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**Date:** 3/27/03 2:39PM  
**Subject:** Oyster Creek Relief Requests of 8/1/02 (**TAC MB5790-93**)

John:

Attached is a draft letter report prepared by NRC contractor PNNL. Embedded in the report you will see descriptions of PNNL's information need to complete this review. Please call me to set up a conference call to discuss these issues.

**The sole purpose of this e-mail and attachment is to prepare you for the proposed conference call. Neither this e-mail nor its attachment conveys a formal NRC staff position, or formally request for additional information.**

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**CC:** Anderson, Michael T; Ankrum, Alvin R; Bernard Grenier; Bisping, Lori S;  
George Georgiev; Thomas McLellan

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ATTACHMENT

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**TECHNICAL LETTER REPORT**  
**REQUEST FOR ADDITIONAL INFORMATION**  
**ON FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL**  
**REQUESTS FOR RELIEF**  
**FOR**  
**AMERGEN ENERGY COMPANY**  
**OYSTER CREEK GENERATING STATION**  
**DOCKET NUMBER 50-219**

1. SCOPE

By letter dated August 1, 2002, the licensee, AmerGen Energy Company, submitted Requests for Relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, for Oyster Creek Generating Station. The requests for relief are for the fourth 10-year inservice inspection (ISI) interval, in which Oyster Creek adopted the 1995 Edition of ASME Section XI, through 1996 Addenda, as the Code of Record.

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee has submitted Relief Request OC-02-02 for the Class 1 integral attachment weld on the reactor pressure vessel support skirt. The Code requires that essentially 100% of the examination surface areas described in Table IWB-2500-1 be completed. "Essentially 100%," as clarified by ASME Code Case N-460, is greater than 90% coverage of the examination volume, or surface area, as applicable. Code Case N-460 has been adopted by the licensee. 10 CFR 50.55a(g)(5)(iii) states that when licensees determine that conformance with Code requirements is impractical at their facility, they shall submit information to support this determination. The NRC will evaluate such requests based on impracticality, and may impose alternatives, giving due consideration to public safety and the burden imposed on the licensee.

Requests for Relief OC-02-01, -03, -04 and -05 are proposed alternatives to ASME requirements, pursuant to 10 CFR 50.55a(a)(3)(i) or (ii). 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 U.S. Nuclear Regulatory Commission (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.

Pacific Northwest National Laboratory (PNNL) reviewed the information submitted by the licensee, and based on this review, determined the following information is required to complete the evaluation.

## 2. REQUEST FOR ADDITIONAL INFORMATION

### 2.1 **Request for Relief OC-02-01, Examination Categories B-J and C-F-1, Items B9.10 and C5.10, Pressure Retaining Welds in Piping (Class 1), and Pressure Retaining Welds in Austenitic or High Alloy Piping (Class 2), Alternative to Surface Examinations**

Examination Categories B-J, Item B9.10, and C-F-1, Item C5.10, require essentially 100% surface and volumetric examinations, as defined by Figures IWB-2500-8 and IWC-2500-7, respectively, of Class 1 and 2 piping welds. This applies to all Class 1 circumferential and longitudinal welds in piping 4-inch NPS and larger in diameter, and all Class 2 circumferential and longitudinal welds in austenitic or high alloy piping with  $\geq$  3/8-inch wall thickness and a diameter greater than 4-inch NPS. "Essentially 100%," as clarified by ASME Code Case N-460, is greater than 90% coverage of the examination volume, or surface area, as applicable.

In accordance with 10 CFR 50.55a(a)(3)(ii), the licensee is proposing to discontinue the surface examinations piping welds required by Examination Categories B-J and C-F-1. The licensee's alternative is based on an approach to target inter-granular stress corrosion cracking (IGSCC) as the only mode of service degradation that may be manifested for these piping welds. This approach to mitigate IGSCC in BWR piping is outlined in BWRVIP-75, which has been adopted by the licensee. The licensee argues that no service-induced outside [surface] diameter (OD) generated cracks have been

discovered on any stainless steel weld at Oyster Creek, and to continue to inspect the OD surface would result in hardship due to radiation exposure, and generate excessive amounts of mixed radioactive waste, with no compensating increase in quality or safety.

However, the licensee has not provided sufficient evidence to support a determination that IGSCC, generated from the inside surface of these piping welds, is the only service-induced degradation that may be manifested in all B-J and C-F-1 piping during the operating life of the plant. The Staff has determined that operating history alone does not provide adequate justification to eliminate Code-required examinations because operational experience also has demonstrated that components degrade as they age. A thorough degradation mechanism analysis would be necessary to support the alternative, to target only IGSCC, as proposed by the licensee.

A precedent for this type of analysis has been set within the risk-informed inservice inspection (RI-ISI) initiatives which have recently been approved by the Staff. During the RI-ISI process, detailed degradation mechanism assessments are required to support the failure frequency side of the risk matrix. As a result of these analyses, nondestructive examination (NDE) methods, and inspection frequencies, if necessary, are chosen to target specific areas for potential degradation. In doing so, many licensee's have been able to show that OD-generated flaws would not be expected to occur at certain piping locations, thus only volumetric examinations are implemented. In order to establish this basis at Oyster Creek, a similar degradation mechanism assessment would be required. Provide a detailed degradation mechanism assessment, as outlined in the EPRI, or Westinghouse Owners Group (WOG), topical reports for performing risk-informed ISI.

2.2 **Request for Relief OC-02-02, Examination Category B-K, Item B10.10, Welded Attachments for Vessels, Piping, Pumps and Valves, Reactor Pressure Vessel (RPV) Support Skirt**

In the relief request the licensee states that the Code-required examinations on the inside surface and adjacent base metal of attachment Weld 1-569 are impractical based on limitations associated with physical obstructions and geometric interference. The license further states that control rod drive housings, instrumentation penetrations and the design of the vessel skirt restrict access to the examination area C-D, as listed in ASME Figure IWB-2500-13.

A typical configuration as shown in Figure IWB-2500-13 has been presented. However, the licensee has not provided sufficient detail to demonstrate the impracticality of the surface examinations, due to these specific interferences at Oyster Creek. Please provide, through drawings or sketches, photographs, or more detailed technical descriptions, further information to support a determination of impracticality. Include in this information the variables that

produce the surface examination limitations with respect to magnetic particle or liquid penetrant testing.

The licensee argued that their nondestructive examination group pursued the use of an alternative ultrasonic method in lieu of the required surface examinations on the inside surface area C-D of Weld 1-569. The licensee concluded that, due to the unique configuration of the Oyster Creek RPV skirt design, an ultrasonic examination would not provide Code examination coverage. However, no physical description or other component specific information has been provided to support this conclusion. The Staff notes that other licensee's with typical RPV skirt weld configurations have applied ultrasonic methods to examine all or large percentages of the Code-required surface areas. Please provide sufficient information to enable the Staff to determine whether ultrasonic techniques may be applied at Oyster Creek.

The licensee stated, as part of their alternative examination, that Oyster Creek will "perform a VT-3 visual examination of the support skirt IWB boundary as shown in Figure IWB-2500-13 for any support deformation." It is unclear whether the VT-3 visual will be conducted as a direct, or remote, inspection, and whether the *IWB boundary* is intended to include the surface areas A-B and C-D, as described in Figure IWB-2500-13. It is also unclear what is meant by the phrase "any support deformation." Please clarify.

2.3

**Request for Relief OC-02-04, Examination Category E-G, Items E8.10 and E8.20, Class MC, Pressure Retaining Bolting, Metal Containment Connections**

In accordance with 10 CFR 50.55a(b)(2)(vi) the licensee has elected to use Subsection IWE of ASME Section XI, 1992 Edition, with the 1992 Addenda, as supplemented by 10 CFR 50.55a(b)(2)(ix), for the metal containment inspection program at Oyster Creek. The first containment inspection interval began on September 10, 1998. Examination Category E-G, Item E8.10 requires a VT-1 visual examination of all containment bolted connections, including bolts, studs, nuts, bushings, and washers. In addition, a VT-1 visual is required for threads and ligaments in base materials if the connection is disassembled. Item E8.20 requires a torque or tension test to be performed on bolts that have not been disassembled during the inspection interval.

Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee is proposing to perform the visual examinations required by ASME Examination Category E-A and to use the 10 CFR 50, Appendix J, requirements for leak-rate testing, in lieu of the visual and torque/tension tests required by Examination Category E-G. The licensee argues that re-examination of bolted connections that are already being examined as part of the Examination Category E-A requirements, and tested in accordance with Appendix J, unnecessarily increases the number of examinations and radiation exposure to personnel, thus constitutes a hardship with no compensating increase in quality or safety.

The licensee has proposed the following as provisions to be applied to this alternative:

1)

Exposed surfaces of bolted connections shall be visually examined during the conduct of examinations performed in accordance with the requirements of Table IWE-2500-1, Examination Category E-A, Containment Surfaces, using VT-3 certified inspectors. These examinations shall be evaluated in accordance with the requirements of IWE-3510. Deficiencies recorded during the visual examinations will subsequently be VT-1 (visually) examined and dispositioned by a responsible engineer.

2)

Bolted connections shall meet the pressure test requirements of 10 CFR 50, Appendix J.

The Staff recognizes that later Code revisions, such as the 1998 Edition through 2000 Addenda, have eliminated Examination Category E-G (previous E-G requirements have been supplanted by those in Examination Category E-A). Issues pertinent to Class MC inspections are addressed in the Final Rule on Industry Codes and Standards included in the Federal Register, Volume 67, Number 187, September 26, 2002. In the Notice the Staff has indicated it's intent to approve later Editions/Addenda of ASME Section XI including 1997 Addenda, 1998 Edition, 1999 Addenda, and 2000 Addenda in the upcoming revision of 10 CFR 50.55a, with certain provisions. It is expected that the 2003 revision of CFR will be available in the near future. Upon it's release, licensee's may seek approval to use these later Code Editions/Addenda, pursuant to 10 CFR 50.55a(g)(4)(iv). Section 2.2.2 of the Notice specifically addresses containment bolted inspections and provides supplemental conditions that must be adopted, if licensee's intend to use the later Code revisions.

Item 1) of the licensee's alternative is not entirely consistent with the Staff's position regarding visual examinations of containment bolted connections. The licensee is supplanting the requirements in Category E-G with those of Category E-A. This is essentially the same approach as found in later revisions of the Code (1997 Addenda, 1998 Edition, 1999 and 2000 Addenda). The Staff has reviewed this change and determined that a *general visual* examination using VT-3 personnel qualified in accordance with IWA-2300 may be acceptable, with certain provisions, as listed in the Final Rule, Section 10 CFR 50.55a(b)(ix)(H):

(E)

A general visual examination as required by Subsection IWE must be performed once each period.

(F)

VT-1 and VT-3 examinations must be conducted in accordance with IWA-2200. Personnel conducting examinations in accordance with the VT-1 or VT-3

examination method shall be qualified in accordance with IWA-2300. The "owner-defined" personnel qualification provisions in IWE-2330(a) for personnel that conduct VT-1 and VT-3 examinations are not approved for use.

(G)

The VT-3 examination method must be used to conduct the examinations in Items E1.12 and E1.20 of Table IWE-2500-1, and the VT-1 examination method must be used to conduct the examination in Item E4.11 of Table IWE-2500-1. An examination of the pressure-retaining bolted connections in Item E1.11 of Table IWE-2500-1 using the VT-3 examination method must be conducted once each interval. The "owner-defined" visual examination provisions in IWE-2310(a) are not approved for use for VT-1 and VT-3 examinations.

(H)

Containment bolted connections that are disassembled during the scheduled performance of the examinations in Item E1.11 of Table IWE-2500-1 must be examined using the VT-3 examination method. Flaws or degradation identified during the performance of a VT-3 examination must be examined in accordance with the VT-1 examination method. The criteria in the material specification or IWB-3517.1 must be used to evaluate containment bolting flaws or degradation. As an alternative to performing VT-3 examinations of containment bolted connections that are disassembled during the scheduled performance of Item E1.11, VT-3 examinations of containment bolted connections may be conducted whenever containment bolted connections are disassembled for any reason.

(I)

The ultrasonic examination acceptance standard specified in IWE-3511.3 for Class MC pressure-retaining components must also be applied to metallic liners of Class CC pressure-retaining components.

The licensee must confirm the provisions stated above will be met as part of the proposed alternative in Request for Relief OC-02-04.

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**Mail Envelope Properties**

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