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NG-97-1081
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Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
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Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Response to NRC Request for Additional Information on the DAEC Third 10-Year Interval Inservice Inspection Program and Associated Requests for Relief

Reference: 1. NG-96-0809, from J. Franz (IES) to W. Russell (NRC), dated April 26, 1996, Third 10-Year Interval Inservice Inspection Program Plan
2. Letter, G. Kelly (NRR) to L. Liu (IES) dated April 28, 1997; Request for Additional Information on the Duane Arnold Energy Center Third 10-Year Interval Inservice Inspection Program and Associated Requests for Relief

File: A-100, A-286

By letter dated April 26, 1996, IES submitted the Duane Arnold Energy Center (DAEC) Third 10-Year Interval Inservice Inspection (ISI) Program Plan for NRC approval (Reference 1). Subsequently, the Staff issued a request for additional information (RAI) on April 28, 1997 (Reference 2).

This RAI was the subject of a conference call between NRC Staff and IES personnel on May 29, 1997. As discussed during this conference call, IES has revised relief requests NDE-R018, PR-001, PR-002 and PR-003. These relief requests, along with additional information, are provided in the attachment.

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The following NRC commitments are made in relief requests NDE-R018 and PR-002.

NDE-R018

Regarding the implementation of the alternative to code requirements contained in Code Case N-509, *Alternative Rules for the Selection and Examination of Class 1, 2, and 3 Integrally Welded Attachments*, IES Utilities will examine a minimum 10% sample of all nonexempt integrally welded attachments to piping, pumps, and valves, in Class 1, 2, and 3 systems.

PR-002

Regarding the implementation of the alternative to code requirements contained in Code Case N-522, *Pressure Testing of Containment Penetration Piping*, IES Utilities will conduct the testing at or above peak calculated containment pressure. The test procedure will provide criteria for the identification of the source of indicated leakage, including provisions for the detection and location of through-wall leakage in CIVs and pipe segments between CIVs.

Should you have any questions regarding this matter, please contact this office.

Sincerely,

Kenneth E. Peveler
Manager, Regulatory Performance

Attachment

cc: C. Rushworth
L. Root (w/o attachments)
J. Franz (w/o attachments)
G. Kelly (NRC-NRR)
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Response to NRC Request for Additional Information Concerning the DAEC Third 10-Year Interval Inservice Inspection Program

NRC Request

In **Request for Relief NDE-R018**, IES Utilities requested to implement the alternative to code requirements contained in Code Case N-509, *Alternative Rules for the Selection and Examination of Class 1, 2, and 3 Integrally Welded Attachments*. The NRC finds this alternative to code requirements acceptable for use with the following condition:

> Examination of a minimum 10% sample of all nonexempt integrally welded attachments to piping, pumps, and valves, in Class 1, 2, and 3 systems.

IES Utilities Response

IES commits to the NRC condition to examine a 10% sample of all nonexempt integrally welded attachments to piping, pumps, and valves, in Class 1, 2, and 3 systems. The DAEC's approach in implementing Code Case N-509 is documented in Technical Approach and Position (TAP)-I007. This TAP contains a table that includes the total number of nonexempt integrally welded attachments for each item number and the 10% sample selected. Relief Request NDE-R018 has been revised to include reference to TAP-I007 for selection of integrally welded attachments and the number to be examined. The revised relief request is provided on pages 8 and 9 of this attachment.

NRC Request

In **Request for Relief PR-002**, IES Utilities requested to implement the alternative to code requirements contained in Code Case N-522, *Pressure Testing of Containment Penetration Piping*. The NRC finds this alternative to code requirements acceptable for use with the following conditions:

> 1) The test is conducted at the peak calculated containment pressure, and
> 2) The test procedure provides criteria for the detection and location of through-wall leakages in containment isolation valves (CIVs) and pipe segments between the CIVs.

IES Utilities Response

IES Utilities Technical Specifications require the performance of testing in accordance with Appendix J, Option B. Testing will be conducted at or above peak calculated containment internal pressure. The test procedure will provide criteria for the identification of the source of indicated leakage, including provisions for the detection and location of through-wall leakage in CIVs and pipe segments between CIVs. Request for Relief PR-002 has been revised to include this information. The revised relief request is provided on pages 6 and 7 of this attachment.

NRC Request

In **Request for Relief PR-001**, IES Utilities proposed an alternative to the bolting corrective measures as follows:

> "If it is determined, by the engineering evaluation, that a VT-3 examination is required, but the leakage is identified when the bolted connection is in service, an evaluation may be performed to justify deferral of bolt removal until the next time the affected component or applicable portion of the piping system is removed from service. However, the removal of the bolts for VT-3 visual examination and evaluation will not be deferred beyond the next refueling outage."

Later editions of the code have provided an alternative to the removal of all bolting at a leaking connection. IES Utilities approach to perform an evaluation of the bolted joint should in itself provide the determination for the need to remove one bolt as part of the corrective action. The NRC has determined that a subsequent evaluation to justify deferral of bolt removal is not appropriate and is considered unacceptable. Provide the action IES Utilities proposes to take regarding the inclusion of the subject paragraph in the proposed alternative.

IES Utilities Response

PR-001 has identified the specific areas that would be addressed if an evaluation was required as a result of leakage detected at a bolting connection during the performance of a system pressure test. The areas discussed as a minimum are:

1) type and location of leakage,
2) historical leakage,
3) bolting material and its resistance to corrosion by the leaking medium,
4) visual evidence of corrosion, and
5) history of bolting material degradation, due to corrosion, in a similar environment.

In addition, stopping the leakage would be addressed. IES Utilities agrees that this evaluation would determine if there was a need to remove one bolt as part of the corrective action.

The "subsequent evaluation to justify deferral of bolt removal" which was discussed in Relief Request PR-001 has been deleted from the relief. The revised relief request is provided on pages 4 and 5 of this attachment.

NRC Request

In **Request for Relief PR-005**, IES Utilities proposed an alternative to the relief valve discharge piping test requirements. Similar requests have been found acceptable provided that the licensee's alternative includes a VT-3 visual examination of the discharge piping to verify its integrity. The NRC believes that a VT-3 visual examination is technically prudent in light of a recent discharge pipe failure in a suppression pool. Therefore, the IES Utilities should modify its submittal to include the VT-3 examination in order that the NRC can find this alternative acceptable.

IES Utilities Response

The DAEC Technical Specifications require, during normal plant startup operations, each relief valve to be manually opened with the reactor pressure $\geq$ 100 psig. The surveillance test procedure requires the monitoring of the following parameters during the test: Reactor Level, Reactor Pressure, Torus Level, Torus Temperature, and Turbine Bypass Valve Position. IES Utilities believes that these parameters provide an acceptable level of quality and safety of the discharge piping integrity. However, to provide more assurance of the quality and safety, IES Utilities will perform a VT-3 visual examination of the six discharge lines every interval. Relief Request PR-005 has been revised to incorporate the addition of these VT-3 visual examinations. The revised relief request is provided on pages 10 and 11 of this attachment.

RELIEF REQUEST NUMBER: PR-001

COMPONENT IDENTIFICATION

Code Classes:	1, 2, and 3
References:	IWA-5250
Examination Categories:	B-P, C-H, D-A, D-B, and D-C
Item Numbers:	B15.10 through B15.71 C7.10 through C7.80 D1.10 through D3.10
Description:	Alternate corrective measures for bolted connections.
Component Numbers:	All Class 1, 2, and Class 3 pressure retaining components subject to system pressure testing.

CODE REQUIREMENT

IWA-5250(a)(2) requires that if leakage occurs at a bolted connection, the bolting shall be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100.

BASIS FOR RELIEF

If a bolted connection leak is detected during a system pressure test, current ASME Section XI Code requirements specify that all bolting must be removed for the purpose of a VT-3 visual examination and evaluation in accordance with IWA-3100. This would require placing the component or piping system out of service which could result in a plant shutdown, a delay of plant startup or, for continued operation, a reduction in plant safety. Additionally, removal of all bolting for examination serves no practical purpose if the bolting is fabricated of a material which is not susceptible to corrosion due to contact with the leaking medium. It is DAEC's position that the following proposed alternative provides an acceptable level of quality and safety equivalent to that provided by the applicable Code requirements.

ALTERNATE EXAMINATION

If leakage occurs at a bolted connection, during the performance of a system pressure test, an engineering evaluation shall be performed to determine if the associated bolting is susceptible to corrosion which could result in further degradation and increased leakage. This evaluation shall address at a minimum:

1) type and location of leakage
2) historical leakage
3) bolting material and its resistance to corrosion by the leaking medium
4) visual evidence of corrosion
5) history of bolting material degradation, due to corrosion, in a similar environment

If the engineering evaluation indicates that the bolting material is not susceptible to corrosion, then bolt removal for visual examination and further evaluation shall not be required. However, termination of leakage shall be addressed and corrective measures taken as necessary.

If the evaluation determines the need for a VT-3 visual examination of the bolting, one bolt closest to the source of leakage shall be removed, and in lieu of performing the Code required VT-3 visual examination the bolting will be VT-1 visually examined per IWA-2211(a) and evaluated in accordance with IWB-3517.1. If the removed bolt has evidence of degradation, all remaining bolting shall be removed and VT-1 examined and evaluated accordingly. All examinations and evaluations shall be traceable to the VT-2 documentation originally detecting the leakage and applicable records will be maintained per IWA-6000.

APPLICABLE TIME PERIOD

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

RELIEF REQUEST NUMBER: PR-002

COMPONENT IDENTIFICATION

Code Classes:	2
References:	IWA-5000 IWC-5000 IWA-5221, IWA-5222
Examination Categories:	C-H
Item Numbers:	C7.20 through C7.80
Description:	Alternate testing for containment penetration piping.
Component Numbers:	Class 2 pressure retaining components penetrating containment connected to nonsafety-related piping subject to pressure testing per IWA-5000.

CODE REQUIREMENT

IWB-5210(a)(1) requires that pressure retaining components following opening and closing within each system boundary be subjected to a system leakage test after pressurization to nominal operating pressure.

IWB-5210(a)(2) requires the pressure retaining components within each system boundary to be subjected to a system hydrostatic pressure test.

BASIS FOR RELIEF

The portion of piping that penetrates containment and the associated inboard and outboard containment isolation valves are required to be constructed in accordance with Class 1 or Class 2 design requirements. In instances where the piping penetration is for a nonsafety-related system, the sole function of the penetration piping and associated valves is to provide containment isolation and maintain containment integrity in the event of a failure of the attached nonsafety-related piping. In all cases during normal plant operation, the isolation valves associated with these penetrations are maintained in the locked closed position, are administratively closed (controlled procedurally), or they close upon receipt of a containment isolation signal. The integrity of these penetrations is verified by 10CFR50, Appendix J, leakage testing.

Additionally, per Code Case N-522, "Pressure Testing of Containment Piping Section XI, Division 1," it has been determined that pressure testing of these containment penetrations per 10CFR50, Appendix J, is an acceptable alternative to the requirements of Table IWC-2500-1, Category C-H, for piping penetrating containment that is attached to non-Code Class piping.

The performance of system pressure tests each inspection period, and a hydrostatic test each inspection interval, per Section XI, Table IWC-2500-1, is redundant to Appendix J testing. Additional pressure testing per the requirements of Table IWC-2500-1, Category C-H, provides no commensurate increase in quality or safety with cost benefit. It is DAEC's position that pressure testing of piping in nonsafety-related systems penetrating containment pursuant to the requirements of 10CFR50, Appendix J, in lieu of Section XI pressure testing requirements, provides an acceptable level of quality and safety.

ALTERNATE EXAMINATION

As an alternative to the Section XI pressure testing requirements for piping penetrating containment and attached to a nonsafety-related system, the DAEC will adopt the provisions of ASME Section XI Code Case N-522. The Appendix J testing is performed by draining the test volume and pressurizing the test volume with air to a pressure of at least P_a, where P_a is the peak calculated containment internal pressure. The test procedure will provide criteria for identification of the source of indicated leakage, including provisions for detection and location of through-wall leakage in CIVs and pipe segments between CIVs.

Pressure testing shall be performed in accordance with the requirements and frequency specified in 10CFR50, Appendix J, in lieu of the additional requirements specified in Table IWC-2500-1, Category C-H.

APPLICABLE TIME PERIOD

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

RELIEF REQUEST NUMBER: NDE-R018

COMPONENT IDENTIFICATION

Code Class:	1, 2, and 3
References:	Tables IWB, IWC and IWD-2500-1
Examination Category:	B-H, B-K-1, C-C, D-A, D-B, and D-C
Description:	Alternative Rules For the Selection and Examination of Class 1, 2, and 3 Integrally Welded Attachments.
Component Numbers:	All Integrally Welded Attachments in Examination Categories B-H, B-K-1, C-C, D-A, D-B, and D-C.

CODE REQUIREMENT

Table IWB-2500-1, Category B-K-1 requires a volumetric or surface examination as applicable of integrally welded attachments exceeding 5/8" design thickness.

Table IWC 2500-1, Category C-C requires a surface examination of all integrally welded attachments exceeding 3/4" design thickness.

Table IWD 2500-1, Category D-A and D-B a visual (VT-3) examination of all integrally welded attachments corresponding to those component supports selected by IWF-2510(b).

BASIS FOR RELIEF

Specific relief is requested on the basis that the proposed alternative would provide an acceptable level of quality and safety. Code Case N-509, "Alternative Rules for the Selection and Examination of Integrally Welded Attachments, Section XI, Division 1", provides an alternative to the Tables of IWB/C/D-2500-1 for integrally welded attachments. The alternative requires a surface examination (IWB/ IWC) of 10% of the integrally welded attachments associated with the component supports selected for examination under IWF-2510, and a visual examination of 10% of the selected integrally welded attachments for IWD. In addition, an examination is required whenever component support member deformation is identified. This Code Case recognizes the results of over 20 years of inservice inspections and the considerable attention that component supports have received through NRC bulletins.

ALTERNATE EXAMINATION

In lieu of performing the Code required examinations, the DAEC proposes to examine integrally welded attachments in accordance with Code Case N-509 requirements. The 10% sample and selection of the nonexempt integrally welded attachments are designated in Technical Approach and Position TAP-1007.

APPLICABLE TIME PERIOD

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

RELIEF REQUEST NUMBER: PR-005

COMPONENT IDENTIFICATION

Code Classes:	3
References:	IWD-5210(b), IWD-5223(f) IWA-5211(d)
Examination Categories:	D-B
Item Numbers:	D2.10
Description:	10 year system hydrostatic testing of class 3 systems.
Component Numbers:	Class 3 pressure retaining safety or relief valve discharge piping subject to Hydrostatic Testing per IWA-5000.

CODE REQUIREMENT

IWD-5210(b) requires an elevated pressure hydrostatic test be performed in accordance with IWA-5000 each inspection interval.

IWD-5223(f) requires a system hydrostatic test be performed at a pressure equal to 90% of the safety or relief valve discharge piping submergence head, for that piping which discharges into the containment suppression pool.

BASIS FOR RELIEF

The difficulties encountered in performing a hydrostatic pressure test are prohibitive when weighed against the benefits. Industry experience, which is corroborated by the DAEC's experience, shows that 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 quite 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 normal operating pressures of a system. Elevating pressure 10-25% has no meaningful impact; most through-wall leakage is detected during system operation rather than during elevated-pressure tests such as ten-year system hydrostatic tests.

Additionally, the Code required hydrostatic test pressure for the subject discharge piping would be 2.2 psi based on the piping submergence head. This is significantly less than that expected during normal system startup and operation. Performing the Code hydrostatic pressure test at this pressure has no meaningful impact on increased plant safety.

These arguments are also supported by the ASME Section XI 1992 Edition of the Code in which the requirements of IWD-5223(f) have been removed.

Based on the above, the DAEC requests relief from the ASME Section XI requirements for performing elevated pressure hydrostatic tests on Class 3 safety or relief valve discharge piping which discharges into the containment suppression pool.

ALTERNATE EXAMINATION

In accordance with the DAEC Technical Specifications, during normal plant startup operations, each relief valve is manually opened with the reactor pressure ≥ 100 psig. Relief valve tailpipe and discharge piping momentarily experiences a discharge pressure of about 25 psi. Tailpipe pressure, temperature and suppression pool temperatures are monitored as necessary. The DAEC will ensure discharge piping integrity through normal plant startup operations. In addition, the DAEC will perform a VT-3 visual examination of the six discharge lines every interval to provide additional assurance of discharge piping integrity.

With the pressures (2.2 psi) currently required by Section XI, elevated pressure hydrostatic tests do not offer a commensurate increase in safety with cost benefit and places undo burden upon a licensee to perform these tests.

APPLICABLE TIME PERIOD

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