September 12, 2001

Mr. Oliver D. Kingsley, President
Exelon Nuclear
Exelon Generation Company, LLC
200 Exelon Way, KSA 3-E
Kennett Square, PA 19348

SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2, EVALUATION OF RELIEF REQUESTS RR-12-9 THROUGH RR-12-11 AND RR-24 THROUGH RR-31: IMPLEMENTATION OF SUBSECTIONS IWE AND IWL OF ASME CODE, SECTION XI FOR CONTAINMENT INSPECTION (TAC NOS. MB1018 AND MB1019)

Dear Mr. Kingsley:

By letter dated January 9, 2001, PECO Energy Company (PECO), the previous licensee, submitted proposed alternatives to the requirements of 10 CFR 50.55a concerning the second 10-year inservice inspection (ISI) programs. PECO was succeeded by Exelon Generation Company (EGC or the licensee) as the licensed operator of Limerick Generating Station (LGS) on January 12, 2001. By letter dated January 30, 2001, EGC requested that the NRC staff continue to process and disposition licensing actions previously docketed and requested by PECO. By letter dated June 27, 2001, the licensee submitted an additional proposed relief request to be included in the staff's review. In response to the staff's questions raised during the May 10, 2001, conference call, and documented in a memorandum dated June 7, 2001, the licensee revised Relief Requests RR-26, RR-29, and RR-31 by letter dated May 23, 2001. By letter dated August 16, 2001, the licensee provided revised proposed relief requests that incorporated editorial changes due to the acquisition of LGS by EGC. The content of the proposed relief requests and alternatives was not affected by the August 16, 2001, letter.

This evaluation addresses the proposed alternatives to the requirements of Subsection IWE of Section XI of the American Society of Mechanical Engineers (ASME) Code (Relief Requests RR-12-9 through RR-12-11 and RR-24 through RR-31) for LGS Units 1 and 2. The staff will provide their evaluation of the remaining relief requests (RR-04, RR-06, RR-07, RR-12-6, RR-12-7, RR-12-8 and RR-13) requested in the January 9 and June 27, 2001, letters under a separate cover.

Based on the information provided, the NRC staff concludes that for Relief Requests RR-12-9 through RR-12-11 and RR-27 through RR-29, the proposed alternatives will provide an acceptable level of quality and safety. Therefore, the proposed alternatives are authorized pursuant to 10 CFR 50.55a(a)(3)(i). For Relief Requests RR-24, RR-25, RR-26, RR-30 and RR-31, the staff concludes that compliance with the ASME Code requirements would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety, and that the licensee's proposed alternatives will provide reasonable assurance of containment pressure integrity. Therefore, the proposed alternatives are authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the second 10-year ISI interval at each unit. The NRC staff's safety evaluation is enclosed.

If you have any questions, please contact your Project Manager, Christopher Gratton, at 301-415-1055.

Sincerely,

/RA/

James W. Clifford, Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-352 and 50-353

Enclosure: As stated

cc w/encl: See next page

If you have any questions, please contact your Project Manager, Christopher Gratton, at 301-415-1055.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

OF RELIEF REQUESTS FROM ASME CODE SECTION XI REQUIREMENTS

FOR CONTAINMENT INSPECTION

EXELON GENERATION COMPANY

LIMERICK GENERATING STATION, UNITS 1 AND 2

DOCKET NOS. 50-352 AND 50-353

1.0 INTRODUCTION

In the *Federal Register* dated August 8, 1996 (61 FR 41303), the Nuclear Regulatory Commission (NRC) amended its regulations to incorporate by reference the 1992 Edition with 1992 addenda of Subsections IWE and IWL of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code). Subsections IWE and IWL provide the requirements for inservice inspection (ISI) of Class CC (concrete containment), and Class MC (metallic containment) of light-water cooled power plants. The effective date for the amended rule was September 9, 1996, and it requires the licensees to incorporate the new requirements into their ISI plans and to complete the first containment inspection by September 9, 2001. However, a licensee may propose alternatives to, or submit a request for relief from, the requirements of the regulation pursuant to 10 CFR 50.55a(a)(3) and (g)(5).

By letter dated January 9, 2001, PECO Energy Company (PECO, the licensee), proposed alternatives to the requirements of Subsection IWE of Section XI of the ASME Code (Relief Requests RR-12-9 through RR-12-11 and RR-24 through RR-31) for its Limerick Generating Station (LGS), Units 1 and 2 for the second 10-year ISI interval. In response to the staff's questions raised during the May 10, 2001, conference call, the licensee revised Relief Requests RR-26, RR-29 and RR-31 through its letter dated May 23, 2001. The Nuclear Regulatory Commission's (NRC's) findings with respect to authorizing the alternative or denying the proposed request are discussed in this evaluation.

PECO was succeeded by Exelon Generation Company (EGC or the licensee) as the licensed operator of LGS on January 12, 2001. By letter dated January 30, 2001, EGC requested that the NRC staff continue to process and disposition licensing actions previously docketed and requested by PECO. By letter dated August 16, 2001, the licensee provided revised proposed relief requests that incorporate editorial changes due to the acquisition of LGS by EGC. The content of the proposed relief requests and alternatives was not affected.

ENCLOSURE

2.0 EVALUATION

2.1 Relief Request RR-12-9

2.1.1 ASME Code Requirements

The ASME Code, Section XI, Subsection IWE, Table IWE-2412-1 listed the required percentages of examinations that must be performed per period within each 10-year ISI interval in accordance with Inspection Program B. This table does not apply to those examinations that may be deferred until the end of the inspection interval as allowed by the ASME Code. Per this table, the number of examinations to be completed during the first period shall be between 16 percent and 34 percent. For the second period, the total number of examinations to be completed shall be between 50 percent to 67 percent, and by the end of the third period, 100 percent of the examinations for the interval shall be completed.

2.1.2 ASME Code Requirements from Which an Alternative is Requested

The licensee requested relief from meeting the required percentages of examinations stated in the ASME Code, Section XI, Subsection IWE, Table IWE-2412-1.

2.1.3 Basis for Relief

The ASME Code, Section XI, Subsection IWE, Table IWE-2412-1 was originally established such that approximately one third of the non-deferred examinations would be performed during each period of the 10-year ISI interval. Over the past 10 years, it has become increasingly more difficult to meet these percentages. The emergence of longer fuel cycles increases the likelihood that one of the periods will only have one refueling outage in it. In addition, efforts to shorten refueling outages have limited the amount of time available to perform examinations. These factors have made it difficult to complete the ASME Code required percentages of examinations in the allotted time.

Code Case N-598 was developed to address this issue. It expands the range of examination completion percentages to allow examinations to be distributed more evenly between outages. This minimizes the need to schedule an excessive number of examinations during one outage just to meet the percentages required by ASME Code, Section XI, Subsection IWE, Table IWE-2412-1. In addition, Code Case N-598 allows a more uniform distribution of examinations between outages that is more conducive to performing quality examinations.

During the development of Code Case N-598, two additional factors were considered when evaluating the impact of the ASME Code case on plant safety. The first was that Table IWE-2412-1 allows up to 50 percent of the examinations to be performed in the second and third periods, but only 34 percent can be performed in the first period. Therefore, the Inspection Plan B schedule is biased towards delaying examinations until the end of the interval. The more flexible percentage stated in Code Case N-598 allows for more examinations to be performed earlier in the interval. This should improve safety because any problems, should they exist, would be detected earlier in the interval.

The second factor that was considered when developing Code Case N-598 was that some minimum amount of examinations should be required in each period. To address this

consideration, Code Case N-598, including Note (1), is structured such that examinations will be required during all three periods.

Due to the factors documented above, the licensee considers that the alternative criteria of Code Case N-598 provide an acceptable, or improved, level of quality and safety.

2.1.4 Alternative Provisions

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposes to use Code Case N-598 for the required percentages of examinations for the Class MC components.

2.1.5 Staff Evaluation of RR-12-9

In lieu of meeting the requirements of examination percentages for each refueling outage listed in Table IWE-2412-1, the licensee proposed an alternative to use the recommendation of Code Case N-598 for the required percentages of examination for all Class MC components.

The staff finds that the range of examination completion percentages based on Code Case N-598 allows examinations to be distributed more evenly between outages. The staff also finds that the recommendation of Code Case N-598 provides a more uniform distribution of examinations between outages that is more conducive to performing the examinations. The redistribution of the percentage of examinations that must be performed each period does not affect the structural integrity of the containment pressure boundary. On this basis, the staff concludes that the licensee's alternative criteria based on Code Case N-598 provides an acceptable level of quality and safety, and is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

2.2 Relief Request RR-12-10

2.2.1 ASME Code Requirements

ASME Code, Section XI, 1992 Edition through 1992 Addenda, requires that a VT-3 examination be performed 100 percent at the end of the interval for Items E1.12 and E1.20.

2.2.2 ASME Code Requirements from Which Relief is Requested

Relief is requested from performing the VT-3 visual examination entirely at the end of the interval for Items E1.12 and E1.20.

2.2.3 Basis for Relief

ASME Code Case N-601, "Extent and Frequency of VT-3 Visual Examination for Inservice Inspection of Metal Containments" provides an alternative to the ASME Code requirement of performing 100 percent of the VT-3 examinations on Items E1.12 and E1.20 at the end of the interval. The licensee believes it is more important to perform visual examinations on the accessible surfaces of the containment structure and vent system during the course of the interval rather than at the end. This way, the integrity of the containment and vent system at the LGS Units 1 and 2, can be better monitored between the 10 CFR Part 50, Appendix J testing, and the visual examinations required by Table IWE-2500-1. The requirement in IWE-2420 to repeat the sequence of component examinations established in the first inspection

interval will be maintained. Therefore, this alternative will provide an acceptable level of quality and safety as compared to the current requirements.

2.2.4 Alternative Provisions

The licensee proposes to perform the VT-3 visual examinations on accessible surface areas of the containment and vent system in accordance with Code Case N-601. This ASME Code case provides an alternative to perform the visual examinations at any time during the interval, provided the requirements for successive inspections stated in IWE-2420 are met.

2.2.5 Staff Evaluation of RR-12-10

In lieu of meeting the requirements of Table IWE-2500-1 (1992 Edition), Category E-A, Items E1.12 and E1.20 that 100 percent of VT-3 visual examinations shall be performed at the end of the interval, the licensee proposed to perform the VT-3 visual examinations on accessible surface areas of the containment and vent system in accordance with Code Case N-601.

The staff finds that to perform visual examinations on the accessible surfaces of the containment structure during the course of the inspection interval (based on the recommendation by Code Case N-601 that the VT-3 examinations in Table IWE-2500-1, Category E-A be performed at any time during the interval of inspection) will be more proper and efficient than following the requirements Table IWE-2500-1 (1992 Edition). The NRC considers that the integrity of the containment can be better monitored between the 10 CFR Part 50, Appendix J testing, and the visual examinations required by Table IWE-2500-1. On this basis, the staff concludes that the alternative proposed by the licensee based on Code Case N-601 provides an acceptable level of quality and safety, and is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

2.3 Relief Request RR-12-11

2.3.1 ASME Code Requirements

ASME Code, Section XI, 1992 Edition through 1992 Addenda, IWE-2500(c)(3) requires one foot square grids be used when ultrasonic thickness measurements are performed on augmented examination surface areas. The number and location of the grids is determined by the Owner. IWE-2500(c)(4) requires that the minimum wall thickness within each grid be determined.

2.3.2 ASME Code Requirements from Which an Alternative is Requested

Relief is requested from the requirement to use one foot square grids for augmented examination areas, and the requirement to determine the minimum wall thickness within each grid.

2.3.3 Basis for Relief

IWE-2500(c)(3) and IWE-2500(c)(4) of the 1992 Edition, 1992 Addenda of ASME Code, Section XI, require that the minimum thickness within each one foot square grid of surface areas requiring augmented examination be marked such that periodic reexamination of the

location can be performed. Thickness readings are point readings. Numerous readings are necessary to identify the minimum thickness within each grid. This only identifies the thinnest area. Periodic examination of the minimum thickness point only monitors that point. The point being monitored may not be the location that is the most susceptible to accelerated degradation within the grid area.

Code Case N-605, Table 2500-2, "Ultrasonic Thickness measurements for Augmented Examinations," provides a proposed alternative to the one foot square grid area required by IWE-2500(c)(3). Table 2500-2 requires examination at the grid intersections. The grid line intersections may not exceed 12 inches, and may be as small as 2 inches.

For a sample area of 50 square feet, Code Case N-605, Table 2500-2 requires a minimum of 100 locations to be monitored. In this instance, utilizing Table 2500-2 monitors more locations than required by IWE-2500(c)(3).

For sample areas greater than 100 square feet, Code Case N-605, Table 2500-2 requires that sufficient points be monitored to ensure at least a 95 percent confidence level that the thickness of the base metal is reduced by no more than 10 percent of the normal plate thickness at 95 percent of the grid line intersections. Table 2500-2 also requires additional examinations when any measurement reveals that the wall thickness is reduced by more than 10 percent of the normal plate thickness.

For all examination areas, should the measurements at a grid line intersection reveal that the base material is reduced by more than 10 percent of the normal plate thickness, Code Case N-605, Table 2500-2 requires that the minimum wall thickness within each adjoining grid be determined. This is similar to the examination requirements of IWE-2500(c)(4) except that Table 2500-2 focuses resources on areas which have exhibited degradation rather than areas which have not exhibited degradation. Therefore, this proposed alternative will provide an acceptable level of quality and safety.

2.3.4 Alternative Provisions

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposes to use Code Case N-605 to determine examination requirements for ultrasonic thickness measurements on areas requiring augmented examination.

2.3.5 Staff Evaluation of RR-12-11

In lieu of meeting ASME Code, Section XI, 1992 Edition through 1992 Addenda, IWE-2500(c)(3) and (4), which require one-foot square grids be used when ultrasonic thickness measurements are performed on augmented examination surface areas, and the minimum wall thickness within each grid be determined, the licensee proposed to use Code Case N-605 to determine examination requirements for ultrasonic thickness measurements on areas requiring augmented examination.

Under the application of Code Case N-605 rules (as described in the request), Table 2500-2 requires a minimum of 100 locations be monitored for a sample area of 50 square feet. According to the licensee, utilizing Table 2500-2 monitors more locations than that determined by the owner (required by the IWE-2500(c)(3) rule). For sample areas greater than 100 square

feet, Table 2500-2 requires: (a) sufficient locations be monitored to ensure at least a 95 percent confidence level that the thickness of the base material is reduced no more than 10 percent of the nominal plate thickness at 95 percent of the grid line intersections, and (b) additional examinations be taken when any measurement reveals that the wall thickness is reduced by more than 10 percent of the nominal plate thickness. For all examination areas, Table 2500-2 requires that the minimum wall thickness within each adjoining grid be determined, if the measurements at a grid line intersection reveal that the base material is reduced by more than 10 percent of the nominal plate thickness.

On the basis discussed above, the NRC staff finds that the alternative proposed by the licensee will provide a reasonable method to perform UT measurements to monitor potential degradation in susceptible areas, and thus, assures the containment (plate) integrity. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the alternative provides an acceptable level of quality and safety.

2.4 Relief Request RR-24

2.4.1 ASME Code Requirements

ASME Code, Section XI, 1992 Edition, 1992 Addenda, Table IWE-2500-1, Examination Category E-D requires a visual examination, VT-3, of seals and gaskets on airlocks, hatches, and other devices that are required to assure containment leak-tight integrity. Examination of 100 percent of each component is required once each 10-year ISI inspection interval.

2.4.2 ASME Code Requirements from Which an Alternative is Requested

Relief is requested from performing the ASME Code-required visual examination (VT-3) on the containment seals and gaskets.

2.4.3 Basis for Relief

In the *Federal Register* dated August 8, 1996 (61 FR 41303), the NRC amended 10 CFR 50.55a to require the use of the 1992 Edition, 1992 Addenda, of Section XI when performing containment examinations. Seals and gaskets receive a 10 CFR Part 50, Appendix J test. As noted in 10 CFR Part 50, Appendix J, the purpose of the test is to measure containment or penetration leakage whose design incorporates resilient seals, gaskets, sealant compounds, and electrical penetrations fitted with flexible metal seal assemblies. Although not required by the ASME Code, practical examination considerations of seals and gaskets require the joints, which are proven adequate through Appendix J testing, to be disassembled. For electrical penetrations, this would involve a pre-maintenance Appendix J test, de-termination of cables at electrical penetrations if enough cable slack is not available, disassembly of the joint, removal and examination of the seals and gaskets, reassembly of the joint, re-termination of the cables if necessary, post-maintenance testing of the cables, and a post-maintenance Appendix J test of the penetration. The work required for the containment hatches would be similar except for the de-termination, re-termination, and testing of cables. This imposes the risk that equipment could be damaged. The 1992 Edition, 1993 Addenda, of Section XI recognizes that disassembly of joints to perform these examinations is not warranted. Note 1 of Examination Category E-D was modified in the 1995 Edition of Section XI to state that sealed or gasket

connections need not be disassembled solely for performance of examinations. However, without disassembly, most of the surface of the seals and gaskets would be inaccessible.

For those penetrations that are routinely disassembled, a Type B test is required upon final assembly and prior to startup. Since the Type B test will assure the leak-tight integrity of primary containment, the performance of the visual examination would not increase the level of safety or quality.

Seals and gaskets are not part of the containment pressure boundary under current ASME Code rules (NE-1220(b)). When the airlocks and hatches containing these material are tested in accordance with 10 CFR Part 50, Appendix J, degradation of the seal and gasket material would be revealed by an increase in the leakage rate. Corrective measures would be applied and the component retested. Repair or replacement of seals and gaskets is not subject to ASME Code (1992 Edition, 1992 Addenda) rules in accordance with Paragraph IWA-4111(b)(5) of ASME Code, Section XI.

The visual examination of seals and gaskets in accordance with IWE-2500, Table IWE-2500-1 is a burden without any compensating increase in the level of safety or quality. This requirement was removed in the 1997 Addenda of ASME Code, Section XI, and is not included in the 1998 Edition. Relief is requested in accordance with 10 CFR 50.55a(a)(3)(i). Compliance with the specified requirements of this section will provide an acceptable level of safety and quality. Testing the seals and gaskets in accordance with Part 50, Appendix J, will provide adequate assurance of the leak-tight integrity of the seals and gaskets.

2.4.4 Alternative Provisions

The leak-tightness of seals and gaskets will be tested in accordance with 10 CFR Part 50, Appendix J. No additional alternatives to the visual examination, VT-3, of the seals and gaskets will be performed.

2.4.5 Staff Evaluation of RR-24

As an alternative to the requirements (VT-3 examinations) of the ASME Code, Section XI, Subsection IWE, 1992 Edition, 1992 Addenda, the licensee proposed to use leak testing in accordance with 10 CFR Part 50, Appendix J, to examine the leak tightness of containment seals and gaskets.

In its request, the licensee stated that because the seals and gaskets associated with these penetrations are not accessible for examination when the penetration is assembled, containment penetration seals and gaskets must be disassembled and re-assembled for the purpose of performing the VT-3 visual examination. These activities (a pre-maintenance Appendix J test, de-termination of cables at electrical penetrations if enough cable slack is not available, disassembly of the joints, removal and examination of the seals and gaskets, re-assembly of the joints, re-termination of the cables if necessary, post-maintenance testing of cables, and post-maintenance Appendix J testing of the penetration) associated with a VT-3 visual examination would introduce the possibility of component damage that would not otherwise occur. The periodic test in accordance with 10 CFR Part 50, Appendix J, will detect and measure local leakage of containment or penetrations. If unacceptable leakage is identified during the test, corrective measures will be taken and components will be re-tested.

Also, the staff finds that ASME Code, Section XI, 1992 Edition, 1993 Addenda recognizes that disassembly of joints for the sole purpose of performing a visual examination is unwarranted. Requiring the licensee to disassemble components for the sole purpose of inspecting seals and gaskets would place a significant hardship on the licensee without a compensating increase in the level of quality and safety.

On the basis discussed above, the NRC staff concludes that the alternative proposed by the licensee will provide reasonable assurance of the functionality and integrity of the containment penetration seals and gaskets during the testing required by 10 CFR Part 50, Appendix J. The proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the specific requirements of the ASME Code would result in hardship without a compensating increase in the level of quality and safety.

2.5 Relief Request RR-25

2.5.1 ASME Code Requirements

ASME Code, Section XI, 1992 Edition, 1992 Addenda, Subarticle IWA-2300 requires nondestructive examination (NDE) personnel to be qualified and certified using a written practice in accordance with CP-189 (1991), "Standard for Qualification and Certification of Nondestructive Testing Personnel," as amended by ASME Code, Section XI.

2.5.2 ASME Code Requirements from Which an Alternative is Requested

Relief is requested from the provisions of Subarticle IWA-2300, requiring qualification and certification of NDE personnel to a written practice in accordance with CP-189 as amended by the requirements of this Division of ASME Code, Section XI.

2.5.3 Basis for Relief

In the *Federal Register* dated August 8, 1996 (61 FR 41303), the NRC amended 10 CFR 50.55a to require the use of the 1992 Edition, 1992 Addenda, of Section XI when performing containment examinations. A written practice based on the requirements of CP-189, as amended by the requirements of Subarticle IWA-2300, to implement Subsections IWE and IWL duplicates efforts already in place for all other subsections. The LGS Units 1 and 2 ISI programs are required by 10 CFR 50.55a to be in accordance with the 1989 Edition of ASME Code, Section XI for all other subsections. Subarticle IWA-2300 of the 1989 Edition requires a written practice based on SNT-TC-1A (1984), as amended by the requirements of Subarticle IWA-2300. Further, Subarticle IWA-2300 of the 1992 Edition, 1992 Addenda, states, "Certifications based on SNT-TC-1A are valid until recertification is required." Visual examination is the primary NDE method required by Subsections IWE and IWL. Neither CP-189 nor SNT-TC-1A specifically includes visual examination; thus, the ASME Code requires qualification and certification to comparable levels as defined in CP-189 or SNT-TC-1A, as applicable, and the employer's written practice. Development and administration of a second program would not enhance safety or quality and would constitute a burden, particularly in developing a second written practice, tracking of certifications, and duplicating paperwork. This duplication would also apply to NDE vendor programs. Updating to CP-189 as referenced in the 1992 Edition, 1992 Addenda, for Subsections IWB, IWC, etc., would require a similar

request for relief. Therefore, an alternative is requested in accordance with 10 CFR 50.55a(a)(3)(i). The alternative will provide an acceptable level of safety and quality.

2.5.4 Alternative Provisions

Examinations required by Subsections IWE and IWL shall be conducted by personnel qualified and certified to a written practice based on SNT-TC-1A in accordance with the 1989 Edition of ASME Code, Section XI, which is the ASME Code of record for Subsections IWB, IWC, IWD and IWF at LGS for the current (i.e., second) interval.

2.5.5 Staff Evaluation of RR-25

In lieu of using the requirements of Subarticle IWA-2300 of the 1992 Edition and Addenda of ASME Code, Section XI, that examination personnel be qualified and certified in accordance with ANSI/ASNT CP-189, "Standard for Qualification and Certification of Nondestructive Testing Personnel," the licensee proposes to conduct examinations required by Subsections IWE and IWL by personnel qualified and certified to a written practice based on SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing," in accordance with the 1989 Edition of ASME Code, Section XI.

The NRC staff finds that examinations required by Subsection IWE are to be conducted by personnel qualified and certified to a written practice based on SNT-TC-1A in accordance with the 1989 Edition of ASME Code, Section XI. The staff also finds that a written practice based on the CP-189 requirements, as amended by the requirements of Subarticle IWA-2300, to implement Subsections IWE and IWL duplicates efforts already in place for all other subsections. To develop and administer a second program would constitute a burden, particularly in developing a second written practice, tracking of certifications, and duplication of paperwork. In addition, Subarticle IWA-2300 of the 1992 Edition, 1992 Addenda, states that certifications based on SNT-TC-1A are valid until recertification is required.

On the basis discussed above, the staff concludes that developing and implementing two qualification programs for NDE personnel would result in a burden on the licensee. The alternative proposed by the licensee will provide adequate qualifications for personnel performing containment examinations. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the specific requirements of the ASME Code would result in hardship without a compensating increase in the level of quality and safety.

2.6 Relief Request RR-26

2.6.1 ASME Code Requirements

ASME Code, Section XI, 1992 Edition, 1992 Addenda, Table IWL-2500-1 requires visual examination, VT-3C, of all containment concrete surface areas and visual examination, VT-1C, of selected containment concrete surface with suspected indications of damage or degradation. The VT-1C and VT-3C methods of examinations shall be performed in accordance with Paragraphs IWL-2310, "Visual Examination and Personnel Qualification," and IWA-2210, "Visual Examinations." Paragraph IWA-2210 requires specific minimum illumination and maximum direct examination distance for performing the visual examinations.

2.6.2 ASME Code Requirements from Which an Alternative is Requested

Relief is requested from the requirements of Paragraph IWA-2210, "Visual Examinations," for minimum illumination and maximum direct examination distance when examining Class CC components under Paragraph IWL-2310.

2.6.3 Basis for Relief

In the *Federal Register* dated August 8, 1996 (61 FR 41303), the NRC amended 10 CFR 50.55a to require the use of the 1992 Edition, 1992 Addenda, of Section XI when performing containment examinations. In addition to the requirements of Subsection IWL, the rulemaking also imposes the requirements of Subsection IWA of the 1992 Edition, 1992 Addendum, of the ASME Code, Section XI for minimum illumination and maximum direct examination distance of Class CC components, specifically for the examination of concrete under Paragraph IWL-2510.

Accessibility to portions of the containment structure make it a hardship to obtain the maximum direct examination distance and minimum illumination requirements. The installation of extensive temporary scaffold systems or a climbing scaffold system to access these portions of the containment would be necessary. These scaffolds would provide limited access due to containment geometry restrictions as well as structural and equipment interferences. The installation and removal of these scaffolds would increase both worker radiation exposure and challenge personnel safety in order to meet Paragraph IWA-2210 requirements.

The NRC staff received seven comments that were consolidated into Public Comment No. 2.3 in Part III of Attachment 6 to SECY-96-080. The staff response to these concerns is as follows, "Comments received from ASME members on the containment committees indicate that the newer, more stringent requirements of Paragraph IWA-2210 were not intended to be used for the examination of containments and were inadvertently included in Subsection IWL. The NRC agrees that remote examinations are the only practical method for inspecting much of the containment surface area. 10 CFR 50a(b)(2)(ix)(B) has been added to the final rule which contains alternative lighting and resolution requirements which may be used in lieu of the requirements contained in Table IWA-2210-1."

However, as specified in 10 CFR 50.55a(b)(2)(ix)(B) of the final rule, this alternative for lighting and resolution requirements applies only to Subsection IWE. An alternative is requested in accordance with 10 CFR 50.55a(a)(3)(i) for Subsection IWL. The use of the alternative lighting and resolution requirements allowed for IWE remote visual examinations per 10 CFR 50.55a(b)(2)(ix)(B) for the IWL remote visual examinations will provide an acceptable level of safety and quality.

2.6.4 Alternative Provisions

When performing remotely the visual examinations required by Subsection IWL, Paragraph IWL-2510, the maximum direct examination distance specified in Table IWA-2210-1 may be extended, and the minimum illumination requirements specified in Table IWA-2210-1 may be decreased provided that the conditions and indications for which the visual examination is performed can be detected at the chosen distance and illumination.

2.6.5 Staff Evaluation of RR-26

In the "Basis for Relief" and "Alternative Provisions" sections of the licensee's request dated January 9, 2001, the licensee stated that the accessibility to higher portions of the containment building itself will make it a hardship to meet the maximum direct examination distance and minimum illumination requirements. It would be necessary to install and use extensive temporary scaffold systems to access these portions of the containment. These scaffolds can only provide limited access due to containment geometry restrictions as well as structural and equipment interferences. The installation and removal of these scaffolds would increase both worker radiation exposure and challenge personnel safety in order to meet Paragraph IWA-2210 requirements. The licensee proposed an alternative to the requirements for the measurement of illumination and direct examination distance for visual examinations specified in ASME Code, Section XI, 1992 Edition, 1992 Addendum, IWL-2310, "Visual Examination and Personnel Qualification," and IWA-2210, "Visual Examination." The alternate examinations quoted the 10 CFR 50.55a(b)(2)(ix)(B) requirement and stated that the ASME Code required maximum direct examination distance may be increased and the minimum illumination may be decreased provided that the conditions or indications for which the visual examination is performed can be detected at the chosen distance and illumination.

The NRC staff finds that visual examinations on the containment are performed to determine if damage or degradation (cracks, corrosion or other physical damage) warrant additional evaluation or repair of the structure. In order for the visual examinations to be performed in such a way as to detect critical flaws, proper lighting is essential. IWA-2210 allows for remote examination as long as the remote examination procedure is demonstrated to resolve the selected test chart characters. When the alternative examination is performed, the licensee also committed in their letter dated May 23, 2001, that the responsible engineer will identify the minimum size of indications of interests. A demonstration of the procedure and equipment to be used for remote visual examination capable of resolving these minimum indications to the satisfaction of the responsible engineer and the Authorized Nuclear Inservice Inspector (ANII), as allowed per IWA-2240, shall be documented.

On the basis discussed above, the staff concludes that the examination requirements proposed by the licensee will provide reasonable assurance of the functionality and integrity of the concrete containment. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the specific requirements of the ASME Code would result in hardship without a compensating increase in the level of quality and safety.

2.7 Relief Request RR-27

2.7.1 ASME Code Requirements

ASME Code, Section XI, 1992 Edition, 1992 Addenda, Subarticle IWE-2200(g) requires that when paint or coatings are reapplied, the condition of the new paint or coating shall be documented in the preservice examination records.

2.7.2 ASME Code Requirements from Which an Alternative is Requested

Relief is requested from the requirement to perform a preservice inspection of the new paint or coatings.

2.7.3 Basis for Relief

Paint and coatings are not part of the containment pressure boundary under current ASME Code rules because they are not associated with the pressure retaining function of the component (Paragraph NE-2111(b) of ASME Code, Section III). Neither paint nor coatings contribute to the structural integrity or leak tightness of the containment. Furthermore, the paint and coatings on the containment pressure boundary were not subject to ASME Code rules when they were originally applied and are not subject to ASME Code, Section XI rules for repair and replacement. The adequacy of applied coatings is verified through the LGS Units 1 and 2 Coatings Program for Nuclear Facilities. Recording the condition of reapplied coating in the preservice record does not substantiate the containment structural integrity. Should deterioration of coating in the reapplied area occur, the area will require additional evaluation regardless of the preservice record. Recording the condition of new paint or coating in the preservice records does not increase the level of quality and safety of the containment.

SECY-96-080, response to Public Comment No. 2.3 about IWE-2200(g) states, “In the NRC’s opinion, this does not mean that a visual examination must be performed with every application of paint or coating. A visual examination of the topcoat to determine the soundness and the condition of the topcoat should be sufficient.” This is currently accomplished through the LGS Units 1 and 2 Coatings Program for Nuclear Facilities. Recording the condition of new paint or coatings in the preservice record is redundant to the requirements of the LGS Units 1 and 2 Coatings Program for Nuclear Facilities, and as such is an administrative burden without a compensating increase in safety.

The LGS Units 1 and 2 Coatings Program for Nuclear Facilities provides an adequate level of quality and safety. The LGS Units 1 and 2 Coatings Program for Nuclear Facilities limits the quantity of unqualified coatings and degraded qualified coatings not removed/repaired/replaced in locations requiring Service Level 1 coating systems to below licensing basis limits and prevents the impairment due to detached coatings obstructing the flow paths of any fluid system required to operate if needed to mitigate a design-basis accident.

2.7.4 Alternative Provisions

The paint and coatings in the containment are considered safety-related and as such they will be applied and inspected in accordance with the LGS Units 1 and 2 Coatings Program for Nuclear Facilities. The LGS Units 1 and 2 Coatings Program for Nuclear Facilities is subject to the requirements of the LGS Units 1 and 2, 10 CFR Part 50, Appendix B, Quality Assurance (QA) Program. The LGS QA Program is described in Section 17.2 of the LGS Units 1 and 2 Updated Final Safety Analysis Report (UFSAR). Appendix 17.2.II of the Appendix B QA Program endorses ASTM D3843-93, “Standard Practice for Quality Assurance for Protective Coatings Applied to Nuclear Facilities.” ASTM D3843-93 replaces Regulatory Guide 1.54, “Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants,” and ANSI Standard N101.4-1972, “Quality Assurance for Protective Coatings Applied to Nuclear Facilities.” Accordingly, the LGS Units 1 and 2 Coatings Program for

Nuclear Facilities shall control those essential coating program elements that are necessary to ensure the quality application and inspection of Service Level 1 coating systems.

While performing Service Level 1 coating work, the licensee shall use one or more procedures as necessary to ensure satisfactory application of the coating systems, including surface preparation, inspection and documentation of the coating work.

The licensee shall comply with ASTM D3843-93 for safety-related protective coating work in Service Level 1 areas to fulfill 10 CFR Part 50, Appendix B, requirements with the following additional clarifications:

1. For coating formulations developed prior to issuance of ASTM D3843-93, Service Level 1 qualifications based on ANSI N5.9 (Revised as ANSI N512-1974) and ANSI N101.2 remain valid.

2. The QA requirements of Sections 6 and 7 of ASTM D3843-93, applicable to the coating manufacturer, are imposed on the coating manufacturer through the procurement process.

3. Coating application procedures are developed based on the manufacturer's recommendations for application of the selected coating systems.

4. Coating applicators are qualified to demonstrate their ability to satisfactorily apply the coatings in accordance with the manufacturer's recommendations.

5. Quality verification (QV) personnel qualified in accordance with ANSI N45.2.6-1978 and ASTM D4537-91 perform inspections to verify conformance to the coating application procedures and perform examinations of previously applied coatings. Section 10 of ASTM D3843-93 is used as a guideline in the establishment of the inspection program.

6. Alternatively, personnel qualified in accordance with SNT-TC-1A (8/84) supplemented with appropriate coatings training, perform examinations of previously applied coatings.

7. In the last sentence of Section 10.1 of ASTM D3843-93, inspections will be documented for record purposes as required by 10 CFR Part 50, Appendix B, and LGS Quality Assurance program. References to ANSI 45.2 and NQA-1 are not applicable. Documentation demonstrating conformance to the above is maintained.

8. Limitations on use of coatings and cleaning materials that contain elements, which would contribute to corrosion, intergranular cracking, or stress corrosion cracking of safety-related stainless steel, will be followed as described in Section C.4 of Regulatory Guide 1.54, June 1973.

A visual coatings examination of accessible and immersed surfaces of the drywell and suppression pool is performed at least every 4 to 6 years in accordance with 10 CFR 50.65, "Requirement for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." These periodic examinations will identify evidence of flaking, blistering, peeling, discoloration, or other signs of coating distress which might be indicative of degradation of the containment structural integrity.

If degradation of the coating is identified, additional measures will be applied to determine if the containment pressure boundary is affected. Although repairs to paint or coatings are not subject to the repair/replacement rules of ASME Code, Section XI (Inquiry 97-22), repairs to the primary containment boundary, not including coatings, if required, would be conducted in accordance with ASME Code, Section XI rules.

2.7.5 Staff Evaluation of RR-27

In lieu of meeting the ASME Code, Section XI, 1992 Edition, 1992 Addenda, Subarticle IWE-2200(g) requirements to perform a preservice inspection of new paint or coatings, the licensee proposed to examine the paint and coatings in accordance with the LGS Units 1 and 2 Coatings Program for Nuclear Facilities. In the “Alternative Provisions” section of the request, the licensee provided a detailed description of the LGS Units 1 and 2 Coatings Program for Nuclear Facilities (previously named PECO Energy Coatings Program for Nuclear Facilities).

According to the licensee, the adequacy of paint and coatings will be verified following application through inspections performed by this program. If degradation of the coating is identified, additional measures will be applied to determine if the containment pressure boundary is affected. The licensee also committed that any required repairs to the primary containment boundary would be conducted in accordance with ASME Code, Section XI rules. The licensee further justified that SECY 96-080, response to Comment 3.2 about IWE-2200(g) states," in the NRC’s opinion, this does not mean that visual examination must be performed with every application of paint or coating. A visual examination of the topcoat to determine the soundness and the condition of the topcoat should be sufficient."

The staff finds that the licensee used the LGS Units 1 and 2 Coatings Program for Nuclear Facilities in response to NRC Generic Letter 98-04, “Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System After a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment.” The licensee’s response was documented in a PECO letter to the NRC dated November 11, 1998. The licensee also stated that the program procedures and implementation meet the requirements of Regulatory Guide 1.54, Revision 0, “Quality Assurance requirements for Protective Coatings Applied to Water Cooled Nuclear Power Plants,” and ANSI N101.4 - 1972, “Quality Assurance for Protective Coatings Applied to Nuclear Facilities.” This program was approved by the NRC in the close-out letter for Generic Letter 98-04, dated November 19, 1999.

From the discussion above, the staff finds that the LGS Units 1 and 2 Coatings Program for Nuclear Facilities is adequate for the examinations of the safety-related protective coating work and will provide an acceptable level of quality and safety for protecting containment components. On this basis, the staff concludes that the alternative proposed by the licensee to the requirements of IWE-2200(g) is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

2.8 Relief Request RR-28

2.8.1 ASME Code Requirements

ASME Code, Section XI, 1992 Edition, 1992 Addenda, Subarticle IWE-2500(b) requires that when paint or coatings are to be removed, the paint or coatings shall be visually examined in accordance with Table IWE-2500-1 prior to removal.

2.8.2 ASME Code Requirements from Which an Alternative is Requested

Relief is requested from the requirements to perform a visual examination of painted or coated containment components prior to removal of paint or coatings.

2.8.3 Basis for Relief

In the *Federal Register* dated August 8, 1996 (61 FR 41303), the NRC amended 10 CFR 50.55a to require the use of 1992 Edition, 1992 Addenda, of ASME Code, Section XI when performing containment examinations. Paint and coatings are not part of the containment pressure boundary under current ASME Code rules because they are not associated with the pressure retaining function of the component (Paragraph NE-2110(b) of ASME Code, Section III). The interiors of the containment are painted to prevent rusting. Neither paint nor coatings contribute to the structural integrity or leak-tightness of the containment. Furthermore, the paint and coatings on the containment pressure boundary were not subject to ASME Code rules when they were originally applied and are not subject to ASME Code, Section XI rules for repair or replacement. Degradation or discoloration of the paint or coating materials on containment could be an indicator of potential degradation of the containment pressure boundary. Additional measures would have to be employed to determine the nature and extent of any degradation, if present. The application of ASME Code, Section XI rules for removal of paint or coatings when unrelated to a Section XI repair or replacement activity, is a burden without a compensating increase in quality or safety.

The LGS Units 1 and 2 Coating Program for Nuclear Facilities currently provides an acceptable level of quality and safety. The LGS Units 1 and 2 Coating Program for Nuclear Facilities limits the quantity of unqualified coatings and degraded qualified coatings not removed/repaired/replaced in locations requiring Service Level 1 coating systems to below licensing basis limits and prevents the impairment due to detached coatings obstructing the flow paths of any fluid system required to operate if needed to mitigate a design-basis accident.

2.8.4 Alternative Provisions

The paint and coatings in the containment are considered safety-related and as such they will be applied and inspected in accordance with the LGS Units 1 and 2 Coatings Program for Nuclear Facilities. The LGS Units 1 and 2 Coatings Program for Nuclear Facilities is subject to the requirements of the LGS Units 1 and 2, 10 CFR Part 50, Appendix B, QA Program. The LGS QA Program is described in Section 17.2 of the LGS Units 1 and 2 UFSAR. Appendix 17.2.II of the Appendix B, QA Program endorses ASTM D3843-93, “Standard Practice for Quality Assurance for Protective Coatings Applied to Nuclear Facilities.” ASTM D3843-93 replaces Regulatory Guide 1.54, “Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants,” and ANSI Standard N101.4-1972, “Quality

Assurance for Protective Coatings Applied to Nuclear Facilities." Accordingly, the LGS Units 1 and 2 Coatings Program for Nuclear Facilities shall control those essential coating program elements that are necessary to ensure the quality application and inspection of Service Level 1 coating systems.

While performing Service Level 1 coating work, the licensee shall use one or more procedures as necessary to ensure satisfactory application to the coating systems, including surface preparation, inspection and documentation of the coating work.

The licensee shall comply with ASTM D3843-93 for safety-related protective coating work in Service Level 1 areas, to fulfill 10 CFR Part 50, Appendix B, requirements with the following additional clarifications:

1. For coating formulations developed prior to issuance of ASTM D3843-93, Service Level 1 qualifications based on ANSI N5.9 (Revised as ANSI N512-1974) and ANSI N101.2 remain valid.

2. The QA requirements of Sections 6 and 7 of ASTM D3843-93, applicable to the coating manufacturer, are imposed on the coating manufacturer through the procurement process.

3. Coating application procedures are developed based on the manufacturer's recommendations for application of the selected coating systems.

4. Coating applicators are qualified to demonstrate their ability to satisfactorily apply the coatings in accordance with the manufacturer's recommendations.

5. QV personnel qualified in accordance with ANSI N45.2.6-1978 and ASTM D4537-91 perform inspections to verify conformance to the coating application procedures and perform examinations of previously applied coatings. Section 10 of ASTM D3843-93 is used as a guideline in the establishment of the inspection program.

6. Alternatively, personnel qualified in accordance with SNT-TC-1A (8/84) supplemented with appropriate coatings training, perform examinations of previously applied coatings.

7. In the last sentence of Section 10.1 of ASTM D3843-93, inspections will be documented for record purposes as required by 10 CFR Part 50, Appendix B, and LGS Quality Assurance program. References to ANSI 45.2 and NQA-1 are not applicable. Documentation demonstrating conformance to the above is maintained.

8. Limitations on use of coatings and cleaning materials that contain elements, which could contribute to corrosion, intergranular cracking, or stress corrosion cracking of safety-related stainless steel, will be followed as described in Section C.4 of Regulatory Guide 1.54, June 1973.

A visual examination of accessible and immersed surfaces of the drywell and suppression pool is performed at least 4 to 6 years in accordance with 10 CFR 50.65, "Requirement for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." These periodic examinations will identify evidence of flaking, blistering, peeling, discoloration, or other signs of coating distress which might be indicative of degradation of the containment structural integrity.

If degradation of the coating is identified, additional measures will be applied to determine if the containment pressure boundary is affected. Although repairs to paint or coatings are not subject to the repair/replacement rules of ASME Code, Section XI (Inquiry 97-22), repairs to the primary containment boundary, not including coatings, if required, would be conducted in accordance with ASME Code, Section XI rules.

2.8.5 Staff Evaluation of RR-28

In lieu of meeting the ASME Code, Section XI, 1992 Edition, 1992 Addenda, IWE-2200(g) requirements to perform a preservice inspection of new paint or coatings, the licensee proposed to examine the paint and coatings in accordance with the LGS Units 1 and 2 Coatings Program for Nuclear Facilities. According to the licensee, this program ensures the adequacy of the reapplied paint or coatings. The licensee also committed that if degradation of the coating is identified, additional measures will be applied to determine if the containment pressure boundary is affected.

As discussed in the evaluation of Relief Request RR-27 and in NRC letter dated November 19, 1999, the NRC staff finds that the LGS Units 1 and 2 Coatings Program for Nuclear Facilities is adequate for the examination of reapplied new coatings and will provide an acceptable level of quality and safety for protecting containment components. On this basis, the staff concludes that the licensee's alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

2.9 Relief Request RR-29

2.9.1 ASME Code Requirements

ASME Code, Section XI, 1992 Edition, 1992 Addenda, Paragraph IWE-5240 requires the performance of a visual examination, VT-2, in accordance with the requirements of Paragraph IWA-5240 following repair, replacement, or modification.

2.9.2 ASME Code Requirements from Which an Alternative is Requested

Relief is requested from performing the VT-2 visual examination in connection with system pressure testing following repair, replacement or modification under Article IWE-5000.

2.9.3 Basis for Relief

In the *Federal Register* dated August 8, 1996 (61 FR 41303), the NRC amended 10 CFR 50.55a to require the use of 1992 Edition, 1992 Addenda, of ASME Code, Section XI when performing containment examinations. Paragraph IWE-5210 states that except as noted within Paragraph IWE-5240, the requirements of Article IWA-5000 are not applicable to Class MC or Class CC components. Paragraph IWE-5240 states that the requirements of Paragraph IWA-5240 (corrected from IWA-5246 to IWA-5340 in the 1993 Addenda) for visual examinations are applicable. Paragraph IWA-5240 identifies a VT-2 visual examination. VT-2 examinations are conducted to detect evidence of leakage from pressure retaining components, with or without leakage collection systems, as required during the conduct of a system pressure test. In addition, personnel performing VT-2 examinations are required to be qualified in accordance with Subarticle IWA-2300 of ASME Code, Section XI.

Table IWE-2500-1, Examination Category E-P, identifies the examination method of 10 CFR Part 50, Appendix J, and does not specifically identify a VT-2 visual examination. Requirements for testing as well as acceptable leakage criteria are provided in 10 CFR Part 50, Appendix J. These tests are performed by Appendix J "test" personnel and utilize calibrated equipment to determine acceptability. Additionally, 10 CFR 50.55a(b)(2)(ix)(E) requires a general visual examination of the containment each period that would identify any structural degradation that may contribute to leakage. Performance of the visual VT-2 examination, during the conduct of these pressure tests, is in most cases impractical, due to accessibility. Access to perform the visual examination of the repaired/replaced area is normally prohibited by either encapsulation of the pressure test boundary (i.e., Local Leak Rate Test) or personnel access restrictions into containment during testing (Integrated Leak Rate Test). VT-2 examination of the repaired/replaced area from the outside surface of the LGS Units 1 and 2 containments during the pressure test would not be meaningful or practical since the majority of the containment outside surface is concrete. A VT-2 visual examination will not provide additional assurance of safety beyond that of current Appendix J practices.

In accordance with 10 CFR 50.55a(a)(3)(i), an alternative is requested. Pressure testing in accordance with 10 CFR Part 50, Appendix J, provides an adequate level of safety.

2.9.4 Alternative Provisions

Testing shall be conducted in accordance with 10 CFR Part 50, Appendix J, in lieu of Paragraph IWE-5240 of ASME Code, Section XI. In addition, examinations following repairs or replacements on containment components will be performed in accordance with the EGC ASME Code, Section XI Repair/Replacement Program, Specification M-679.

Specification M-679 provides the administrative guidance for satisfying the requirements of the Section XI Code, as applicable to repairs and replacements of Class 1, 2 and 3 MC and CC components and their supports. Sections 8, 9 and 10 of this specification address the need for satisfying the ASME construction code requirements. Section 12 addresses pressure testing of components following repair or replacement, and Section 13 addresses preservice inspections (PSI) required of repaired or replaced components. Accordingly, a repair/replacement of a Class MC or Metallic Liner of a Class CC component shall be implemented, as required by the EGC ASME Section XI Repair/Replacement Program, Specification M-679, in accordance with the rules of the original ASME construction code. After completion of the repair/replacement, the original ASME construction code-required NDE shall be performed. Following this, the ASME Code, Section XI requirement for the PSI shall be performed, in accordance with the containment portion of the ISI program. As required by ASME Code, Section XI, the method of inspection for the PSI shall be the method originally used to detect the condition which required the repair/replacement, and the method required for subsequent ISIs.

The examinations required by the EGC ASME Section XI Repair/Replacement Program, Specification M-679, will confirm the structural integrity of the repaired or replaced area of the containment. Confirmation of the leak-tight integrity of the area will then be verified by a pressure test in accordance with the requirements of IWE-5220. The system pressure testing shall be conducted, as applicable, in the area of the repair or replacement, per 10 CFR Part 50, Appendix J. The pressure testing shall be conducted by personnel trained in the methods of testing the containment vessel, as required by Appendix J, utilizing equipment and procedures routinely used for the periodic pressure testing of the containment. The acceptance criteria in

10 CFR Part 50, Appendix J, for the results of the pressure testing assures that the leak-tight integrity of the containment vessel will support NRC safety goals.

The above-described examinations and testing assure that the structural integrity and leak-tight integrity of the primary containment will be maintained following any repairs or replacements of the pressure boundary. Nevertheless, a VT-2 visual examination will be performed from the outside surface of the containment, whenever access from the outside surface is available in the area of the repair or replacement being pressure tested.

2.9.5 Staff Evaluation of RR-29

In lieu of the requirements of Paragraph IWE-5240 of ASME Code, Section XI for the visual examination, VT-2, to be applied following repair, replacement or modification, the licensee proposed that testing shall be conducted in accordance with 10 CFR Part 50, Appendix J. In addition to the pressure test, examinations following repairs or replacements on containment components will be performed in accordance with the EGC ASME Section XI Repair/Replacement Program, Specification M-679.

In the "Basis for Alternative" and "Alternative Provisions" sections, the licensee justified that Table IWE-2500-1 (examination category E-P) requires only an examination method of 10 CFR Part 50, Appendix J, for the containment vessel pressure retaining boundary following each repair, replacement, or modification and does not specifically identify a VT-2 visual examination. Also, 10 CFR Part 50, Appendix J, provides requirements for testing including acceptable leakage criteria and the tests are performed by Appendix J test personnel by utilizing calibrated equipment to determine acceptability. In addition, 10 CFR 50.55a(b)(2)(x)(E) requires a general visual examination of the containment each period that would identify any structural degradation that may contribute to leakage. However, the licensee did not provide any description to demonstrate that the implementation of this program will meet the requirements of 10 CFR 50.55a(a)(3) for assuring an acceptable level of quality and safety. In addition, the licensee provided three reasons that justified the acceptability of their proposed alternatives in its "Basis for Alternatives": (1) Table IWE-2500-1, Examination Category E-P identifies the examination method of 10 CFR Part 50, Appendix J, and does not specifically identify a VT-2 visual examination, (2) 10 CFR Part 50, Appendix J, provides requirements for testing as well as acceptable leakage criteria, and (3) 10 CFR 50.55a(b)(2)(x)(E) requires a general visual examination. The NRC staff considered that the first reason merely pointed out an inconsistency in the ASME Code, and the second and the third reasons identified existing regulatory requirements without explaining why these requirements provided an acceptable level of quality and safety. As an alternative, the licensee should either (1) conduct a VT-3 (or general) visual examination during or after the pressure test on areas affected by the repair/replacement activity if a pressure test is performed for the leak-tight integrity of the pressure boundary, or (2) perform a VT-1 (or detailed) visual examination on areas affected by the repair/replacement activity if a pressure test is deferred. For the second option, the requirement of IWE-5240 shall be met, when the pressure test is performed.

In response to the staff's concern as discussed above and raised during a May 10, 2001, telephone conversation, the licensee added in the "Alternative Examination" section of Relief Request RR-29 that after any repair or replacement affecting the containment pressure boundary, if a pressure test (Type A, Type B or Type C) is performed to verify the leak-tight integrity of the affected pressure boundary, a VT-3 visual examination of the accessible areas

shall be performed during or after the pressure test to ensure the overall integrity of the repaired/replaced component with the containment. This change was documented in their letter dated May 23, 2001. For any repair or replacement affecting the containment pressure boundary, where a pressure test is deferred or not performed, a VT-1 or detailed visual examination shall be performed to ensure the overall integrity of the repaired/replaced component with the containment.

On this basis, the staff finds that the alternative examination proposed by the licensee will provide an acceptable level of quality and safety for protecting the containment pressure boundary integrity. The staff concludes that the alternative proposed by the licensee is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

2.10 Relief Request RR-30

2.10.1 ASME Code Requirements

ASME Code, Section XI, 1992 Edition, 1992 Addenda, Paragraphs IWE-2420(b) and IWE-2420(c) requires that when component examination results require evaluation for flaws, evaluation of areas of degradation, or repairs in accordance with the Article IWE-3000, and the component is found to be acceptable for continued service, the areas containing such flaws, degradation, or repairs shall be reexamined during the next inspection period listed in the schedule of the inspection program of Paragraph IWE-2411 or Paragraph IWE-2412, in accordance with Table IWE-2500-1, Examination Category E-C.

2.10.2 ASME Code Requirements from Which an Alternative is Requested

Relief is requested from the requirements of Paragraphs IWE-2420(b) and IWE-2420(c) to perform successive examination of repairs.

2.10.3 Basis for Relief

In the *Federal Register* dated August 8, 1996 (61 FR 41303), the NRC amended 10 CFR 50.55a to require the use of 1992 Edition, 1992 Addenda, of ASME Code, Section XI when performing containment examinations. The purpose of a repair is to restore the component to an acceptable condition for continued service in accordance with the acceptance standards of Article IWE-3000. Paragraph IWA-4150 requires the owner to conduct an evaluation of the suitability of the repair including consideration of the cause of failure.

If the repair has restored the component to an acceptable condition, successive examinations are not warranted. If the repair was not suitable, then the repair does not meet ASME Code requirements and the component is not acceptable for continued service. Neither Paragraph IWB-2420(b), Paragraph IWC-2420(b), nor Paragraph IWC-2420(b) requires a repair to be subject to successive examination requirements. Furthermore, if the repair area is subject to accelerated degradation, it would still require augmented examination in accordance with Table IWE-2500-1, Examination Category E-C. The successive examination of repairs in accordance with Paragraphs IWE-2420(b) and IWE-2420(c) constitutes a burden without a compensating increase in quality or safety. (Repair was deleted in Paragraphs IWE-2420(b) and IWE-2420(c) in the 1997 Addenda of ASME Code, Section XI, and is not included in the 1998 Edition.)

In their resolution to Public Comment No. 3.3, the NRC stated, "The purpose of IWE-2420(b) is to manage components found to be acceptable for continued service (meaning no repair or replacement at this time) as an Examination Category E-C component... If the component had been repaired or replaced, then the more frequent examination would not be needed."

An alternative is requested in accordance with 10 CFR 50.55a(a)(3)(ii). Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.10.4 Alternative Provisions

Successive examinations in accordance with Paragraphs IWE-2420(b) and IWE-2420(c) are not required for repairs made in accordance with Article IWA-4000.

2.10.5 Staff Evaluation of RR-30

The staff finds that when repairs are complete, IWA-4150 requires licensees to evaluate the suitability of the repair. When a repair is required because of the failure of an item, the evaluation shall consider the cause of failure to ensure that the repair is suitable. Considering that the failure mechanism is identified and corrected as required and the repair receives preservice examinations, as required, the proposed alternative will provide reasonable assurance of structural integrity. In doing this, the hardship associated with the requirements of successive examinations can be eliminated. Furthermore, Paragraphs IWB-2420(b), IWC-2420(b), and IWD-2420(b) do not require the successive inspection of repairs for ASME Code Class 1, 2, and 3 components as required in Paragraph IWE-2420(b) for ASME Code Class MC components. On this basis, the alternative proposed by the licensee is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) because compliance with the specific ASME Code requirements would result in hardship without a compensating increase in the level of quality and safety.

2.11 Relief Request RR-31

2.11.1 ASME Code Requirements

ASME Code, Section XI, 1992 Edition, 1992 Addenda, Table IWE-2500-1, Examination Category E-G, Pressure Retaining Bolting, Item E8.10 requires that Class MC bolted connections be subject to a VT-1 visual examination.

ASME Code, Section XI, 1992 Edition, 1992 Addenda, Table IWE-2500-1, Examination Category E-G, Pressure Retaining Bolting, Item E8.20 requires that Class MC bolted connections be subject to a bolt torque or tension test.

2.11.2 ASME Code Requirements from Which an Alternative is Requested

Relief is requested from the requirements of ASME Code, Section XI, 1992 Edition with the 1992 Addenda, Table IWE-2500-1, Examination Category E-G, Pressure Retaining Bolting, Items E8.10 and E8.20.

2.11.3 Basis for Relief

In the *Federal Register* dated August 8, 1996 (61 FR 41303), the NRC amended 10 CFR 50.55a to require the use of 1992 Edition, 1992 Addenda, of ASME Code, Section XI when performing containment examinations. Per the 1992 Edition, 1992 Addenda, of ASME Code, Section XI, pressure retaining bolted connections require a VT-1 visual examination.

Examination Category E-G visual examinations of pressure-retaining bolting may be performed with the bolting in place under tension and do not require removal or disassembly of the bolted connection solely for the purpose of performing the examination. Only those exposed surfaces of bolting materials need to be examined. However, containment surfaces, including bolted connections, are already subject to visual examination in accordance with Table IWE-2500-1, Examination Category E-A. Bolted connections in containment are also subject to testing performed under 10 CFR Part 50, Appendix J.

Containment bolting is not subject to a known degradation mechanism primarily because it is not in contact with a corrosive environment. There have been no problems with containment bolting identified within the industry. Accordingly, Examination Category E-G has been eliminated from Table IWE-2500-1 in the 1998 Edition of ASME Code, Section XI and the examination requirements for pressure-retaining bolting have been consolidated into Examination Category E-A.

The performance of visual examinations on bolted connections in accordance with the 1992 Edition through 1992 Addenda of ASME Code, Section XI, Examination Category E-G represents a hardship with no compensating increase in the level of quality and safety. The reexamination of bolted connections that are already examined as part of Examination Category E-A, and tested in accordance with 10 CFR Part 50, Appendix J, unnecessarily increase the number of inservice examinations and the associated radiation exposure to personnel.

In addition to the visual examination of bolted connections, the 1992 Edition through 1992 Addenda of ASME Code, Section XI requires that bolt torque or tension testing be performed on bolted connections that have not been disassembled and reassembled during the inspection interval. Determination of the torque or tension value would require that the bolting be un-torqued and then re-torqued or re-tensioned. The performance of a 10 CFR Part 50, Appendix J, Type B test proves that the bolt torque or tension remains adequate to provide a leak rate that is within acceptable limits. The torque or tension value of bolting only becomes an issue if the leak rate is excessive. Once the bolt is torqued or tensioned, it is not subject to dynamic loading that could cause it to experience significant change. Verification of torque or tension values on bolted joints that are proven adequate through Appendix J testing and visual inspection is adequate to demonstrate that design function is met. Torque or tension testing is not required on any other ASME Code, Section XI, Class 1, 2 or 3 bolted connections or their supports as part of the ISI program.

In accordance with 10 CFR 50.55a(a)(3)(ii), an alternative is requested. Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.11.4 Alternative Provisions

The following examinations and tests required by Subsection IWE ensure the structural integrity and the leak-tightness of Class MC pressure retaining bolting; and, therefore, no additional alternative examinations are proposed.

(1) Exposed surfaces of bolted connections shall be visually examined in accordance with the requirements of Table IWE-2500-1, Examination Category E-A, Containment Surfaces, and

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

2.11.5 Staff Evaluation of RR-31

In this relief request, the licensee proposed an alternative examination as follows:

(1) In lieu of performing the VT-1 examination of the pressure retaining bolting in accordance with Table IWE-2500-1, examination category E-G, E8.10, the licensee proposed to perform a visual examination in accordance with the requirements of Table IWE-2500-1, Examination Category E-A, "Containment Surface," of the exposed surfaces of bolted connections.

(2) In lieu of performing the torque or tension test (in accordance with Table IWE-2500-1, examination category E-G, E8.20), the leak-tight integrity will be verified in accordance with applicable requirements of 10 CFR Part 50, Appendix J.

The NRC staff finds that the performance of VT-1 visual examinations on bolted connections in accordance with the 1992 Edition through 1992 Addenda of ASME Code, Section XI represents a hardship (the reexamination of bolted connections unnecessarily increases the number of inservice examinations and the associated radiation exposure to personnel) with no compensating increase in the level of quality and safety. The staff also finds that the 10 CFR Part 50, Appendix J, requirements together with the visual examination in accordance with Table IWE-2500-1, Examination Category E-A, for evaluating inservice effects that could adversely impact the performance of the bolted connections will ensure the leak-tight integrity of the containment structure with bolted connections. However, the licensee did not explain the extent of examination to be performed if an area is found to be suspect (e.g., contains flaws, degradation).

In response to the staff's concern raised during the May 10, 2001, telephone conversation, the licensee revised Item (1) of the "Alternative Provisions" section of Relief Request RR-31 and stated that exposed surfaces of bolted connections shall receive a VT-3 examination in accordance with the requirements of Table IWE-2500-1, Examination Category E-A, Containment Surfaces. The revision was documented in their letter dated May 23, 2001. If an area is found to be suspect, then a VT-1 examination shall be performed to determine the magnitude and extent of degradation. If required, the bolted connection shall be disassembled to support the VT-1 examination.

For the ASME Code requirements related to bolt torque and tension tests, the staff finds that to perform a bolt torque or tension test on bolted connections that have not been disassembled and reassembled during the inspection interval will cause a hardship without a compensating increase in the level of quality and safety. Determination of the torque or tension value would require that the bolting be un-torqued and then re-torqued or re-tensioned. The staff also finds that the licensee's alternate approach (the Type B test required by 10 CFR Part 50, Appendix J, to verify the leak-tight integrity of bolted connections for containment vessel leak-tight integrity) will verify the adequacy of the bolted connections to provide a leak rate that is within acceptable limits.

On the basis discussed above, the staff concludes that the examination approach proposed by the licensee will provide reasonable assurance of the functionality and integrity of containment pressure retaining bolted connections. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the specific ASME Code requirements would result in hardship without a compensating increase in the level of quality and safety.

3.0 CONCLUSIONS

Based on our review of the information provided in the requests for relief (Relief Requests RR-12-9 through RR-12-11 and RR-24 through RR-31), the staff concludes that for Relief Requests RR-12-9 through RR-12-11, and RR-27 through 29, the licensee's proposed alternatives will provide an acceptable level of quality and safety. Therefore, the proposed alternatives are authorized pursuant to 10 CFR 50.55a(a)(3)(i). For Relief Requests RR-24, RR-25, RR-26, RR-30 and RR-31, the staff concludes that compliance with the ASME Code requirements would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety, and that licensee's proposed alternatives will provide reasonable assurance of containment pressure integrity. Therefore, these proposed alternatives are authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

Principal Contribitor: T. Cheng

Date: September 12, 2001