



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

July 31, 2009

Mr. John T. Carlin  
Vice President R.E. Ginna Nuclear Power Plant  
R.E. Ginna Nuclear Power Plant, LLC  
1503 Lake Road  
Ontario, NY 14519

SUBJECT: R.E. GINNA NUCLEAR POWER PLANT: SAFETY EVALUATION FOR RELIEF  
REQUEST NO. 18, REACTOR VESSEL WELD EXAMINATION EXTENSION  
(TAC NO. MD9962)

Dear Mr. Carlin:

By letter dated October 3, 2008, R.E. Ginna Nuclear Power Plant, LLC, the licensee for the R.E. Ginna Nuclear Power Plant, requested Nuclear Regulatory Commission (NRC) approval to use an alternative to the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, paragraph IWB-2412, Inspection Program B. Specifically, the alternative was requested pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i). The licensee requested approval for the use of an alternative to extend the inservice inspection (ISI) interval for examinations of the reactor pressure vessel (RPV) circumferential shell and shell-to-flange welds (Category B-A) as well as the nozzle-to-vessel welds and nozzle inner radius sections (Category B-D) from 10 years to 20 years.

The NRC staff has completed its review of the information provided by the licensee for Relief Request No. 18. The staff concludes that the information provided by the licensee supports the granting of an alternative pursuant to 10 CFR 50.55a(a)(3)(i) because the alternative provides an acceptable level of quality and safety. This approval is only to extend the licensee's current ISI interval to 2019 with the licensee performing the subject examinations in 2011.

Sincerely,

A handwritten signature in cursive script that reads "Nancy L. Salgado".

Nancy L. Salgado, Chief  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-244

Enclosure:  
Safety Evaluation

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST NO. 18

RENEWED FACILITY OPERATING LICENSE NO. DPR-18

R.E. GINNA NUCLEAR POWER PLANT, LLC

R.E. GINNA NUCLEAR POWER PLANT

DOCKET NO. 50-244

1.0 INTRODUCTION

By letter dated October 3, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML0828800328), R.E. Ginna Nuclear Power Plant, LLC, the licensee for the R.E. Ginna Nuclear Power Plant (Ginna), resubmitted a request for Nuclear Regulatory Commission (NRC) approval to use an alternative to the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, paragraph IWB-2412, Inspection Program B. Specifically, the alternative was requested pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i). The licensee requested approval for the use of an alternative to extend the inservice inspection (ISI) interval for examinations of the reactor pressure vessel (RPV) circumferential shell and shell-to-flange welds (Category B-A) as well as the nozzle-to-vessel welds and nozzle inner radius sections (Category B-D) from 10 years to 20 years.

2.0 REGULATORY REQUIREMENTS

In accordance with 10 CFR 50.55a(g)(4), the licensee is required to perform ISI of ASME Code Class 1, 2, and 3 components and system pressure tests during the first 10-year interval and subsequent 10-year intervals that comply with the requirements in the latest edition and addenda of Section XI of the ASME Code, incorporated by reference in 10 CFR 50.55a(b), subject to the limitations and modifications listed therein.

For the current ISI interval at Ginna, which ends in 2009, the code of record for the inspection of ASME Code Class 1, 2, and 3 components will be Section XI of the ASME Code 1995 Edition with the 1996 Addenda. The regulation in 10 CFR 50.55a(a)(3) states, in part, that the Director of the Office of Nuclear Reactor Regulation may authorize an alternative to the requirements of 10 CFR 50.55a(g). For an alternative to be authorized, as per 10 CFR 50.55a(a)(3)(i), the licensee must demonstrate that the proposed alternative would provide an acceptable level of quality and safety.

Enclosure

## 2.1 Background

The ISI of Category B-A and B-D components consists of visual and ultrasonic examinations intended to discover whether flaws have initiated, whether pre-existing flaws have extended, and whether pre-existing flaws may have been missed in prior examinations. These examinations are required to be performed at regular intervals, as defined in Section XI of the ASME Code.

## 2.2 Summary of WCAP-16168-NP

In 2006, the Pressurized Water Reactor (PWR) Owners Group submitted Topical Report WCAP-16168-NP, Revision 1 (ADAMS Accession No. ML060330504, referred to as the WCAP in the rest of this document), "Risk-Informed Extension of the Reactor Vessel In-Service Inspection Interval," to the NRC in support of making a risk-informed assessment of extensions to the ISI intervals for Category B-A and B-D components. In the report, the PWR Owners Group took data associated with three different PWR plants (referred to as the pilot plants), one designed by each of the main vendors for nuclear power plants in the United States, and performed the necessary studies on each of the pilot plants required to justify the proposed extension for the ISI interval for Category B-A and B-D components from 10 to 20 years.

The analyses in the WCAP used probabilistic fracture mechanics tools and inputs from the work described in the NRC's pressurized thermal shock (PTS) risk re-evaluation, specifically NUREG-1806, "Technical Basis for Revision of the Pressurized Thermal Shock (PTS) Screening Limit in the PTS Rule (10 CFR 50.61): Summary Report," (ADAMS Accession No. ML061580318) and NUREG-1874, "Recommended Screening Limits for Pressurized Thermal Shock (PTS)," (ADAMS Accession No. ML070860156). The PWR Owners Group analyses incorporated the effects of fatigue crack growth and inservice inspection. Design basis transient data was used as input to the fatigue crack growth evaluation. The effects of ISI were modeled consistently with the previously-approved probabilistic fracture mechanics codes contained in WCAP-14572-NP-A, "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report," (ADAMS Accession Nos. ML012630327, ML012630349, and ML012630313). These effects were put into evaluations performed with the Fracture Analysis of Vessels-Oak Ridge (FAVOR) code (ORNL/NRC/LTR0418 (ADAMS Accession No. ML042960391)). All other inputs were identical to those used in the PTS risk re-evaluation.

From the results of the studies, the PWR Owners Group concluded that the ASME Code, Section XI 10-year inspection interval for Category B-A and B-D components in PWR reactor vessels can be safely extended to 20 years. Their conclusion from the results for the pilot plants was considered to apply to any plant designed by the three vendors (Westinghouse, Combustion Engineering, and Babcock and Wilcox) as long as the critical, plant-specific parameters (defined in Appendix A of the WCAP) are bounded by the pilot plants.

## 2.3 Summary of NRC Safety Evaluation Report of WCAP-16168-NP

The NRC staff's conclusion in its safety evaluation (SE) (ADAMS Accession No. ML0929200462) of the WCAP indicates that the methodology presented in the WCAP, in concert with the guidance provided by Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," is acceptable for referencing in requests to implement alternatives to ASME Code inspection requirements for PWR plants in accordance with the limitations and conditions

in the SE. In addition to showing that the subject plant is bounded by the pilot plants' information from Appendix A in the WCAP, the key points of the SE are summarized below.

- The dates identified in the request for an alternative should be within plus or minus one refueling cycle of the dates identified in the implementation plan provided to the NRC. Any deviations from the implementation plan contained in OG-06-356 (ADAMS Accession No. ML082210245) should be discussed in detail in the request for an alternative ISI interval. The maximum interval for a proposed ISI is 20 years.
- The request for an alternative ISI interval can use any NRC-approved method to calculate  $\Delta T_{30}$  and  $RT_{MAX-X}$ . However, if the request uses NUREG-1874 methodology to calculate  $\Delta T_{30}$ , then the request should include the analysis described in paragraph (6) of subsection (f) to the voluntary PTS rule. The analysis should be done for all of the materials in the beltline area with at least three surveillance data points.
- If the subject plant has RPV forgings that are susceptible to underclad cracking or if the RPV includes forgings with  $RT_{MAX-FO}$  values exceeding 240 °F, then the WCAP analyses are not applicable. The licensee must submit a plant-specific evaluation for any extension to the 10-year inspection interval for ASME Code, Section XI, Category B-A and B-D RPV welds.

### 3.0 ALTERNATIVES PROPOSED FOR GINNA

#### 3.1 Description of Proposed Alternatives

In Relief Request No. 18, the licensee proposes to allow performance of the ASME Code required Category B-A and B-D weld ISI of Ginna during the 2011 outage, with the next exam to be performed in 2031 (a 20-year interval from the last inspection). This schedule is consistent with the information in PWR Owners Group letter, OG-06-356.

#### 3.2 Component for Which Relief is Requested

The affected component is the Ginna RPV. The following examination categories and item numbers from IWB-2500 and Table IWB-2500-1 of the ASME Code, Section XI, are addressed in this request:

For Relief Request No. 18

Examination Category	Item Number	Description
B-A	B1.11	Circumferential Shell Weld
B-A	B1.30	Shell-to-Flange Weld
B-D	B3.90	Nozzle-to-Vessel Welds
B-D	B3.100	Nozzle Inner Radius Areas

### 3.3 Basis for Proposed Alternatives

The basis for the first alternative is found in the NRC-approved version of the WCAP, WCAP-16168-NP-A, Rev. 2 (ML0828200462, referred to as WCAP-A in the rest of this document). Plant-specific parameters for the subject plant are summarized in the attachment to the licensee's letter of October 3, 2008. The format of the information is patterned after that found in Appendix A of the WCAP.

All of the critical parameters listed in Tables 1, 2, and 3 of the attachment to the licensee's submittal are bounded by the WCAP-A pilot plant evaluations.

### 3.4 Duration of Proposed Alternatives

The duration of the proposed alternative is for examinations for the Fourth Interval Inservice Inspection Program are proposed to be performed in the 2011 outage, with following examinations proposed to be performed in 2031.

## 4.0 STAFF TECHNICAL EVALUATION

The NRC staff has reviewed the attachment to the licensee's request for an alternative submittal, dated October 3, 2008, to make this evaluation. The "Frequency and Severity of Design Transients" of Ginna were found to be bounded by WCAP-A. Also, the Ginna RPV is single-layer clad and, therefore, was bounded by WCAP-A.

Table 2 of the submittal includes additional information pertaining to previous RPV inspections and the schedule for future ones. One recordable indication is in the inner 1/8<sup>th</sup> of the vessel inside diameter in the beltline region. The indication has a depth of 0.22", length of 1.54", and is 0.38" subsurface. This indication was found to be acceptable in accordance with IWB-3500 of Section XI of the ASME Code.

The calculation of through-wall cracking frequency (TWCF)  $TWCF_{95-TOTAL}$  was performed using Table 3 as a basis. The licensee's submittal used the NUREG-1874 methodology to calculate  $\Delta T_{30}$ . The NRC staff verified these values and calculated  $\Delta T_{30}$  values using the methodology of RG 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials." The TWCF was found to be acceptably low as calculated through the methodology prescribed in the WCAP and in Table 3 of the submittal, using the RG 1.99, Rev. 2 methodology.

At the time of issuance of the SE for WCAP-16168-NP, it was the NRC's intent to establish a process by which licensees could receive approval to implement 20-year ISI intervals for the subject component examinations through the end of their facility's current operating license. This objective led to the provision established in the WCAP-16168-NP SE that licensees submit a license condition which would require the licensee to evaluate future volumetric ISI data in accordance with the criteria in the draft and/or final alternative PTS Rule, 10 CFR 50.61a. However, since that time, further guidance from the NRC's Office of General Counsel has resulted in a modification of this NRC position.

Based on the current guidance, the NRC staff will grant ISI interval extensions for the subject components on an interval-by-interval basis, i.e., only a facility's current ISI interval will be extended for up to 20 years. Licensees will have to submit subsequent requested alternatives,

for NRC review and approval, to extend each following ISI interval from 10 years to 20 years, as needed. Based on this new NRC position, the requirement in the staff's SE on WCAP-16168-NP for a license condition to address the evaluation of future ISI data is no longer necessary, and the license condition requested by Ginna LLC for Ginna by letter dated October 7, 2008 (ADAMS Accession No. ML082880033), will not be issued in conjunction with this requested alternative. However, subsequent requested alternatives which seek to extend additional ISI intervals from 10 to 20 years for the subject component examinations should include the evaluation of a facility's most recent ISI data in accordance with the criteria in the final alternative PTS Rule, 10 CFR 50.61a, in order to obtain NRC staff approval. In addition, for purposes of technical and regulatory consistency, the WCAP-16168-NP SE will be revised to reflect these changes in NRC position regarding the implementation of ISI interval extensions based on WCAP-16168-NP.

Hence, the NRC staff also reviewed the licensee's proposed schedule as it applies to the Fourth Ginna ISI Interval. The staff finds the proposal to perform the subject examinations in 2011 consistent with the information provided in OG-06-356, therefore, acceptable.

In summary, the licensee has demonstrated through the submittal that the RPV components identified under Relief Request No. 18 for Ginna is bounded by WCAP-A. The submittal demonstrates that there is no significant additional risk associated with extending the current ISI interval for Category B-A and B-D components from 10 years to 20 years.

## 5.0 CONCLUSION

The NRC staff has completed its review of the submittals for Relief Request No. 18 for Ginna. The staff concludes that extending the current ISI interval for the identified Category B-A and B-D components from 10 years to 20 years shows no appreciable increase in risk. The staff comes to this conclusion based on the fact that the plant-specific information provided by the licensee is bounded by the data in WCAP-A, and the request meets all the conditions and limitations described in WCAP-A and the SE to the WCAP. Therefore, the staff concludes that Relief Request No. 18 provides an acceptable level of quality and safety and the alternative can be granted pursuant to 10 CFR 50.55a(a)(3)(i) until the end of the current extended ISI interval in 2019 with the licensee performing the subject examinations in 2011.

All other requirements of the ASME Code, Section XI, not specifically included in the request for the proposed alternatives, remain in effect.

Principal Contributor: Carolyn Fairbanks

Date: July 31, 2009

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Vice President R.E. Ginna Nuclear Power Plant  
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Sincerely,

**/RA/**

Nancy L. Salgado, Chief  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-244

Enclosure:  
Safety Evaluation  
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