surface examination of the remaining Reactor Vessel Head Closure Nuts.

IV BASIS FOR RELIEF

Table IWB-2500-1 of the 1980 Edition with the Winter 1981 Addenda of ASME Section XI requires a surface examination to be performed on the reactor vessel closure head nuts. However, Table IWB-2500-1 does not provide the corresponding "Examination Requirements/Figure Number" and "Acceptance Standard". These provisions were still in course of preparation.

Provisions for the "Examination Requirements/Figure Number" and "Acceptance Standard" for the reactor vessel closure head nuts were later incorporated in the 1989 Addenda of ASME Section XI. This Addenda also changed the examination method to a VT-1 visual examination.

The DAEC has completed the surface examination on 2/3 of the reactor vessel closure head nuts for the current interval. The examination results have not shown any relevant indications.

V ALTERNATE EXAMINATIONS

IES Utilities Inc. proposes to perform a Visual VT-1 Examination on the remaining reactor vessel closure head nuts (1/3) in accordance with the 1989 Addenda of ASME Section XI.

VI JUSTIFICATION FOR THE GRANTING OF RELIEF

To perform the surface examination on the remaining 1/3 of the reactor vessel closure head nuts would only have a small potential of increasing plant safety margins and a very disproportionate impact on expenditures of plant manpower. The visual VT-1 examination would detect the type of flaws that would be detrimental to the integrity of the nuts and therefore is an acceptable examination method.

VII IMPLEMENTATION SCHEDULE

This relief request will be implemented during the 2nd Ten Year Interval.

IES UTILITIES INC.
DUANE ARNOLD ENERGY CENTER
2ND 10-YEAR INTERVAL
REQUEST FOR RELIEF NO. NDE-020

I SYSTEM/COMPONENT(S) FOR WHICH RELIEF IS REQUESTED

Reactor Vessel Welds Inspection Program

EXAMINATION CATEGORY B-A, ITEM(S) B1.10,

II CODE REQUIREMENT

10CFR50.55a(g)(6)(ii)(A)(2) requires all licensees to augment their reactor vessel examination by implementing once, as part of the Inservice Inspection Interval in effect on September 8, 1992, the examination requirements for reactor vessel shell welds specified in Item B1.10 of Examination Category B-A in the 1989 Edition of ASME Section XI.

Section XI (1989), IWA-2232 states that ultrasonic examination shall be conducted in accordance with Appendix I.

Appendix I, I-2100 states that ultrasonic examination of vessel welds greater than 2 inches in thickness shall be conducted in accordance with Article 4 of Section V, as supplemented by Appendix Supplements identified in table I-2000-1.

Article 4 of ASME Section V states that the calibration block fabrication and material shall be one of the following; (1) a nozzle dropout, (2) a component prolongation; (3) material of the same material specification product form, and heat treatment condition as one of the materials being joined.

Appendix I, Supplement 4 states the alternative calibration block design of fig. I-S4 may be used in lieu of blocks fabricated in accordance with Articles 4 and 5 of Section V provided the block meets Supplement 1 of Article 4 and 5 of Section V.

III CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

Relief is requested from the ASME Section XI 1989 Edition, Appendix I requirements for calibration block design, fabrication requirements and, material specifications as specified in the augmented reactor vessel inspection program in 10CFR 50.55a.

IV BASIS FOR RELIEF

The RPV calibration blocks currently being used at DAEC, when reviewed against the 1980 with winter 81 addenda of ASME Section XI and V, were identified as marginal in certain block design characteristics. This is because the requirements and examination techniques existing at the time of their fabrication were significantly different then those employed today. The current block dimensions, while in compliance with the original fabrication requirements, satisfy all but two of the side drilled hole dimensional requirements of the 1989 Section XI Code for calibration standards. Calibration reflectors (side drilled holes), though they do not meet the 1989 Code requirements have been proven adequate during previous inspections. Any alterations to the existing calibration standards would be undesirable since the potential is high that the alterations may effect comparisons of past calibration and examinations results with future examinations. ASME Section XI requirements to detect service induced flaws is directly associated with the ability for traceability to previous examination results available from these existing calibration blocks. This is supported by Regulatory Guide 1.150, Position C.2, which states in part, "Where possible, the same calibration block should be used for successive inservice examination of the same RPV."

It would be impractical to fabricate a new set of calibration blocks and establish new baseline examination values for those affected examinations in order to satisfy current block dimensional requirements. Based on the above, DAEC requests relief from the ASME Section XI, Appendix I requirements for calibration block design, fabrication requirements, and material specifications, in order to allow the continued use of the existing calibration blocks in the following table:

Cal Blk#	Nominal Pipe Size	Pipe Schedule	Thickness (inches)	Heat No.	Cal Blk Dwg. No.
IE-30	PLATE	N/A	5.5"	B0402	SK-4-7-78
IE-31	PLATE	N/A	6.625"	P2112	SK-4-7-78
IE-32	PLATE	N/A	6.625"	P2130	SK-4-7-78
IE-33	PLATE	N/A	6.625"	T1937	SK-4-7-78
IE-34	PLATE	N/A	6.625"	P2076	SK-4-7-78
IE-35	PLATE	N/A	4.0"	B0390	SK-4-7-78

V ALTERNATE EXAMINATIONS

All future calibration blocks will meet the design, fabrication, and material specification requirements of ASME Section XI Appendix I, III, and Article 4 of ASME Section V, and will be provided with the documentation necessary to demonstrate compliance with these requirements. Additionally, when using existing calibration blocks that lack certain design requirements or appropriate documentation, adequate assurance that the blocks will establish the proper ultrasonic calibration and sensitivity, and a comparison will be made between the attenuation of the calibration block and the material being examined.

A demonstration was conducted to verify that the vessel calibration block IE-30 is compatible with ultrasonic equipment that will be utilized for the vessel examination. The results were found to be acceptable under the 1989 Section XI requirements (edition which will be used for the Third Ten Year Interval ISI program) and will be documented under IWA-2240 requirements.

VI JUSTIFICATION FOR THE GRANTING OF RELIEF

To fabricate new calibration blocks to meet the requirements of ASME Section XI and Section V, Article 4 would only have a small potential of increasing plant safety margins and a very disproportionate impact on expenditures of plant manpower. In order to maintain the comparison of previous examination results the current calibration blocks will be utilized during the Second Ten Year ISI Program Interval.

VII IMPLEMENTATION SCHEDULE

This relief request will be implemented during the 2nd Ten Year Interval.

RELIEF REQUEST NUMBER: NDE-R022

COMPONENT IDENTIFICATION

Code Class: 1
References: IWB-2500
Table IWB-2500-1

Examination Category: B-A
Item Number: B1.30
Description: Shell to Flange Welds

Component Numbers: VCB-C005, Reactor Vessel Shell to Flange Weld

CODE REQUIREMENT

Section XI (1989 Edition), Table IWB-2500-1 Category B-A, Item B1.30, requires a volumetric examination, which includes essentially 100% of weld length once during the ten year interval.

Note 4 of Table IWB-2500-1 states "The examination of shell-to-flange welds may be performed during the first and third inspection periods in conjunction with the nozzle examinations of Exam. Cat. B-D (Program B). At least 50% of shell-to-flange welds shall be examined by the end of the first inspection period, and the remainder by the end of the third inspection period.

Relief is requested from performing 50% of the weld length during the first inspection period for the subject Reactor Vessel Shell-to-Flange Weld.

BASIS FOR RELIEF

NUREG 0619, 4.3.1 states in part "Should future developments and the results of inservice UT examinations demonstrate that UT techniques can detect small nozzle thermal fatigue cracks with acceptable reliability and consistency these techniques could then form the basis for modification of the inspection criteria that follow." The DAEC has performed this demonstration and plans on performing the UT examination of our feedwater nozzles during RFO14. In order to save exposure and manpower all vessel weld examinations were deferred to RFO14 (1996). This included the remaining 1/3 (252° to 0°) of the subject shell-to-flange weld which is to complete the required examination for the 2nd Ten Year Interval. The DAEC will be scheduling the first period examinations required for the Third Ten Year Interval during RFO14 to reduce exposure and manpower and to utilize the specialized examination equipment needed to perform the NUREG 0619 feedwater examinations. In order to meet the requirements for the Third Ten Year Interval an additional 50% of the weld VCB-C005 would be required to be examined in RFO14. The total amount of the weld VCB-C005 examined in RFO14 would be approximately 83%. Thus exceeded the intent of the code by 33% in one period even though the extra 33% is being examined to complete the prior interval requirements. The DAEC proposes to examine a total of

RELIEF REQUEST NUMBER: NDE-R022

BASIS FOR RELIEF (Cont'd)

50% of VCB-C005 during RFO14 (33% to complete the 2nd Ten Year Interval requirements and an additional 17% to be credited to the Third Ten Year Interval). The area that will be examined is 252° to 72° equaling 50% of the total length of weld. To perform a total of 83% during RFO14 has a small potential of increasing plant safety margins and a very disproportionate impact on expenditures of plant manpower and radiation exposure. In order to maintain the successive examination requirement (ref IWB-2420) the area examined during RFO14 (first period of the Third Ten Year Interval) will be examined during the first period of the Fourth Ten Year Interval. The following table shows the history and proposed future examinations of VCB-C005:

	1st Interval	2nd Interval	3rd Interval	4th Interval
Period 1	108° - 252°	0° - 108°	0° - 72°	252° - 72°
Period 2	0° - 108°	108° - 252°		
Period 3	252° - 0°	252° - 0°	72° - 252°	72° - 252°

ALTERNATE EXAMINATION

DAEC will examine a total of 50% of the shell-to-flange weld (VCB-C005) during RFO14 with 33% being credited to the 2nd Ten Year Interval and 17% being credited to the Third Ten Year Interval. The area examined will be scheduled for the first period of the 4th Ten Year Interval in order to meet the successive examination requirement under IWB-2420.

APPLICABLE TIME PERIOD

Relief is requested for the third ten-year interval of the Inservice Inspection Program for DAEC.

RELIEF REQUEST NUMBER: NDE-R024

COMPONENT IDENTIFICATION

Code Class: 1, 2, and 3
References: IWA-2430(d)

Examination Category:	Not Applicable
Item Number:	Not Applicable
Description:	Scheduling of Inservice Inspections for Components inspected under Program B.

CODE REQUIREMENT

IWA-2430(d) states "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."

IWB-2500-1, Cat. B-A, Note 4 states "The examination of shell-to-flange welds may be performed during the first and third inspection periods in conjunction with the nozzle examinations of Exam. Cat. B-D (Program B). At least 50% of shell-to-flange welds shall be examined by the end of the first inspection period, and the remainder by the end of the third inspection period."

IWB-2500-1, Cat. B-D, Note 2 states "At least 25% but not more than 50% (credited) of the nozzles shall be examined by the end of the first inspection period, and the remainder by the end of the inspection interval."

BASIS FOR RELIEF

NUREG 0619, 4.3.1 states in part "Should future developments and the results of inservice UT examinations demonstrate that UT techniques can detect small nozzle thermal fatigue cracks with acceptable reliability and consistency these techniques could then form the basis for modification of the inspection criteria that follow." The DAEC has performed this demonstration and plans on performing the UT examination of our feedwater nozzles during RFO14. In order to save exposure and manpower all vessel weld examinations were deferred to RFO14. The DAEC has also scheduled the first period examinations required for the Third Ten Year Interval during RFO14 to reduce exposure and manpower and to utilize the specialized examination equipment needed to perform the NUREG 0619 feedwater examinations. In order to meet the requirements of the two notes above 50% of the vessel-to-flange weld (VCB-C005) (Ref Relief Request NDE-R022) and a total of 13 Nozzle-to-vessel welds with the associated inner radius (38% of 34 total nozzles) has been scheduled to be completed in RFO14. The DAEC has also scheduled an additional 8 Nozzle-to-safeend welds to be credited to the Third Ten Year Interval during RFO14.

RELIEF REQUEST NUMBER: NDE-R024

ALTERNATE EXAMINATION

The DAEC will perform the necessary examinations per Table IWB-2500-1 Cat B-A, Note 4 and Cat. B-D, Note 2 during RFO14. The DAEC RFO14 encompasses both the Third Period of the Second Ten Year Interval and the First Period of the Third Ten Year Interval. This approach has been accepted by Code Case N-535 as long as the examinations performed are not credited to both intervals. The additional examinations performed in RFO14 will not be credited to both intervals and the Summary Report shall identify the interval in which the examinations will be credited.

The DAEC plans on utilizing Code Case N-535 for future outages and will follow the requirements specified in the code case.

APPLICABLE TIME PERIOD

Relief is requested for the third ten-year interval of the Inservice Inspection Program for DAEC.