



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

September 10, 2012

Mr. Kevin D. Richards
President and Chief Executive Officer/
STP Nuclear Operating Company
South Texas Project
P.O. Box 289
Wadsworth, TX 77483

SUBJECT: SOUTH TEXAS PROJECT, UNITS 1 AND 2 – REQUEST FOR RELIEF
RR-ENG-3-04 TO APPLY ALTERNATIVE TO THE AMERICAN SOCIETY OF
MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE
SECTION XI REQUIREMENTS FOR EXAMINATION OF CLASS 1 AND
CLASS 2 PIPING WELDS (TAC NOS. ME7055 AND ME7056)

Dear Mr. Richards:

By letter dated September 1, 2011 (Agencywide Document Access and Management System (ADAMS) Accession No. ML11250A170), as supplemented by letter dated May 9, 2012 (ADAMS Accession Nos. ML12138A009), STP Nuclear Operating Company (the licensee) submitted for U.S. Nuclear Regulatory Commission (NRC) review and approval Relief Request RR-ENG-3-04 for South Texas Project (STP), Units 1 and 2. The licensee requested relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI examination requirements for inservice inspection (ISI) of Class 1 and Class 2 piping welds pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), paragraph 50.55a(a)(3)(i).

Specifically, the licensee requested approval to continue applying the risk-informed ISI (RI-ISI) approach during the third 10-year inspection interval as an alternative to the ASME Code requirements. The application of the RI-ISI approach was previously approved by the NRC staff for use during the second 10-year ISI interval.

The NRC staff has completed its review of the request and concludes that the proposed RI-ISI approach is an acceptable alternative to the requirements of the ASME Code, Section XI, for the ISI of Class 1 and 2 piping welds. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the use of RR-ENG-3-04 at STP, Units 1 and 2, for the third 10-year ISI interval, which began on September 25, 2010, for Unit 1 and October 19, 2010, for Unit 2 and ends on September 24, 2020, for Unit 1 and October 18, 2020, for Unit 2.

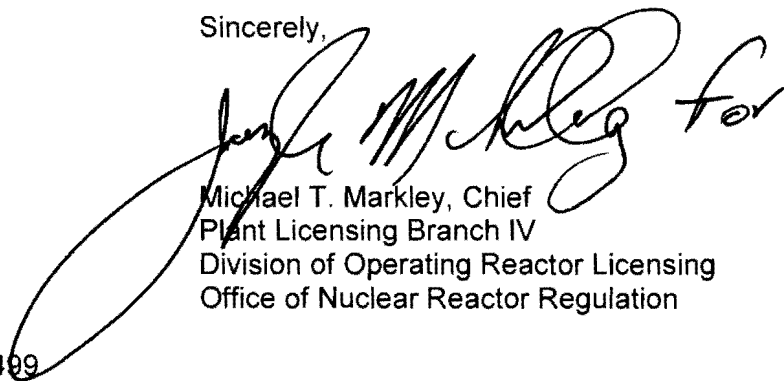
All other ASME Code, Section XI, requirements for which relief has not been specifically requested, remain applicable, including a third-party review by the Authorized Nuclear Inservice Inspector.

K. Richards

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If you have any questions, please contact Balwant K. Singal at 301-415-3016 or by e-mail at Balwant.Singal@nrc.gov.

Sincerely,

A large, stylized handwritten signature in black ink, appearing to read "Markley for". The signature is written over the typed name and title of Michael T. Markley.

Michael T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Enclosure:
Safety Evaluation

cc w/encl: Distribution via Listserv



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF NO. RR-ENG-3-04

ALTERNATIVE TO THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND

PRESSURE VESSEL CODE SECTION XI REQUIREMENTS

FOR EXAMINATION OF CLASS 1 AND CLASS 2 PIPING WELDS

STP NUCLEAR OPERATING COMPANY

SOUTH TEXAS PROJECT, UNITS 1 AND 2

DOCKET NOS. 50-498 AND 50-499

1.0 INTRODUCTION

By letter dated September 1, 2011 (Agencywide Document Access and Management System (ADAMS) Accession No. ML11250A170), as supplemented by letter dated May 9, 2012 (ADAMS Accession Nos. ML12138A009), STP Nuclear Operating Company (the licensee) submitted for U.S. Nuclear Regulatory Commission (NRC) review and approval Relief Request RR-ENG-3-04 for South Texas Project (STP), Units 1 and 2. The licensee requested relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI examination requirements for inservice inspection (ISI) of Class 1 and Class 2 piping welds pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), paragraph 50.55a(a)(3)(i).

Specifically, the licensee requested approval to continue applying the risk-informed ISI (RI-ISI) approach during the third 10-year ISI as an alternative to the ASME Code requirements. The application of the RI-ISI approach was previously approved by the NRC staff for ISI of Class 1 and Class 2 piping welds during the second 10-year ISI interval by letters dated September 11, 2000 (ADAMS Accession No. ML003749167) and March 5, 2002 (ADAMS Accession No. ML020390041).

2.0 REGULATORY EVALUATION

Pursuant to 10 CFR 50.55a(g), ASME Code, Class 1, 2, and 3 components (including supports) shall meet the requirements, "except design and access provisions and preservice examination requirements" set forth in the Code to the extent practical within the limitations of design, geometry, and materials of construction of the components. Paragraph 10 CFR 50.55a(g) also

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states that ISI of the ASME Code, Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and applicable addenda, except where specific relief has been granted by the NRC.

The regulations also require, during the first 10-year ISI interval and during subsequent intervals, that the licensee's ISI program complies with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference into 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the conditions listed therein. STP, Units 1 and 2 are currently in the third 10-year ISI interval that began September 25, 2010 (Unit 1) and October 19, 2010 (Unit 2).

Pursuant to 10 CFR 50.55a(g) and ASME Code, Section XI, Tables IWB-2500-1 and IWC-2500-1, a certain percentage of ASME Code Category B-F, and B-J pressure retaining piping welds must receive ISI during each 10-year ISI interval. The ASME Code requires 100 percent of all B-F welds and 25 percent of all B-J welds greater than 1-inch nominal pipe size (NPS) be selected for volumetric or surface examination, or both, on the basis of existing stress analyses. For Examination Categories C-F-1 and C-F-2 welds, the ASME Code requires 7.5 percent of non-exempt welds be selected for volumetric and/or surface examinations. According to 10 CFR 50.55a(a)(3), the NRC may authorize alternatives to the requirements of 10 CFR 50.55a(g), if an applicant demonstrates that the proposed alternatives would provide an acceptable level of quality and safety, or that compliance with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The guidance provided by the following documents was used by the NRC staff to evaluate proposed RI-ISI program:

- Regulatory Guide (RG) 1.174, Revision 2, "An Approach for Using Probabilistic Risk Assessment In Risk-Informed Decisions On Plant-Specific Changes to the Licensing Basis" (ADAMS Accession No. ML100910006)
- RG 1.178, Revision 1, "An Approach For Plant-Specific Risk-Informed Decisionmaking for Inservice Inspection of Piping" (ADAMS Accession No. ML032510128)
- RG 1.200, Revision 2, An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities (ADAMS Accession No. ML090410014)
- Standard Review Plan (SRP) 3.9.8, "Standard Review Plan For the Review of Risk-Informed Inservice Inspection of Piping," September 2003 (ADAMS Accession No. ML032510135)

RG 1.174 provides guidance on the use of probabilistic risk analysis (PRA) findings and risk insights in support of licensee requests for changes to a plant's licensing basis. RG 1.178 describes a RI-ISI program as one that incorporates risk insights that can focus inspections on more important locations, while at the same time maintaining or improving public health and safety. RG 1.200 describes one acceptable approach for determining whether the quality of the

PRA, in total or the parts that are used to support an application, is sufficient to provide confidence in the results, such that the PRA can be used in regulatory decision-making

3.0 TECHNICAL EVALUATION

3.1 Affected Components

ASME Code, Class 1 and Class 2 piping welds.

3.2 Code of Record

ASME Code Section XI, 2004 Edition, No Addenda

3.3 Applicable Code Requirements (as stated by the licensee)

- Table IWB-2500-1, Examination Category B-F and Category B-J

ASME [Code] Section XI Examination Categories B-F and B-J contain the requirements for nondestructive examination of Class 1 piping components. Category B-F applies to pressure-retaining dissimilar metal welds in vessel nozzles. Category B-J applies to pressure-retaining welds in piping.

- Table IWC-2500-1, Examination Category C-F-1 and Category C-F-2

ASME [Code] Section XI Examination Categories C-F-1 and C-F-2 contain the requirements for nondestructive examination of Class 2 piping components. Category C-F-1 applies to pressure-retaining welds in austenitic stainless steel or high alloy piping. Category C-F-2 applies to pressure-retaining welds in carbon or low alloy steel piping.

3.4 Basis for Relief (as stated by the licensee)

ASME Section XI code requirements do not allow for selection of inspection locations using consideration of degradation mechanisms that are potentially active, the relative severity of each degradation mechanism at an inspection location, and the inspection methods to be applied. Focusing inspection activities on risk-significant piping segments enables reduction of pipe leak and rupture frequencies, reducing core damage frequency (CDF) and large early release frequency (LERF).

3.5 Licensee's Proposed Alternative to Code

The licensee is proposing to continue use of the STP RI-ISI program plan in the third 10-year ISI interval as an alternative to the current ASME Code, Section XI, 2004 Edition, no Addenda, examination requirements for Class 1 Examination Category B-F and B-J piping welds and Class 2 Examination Category C-F-1 and C-F-2 piping welds. The RI-ISI program approved for use in the second 10-year inspection interval was submitted by the licensee in letters dated December 30, 1999 (ADAMS Accession No. ML003676903) for the Class 1 piping welds and

February 27, 2001 (ADAMS Accession No. ML010650285) for the Class 2 piping welds. The proposed alternative is sought for the STP third 10-year ISI interval, which is scheduled to end on September 24, 2020 (STP, Unit 1) and October 18, 2020 (STP, Unit 2).

The licensee's process used to develop the initial RI-ISI program was based on Electric Power Research Institute, Inc. (EPRI) Topical Report TR-112657, "Revised Risk-Informed Inservice Inspection Evaluation Procedure (PWRMRP-05)" Revision B-A, Final Report, December 1999, (ADAMS Accession No. ML013470102). In its letter dated September 1, 2011, the licensee stated that the RI-ISI program has been updated and continues to meet EPRI TR-112657 guidance and the intent and principles of RG 1.174 and RG 1.178.

3.6 NRC Staff Evaluation

The NRC staff has reviewed and evaluated the licensee's proposed RI-ISI program, including those portions related to the applicable methodology and processes, based on guidance and acceptance guidelines provided in RGs 1.174 and 1.178, SRP 3.9.8, and EPRI-TR-112657, Revision B-A. An acceptable RI-ISI program plan is expected to meet the five key principles discussed in RGs 1.174 and 1.178, SRP 3.9.8, and the EPRI-TR, as stated below:

1. The proposed change meets the current regulations unless it is explicitly related to a requested exemption or rule change.
2. The proposed change is consistent with the defense-in-depth philosophy.
3. The proposed change maintains sufficient safety margins.
4. When the proposed change results in an increase in CDF and/or LERF, the increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.
5. The impact of the proposed changes should be monitored by using performance measurement strategies.

Principle 1

The first principle is met in this relief request because an alternative ISI program may be authorized pursuant to 10 CFR 50.55a(3)(i) and therefore, an exemption request is not required.

Principles 2 and 3

The second and third principles require assurance that the alternative program is consistent with the defense-in-depth philosophy and that sufficient safety margins are maintained, respectively. The methodology used to develop the third 10-year RI-ISI program interval is unchanged from the methodology approved for use for the second-10 year RI-ISI interval program. Assurance that the second and third principles are met is based on the application of the approved methodology and not on the particular inspection locations selected. The licensee stated in its letter dated September 1, 2011 that as part of the 10-year code update, 4" NPS Class 2 Auxiliary Feedwater piping was added to the program. The approved methodology was applied to the piping added in accordance with the 2004 Edition of ASME Code Section XI. In response to the Request for Additional Information, in its letter dated May 9, 2012, the licensee stated that the augmented inspection program for high energy break exclusion zone piping is not affected by the RI-ISI program for the third interval. Therefore, the second and third principles are met.

Principle 4

The fourth principle requires an estimate of the change in risk between the proposed risk-informed program and the program the licensee would otherwise be required to implement. The topical report (EPRI TR-112657) requires that a change in risk measurement must consider the discontinuance of ASME Code required inspections, as well as any new inspections resulting from the application of its methodology. In its letter dated May 9, 2012, the licensee stated that the RI-ISI program was written in compliance with EPRI TR-1021467-A, "Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-Informed In-Service Inspection Programs" (ADAMS Accession No. ML12171A450). The primary objective of EPRI 1021467 is to provide guidance on determining the technical adequacy of PRAs used to develop a RI-ISI program that utilizes the traditional methodology as described in EPRI TR-112657 Revision B-A. Furthermore, the licensee did not identify any exceptions to ASME RA-S-2002, "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," for its internal events PRA model. The NRC staff reviewed this information and performed additional focused reviews during a site visit in June 2006. The staff review considered technical changes between ASME RA-S-2002 and its update in ASME RA-Sb-2005 (Addendum B to ASME RA-S-2002), along with changes and clarifications of RG 1.200, Revision 1. Based on the licensee's assessment and the staff reviews, the staff determined that the STP, Units 1 and 2 PRA internal events model satisfied the guidance of RG 1.200, Revision 1, and conformed to capability category II of the ASME standard for the supporting requirements. The STP PRA also models external events that include seismic, high winds, and external flooding events. The NRC staff recognizes that the EPRI method uses the quantitative results of the PRA as order-of-magnitude estimates for several risk and reliability parameters and to support the assignment of segments into three broad consequence categories. Inaccuracies in the models or in assumptions large enough to invalidate the broad categorizations developed to support RI-ISI or the change in risk estimates should have been identified during the licensee's evaluation of the gaps associated with meeting ASME supporting requirements. Minor errors or inappropriate assumptions could potentially affect only the consequence categorization of a few segments and will not invalidate the general results or conclusions. Therefore, the NRC staff concludes that the licensee has assessed the technical adequacy of its PRA and the quality of the PRA is sufficient to support the proposed RI-ISI program.

The staff has previously determined that it is not necessary to develop a new deterministic ASME program for each new 10-year interval but, instead, it is acceptable to compare the new propose RI-ISI program with the last deterministic ASME program. The licensee states that a new Risk Impact Analysis was performed, and the revised program represents a reduction of 7.0×10^{-11} for STP, Unit 1 and 6.0×10^{-11} for STP, Unit 2 with regards to CDF. This satisfies the acceptance criteria of RG 1.174 and EPRI TR-112657 when compared to the last deterministic Section XI inspection program. Thus, the NRC staff concludes that the licensee's analysis provides assurance that the fourth key principle is met.

Principle 5

The fifth principle of risk-informed decisionmaking requires that the impact of the proposed change be monitored by using performance measurement strategies. The RI-ISI program is a living program and, as such, is subject to periodic reviews. The licensee indicates that, to satisfy the periodic review requirements, an evaluation and update was performed in accordance with the Nuclear Energy Institute (NEI) document NEI 04-05, "Living Program Guidance to Maintain Risk-Informed Inservice Inspection Program for Nuclear Power Plant Piping Systems," published in April 2004 (ADAMS Accession No. ML041480432) on an ASME period basis as required by the initial submittal.

These periodic reviews have resulted in changes in consequence rankings and the addition/deletion of welds based on plant modifications. Also as part of the living program aspect of the RI-ISI program, the STP, Units 1 and 2 Inservice Inspection Program has been augmented by incorporating ASME Code Case N-770-1, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR [Pressurized-Water Reactors] Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities" requirements consistent with 10 CFR 50.55a(g)(ii)(F)(1). Based on the above discussion, the NRC staff concludes that the five key principles of risk-informed decision making are ensured by the licensee's proposed third 10-year RI-ISI program, and therefore the proposed program for the third 10-year ISI interval is acceptable.

4.0 CONCLUSION

Based on the discussion above, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a, and the proposed alternative provides an acceptable level of quality and safety. Therefore, the NRC staff authorizes continued use of the RI-ISI Program at STP, Units 1 and 2 for the third 10-year ISI interval. All other ASME Code, Section XI requirements for which relief was not specifically requested and approved remain applicable, including third-party review by Authorized Nuclear Inservice Inspector.

Principal Contributors: Keith Hoffman
Jigar Patel

Date: September 10, 2012

K. Richards

- 2 -

If you have any questions, please contact Balwant K. Singal at 301-415-3016 or by e-mail at Balwant.Singal@nrc.gov.

Sincerely,

/RA by JSebrosky for/

Michael T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

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***SE email dated August 2, 2012**

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