



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

July 5, 2012

Mr. Randy S. Gideon, Vice President
Carolina Power & Light Company
H.B. Robinson Steam Electric Plant
3581 West Entrance Road
Hartsville, SC 29550

SUBJECT: H.B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2, REVIEW OF
COMMITMENT SUBMITTAL FOR LICENSE RENEWAL REGARDING THE
NICKEL-ALLOY NOZZLES AND PENETRATIONS PROGRAM INSPECTION
PLAN (TAC NO. ME7124)

Dear Mr. Gideon:

By letter dated July 29, 2009, as revised by letter dated April 13, 2010, Carolina Power and Light Company (the licensee) submitted information to fulfill a commitment for license renewal regarding the licensee's Nickel-Alloy Nozzles and Penetrations Program. The licensee's commitment is specified in Commitment no. 31 in Appendix A of NUREG-1785, "Safety Evaluation Report Related to the License Renewal of H.B. Robinson Steam Electric Plant, Unit 2," dated March 2004. Commitment no. 31 states that the licensee will "...submit, for review and approval, its inspection plan for the Nickel-Alloy Nozzles and Penetrations Program, as it will be implemented from the applicant's participation in industry initiatives..."

The NRC staff reviewed the information in the licensee's letter and determined that the licensee has fulfilled Commitment no. 31 for license renewal and demonstrated that the Nickel Alloy Inspection Plan provides reasonable assurance that aging of the components under consideration will be adequately managed.

Sincerely,

A handwritten signature in black ink, appearing to read "Heather M. Jones", with a stylized flourish at the end.

Heather M. Jones, Project Manager
Subsequent Renewal, Guidance, and Operations
Branch
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-261

Enclosure: Review of Commitment

cc w/encl: Listserv

OFFICE OF NUCLEAR REACTOR REGULATION
REVIEW OF COMMITMENT FOR LICENSE RENEWAL
EVALUATION OF NICKEL-ALLOY NOZZLES AND PENETRATIONS PROGRAM
INSPECTION PLAN H.B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2
DOCKET NO. 50-261

1.0 INTRODUCTION

By letter dated July 29, 2009, which can be found in the Agencywide Documents Access and Management System (ADAMS) under Accession No. ML092170065, as revised by letter dated April 13, 2010, (ADAMS Accession No. ML101090153), Carolina Power and Light Company (the licensee) submitted the "Nickel-Alloy Nozzles and Penetrations Program Inspection Plan" to satisfy Commitment no. 31 of the licensee's license renewal application (LRA) "Response to Open and Confirmatory Items," letter dated September 16, 2003, (ADAMS Accession No. ML032650884), as revised by letter dated December 10, 2003, (ADAMS Accession No. ML033530151), for H.B. Robinson Steam Electric Plant, Unit 2 (RNP).

As documented in NUREG-1785 (ADAMS Accession No. ML040990702), "Safety Evaluation Report Related to the License Renewal of H.B. Robinson Steam Electric Plant, Unit 2," Paragraph 3.1.2.3.2.2, the staff concluded that the applicant's revision to Commitment no. 31 and the new inspection requirements for the vessel head penetration nozzles provides reasonable assurance that the Nickel-Alloy Nozzles and Penetrations Program is capable of managing primary water stress-corrosion cracking (PWSCC)-induced degradation of Class 1 nickel-based alloy components and welds in the reactor coolant pressure boundary.

Revised Commitment no. 31 states:

"The Nickel-Alloy Nozzles and Penetrations Program is a new program that will incorporate the following:

- (1) evaluations of indications will be performed under the ASME Boiler & Pressure Vessel Code, Section XI program,
- (2) corrective actions for augmented inspections will be performed in accordance with repair and replacement procedures equivalent to those requirements in ASME Boiler & Pressure Vessel Code, Section XI,
- (3) RNP will maintain its involvement in Industry initiatives and will systematically assess for implementation applicable programmatic enhancements, that are agreed upon between the NRC and the nuclear power industry to monitor for, detect, evaluate, and correct cracking in the vessel head penetration (VHP) nozzles, specifically as the actions relate to ensuring the Integrity of VHP nozzles in the RNP upper reactor vessel head during the extended period of operation, and
- (4) RNP will submit, for review and approval, its Inspection plan for the Nickel-Alloy Nozzles and Penetrations Program, as it will be implemented from the applicant's participation in industry initiatives, prior to July 31, 2009."

2.0 REGULATORY EVALUATION

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the H.B. Robinson Steam Electric Plant, Unit 2, LRA for compliance with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." In accordance with 10 CFR 54.21(a)(3), "For each structure and component identified in Paragraph (a)(1) of this section, the licensee shall demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis (CLB) for the period of extended operation."

By letter dated July 29, 2009, as revised by letter dated April 13, 2010, the licensee submitted the Nickel-Alloy Nozzles and Penetrations Program Inspection Plan to the NRC for review and approval.

3.0 STAFF EVALUATION

The plant-specific Nickel Alloy Inspection Program manages cracking due to PWSCC for nickel alloy component locations. The overall goal of the program is to maintain plant safety and minimize the impact of PWSCC on plant availability through assessment, inspection, mitigation, and repair or replacement of susceptible components.

The staff notes that revisions to guidance concerning augmented inspection of pressure retaining nickel alloy welds is now codified in 10 CFR 50.55a(g)(6)(ii)(D) through (F). The staff additionally notes that the requirements in 10 CFR 50.55a(g)(6)(ii)(D) through (F) bound the recommendations contained in Revision 0 of the generic aging lessons learned (GALL) Report and all subsequent revisions. Based on these changes, the staff finds that meeting the elements of the commitment, as stated, are not sufficient to provide reasonable assurance that the aging of the components under consideration will be adequately managed. Alternatively, the staff finds that compliance with 10 CFR 50.55a(g)(6)(ii)(D) through (F) is sufficient to provide such assurance.

Commitment no. 31, item number (1) requires that evaluations of indications will be performed under the ASME Boiler & Pressure Vessel Code, Section XI program. By letter dated April 13, 2012 (ADAMS Accession No. ML12128A056) in response to the staff's current request for additional information (RAI) the licensee states "The Inspection Plan ... reflects the current industry and regulatory guidance for component inspections. This Plan is based on the known inventory of nickel alloy components in the systems subject to the rules of 10 CFR 50.55a." Since the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI, is incorporated by reference in 10 CFR 50.55a and the licensee is conforming to the requirements of 10 CFR 50.55a, the staff finds that the requirements of item number (1) have been satisfactorily fulfilled by the licensee.

Commitment no. 31, item number (2) requires that corrective actions for augmented inspections will be performed in accordance with repair and replacement procedures equivalent to those requirements in ASME Boiler & Pressure Vessel Code, Section XI. In response to the staff's current RAI, the licensee states "The Inspection Plan ... reflects the current industry and regulatory guidance for component inspections. This Plan is based on the known inventory of nickel alloy components in the systems subject to the rules of 10 CFR 50.55a." Since the ASME Code, Section XI, is incorporated by reference in 10 CFR 50.55a and the licensee is

conforming to the requirements of 10 CFR 50.55a, the staff finds that the requirements of item number (2) have been satisfactorily fulfilled by the licensee.

Commitment no. 31, item number (3) requires that RNP maintain its involvement in industry initiatives and systematically assess for implementation applicable programmatic enhancements, that are agreed upon between the NRC and the nuclear power industry to monitor for, detect, evaluate, and correct cracking in the VHP nozzles, specifically as the actions relate to ensuring the integrity of VHP nozzles in the RNP upper reactor vessel head during the extended period of operation. In response to the staff's current RAI, the licensee confirms that the current inservice inspection (ISI) program has incorporated the inspection of nickel alloy pressure retaining welds using ASME Code Cases N-722, N-729-1 and N-770-1, as required and conditioned by 10 CFR 50.55a(g)(6)(ii)(D) through (F). In addition, the industry initiative Materials Reliability Program (MRP) -227, "Pressurized Water Reactor Internals Inspection and Evaluation Guidelines," is being instituted by the industry, including the licensee. The staff therefore finds that the requirements of item number (3) have been satisfactorily fulfilled by the licensee.

Commitment no. 31, item number (4) states that the Nickel-Alloy Nozzles and Penetrations Program Inspection Plan will be submitted to the NRC for review and approval prior to July 31, 2009. The Nickel-Alloy Nozzles and Penetrations Program Inspection Plan was submitted by letter dated July 29, 2009, thus was timely submitted.

In response to the staff's RAI concerning Flux Thimble Eddy Current Inspections, the licensee provided trending data for the inner tube wear which shows that there is "no detectable indication" for the thimble tubes which have already been examined, except for G-07 in refueling outage (RO)-23 in September 2005, that was reported as "a residual non damage artifact, and not as a through wall wear indication." The staff notes that the Flux Thimble Eddy Current Inspection more appropriately belongs in the industry initiative MRP-227, an initiative that is being instituted by the licensee.

The staff notes that reactor vessel core support pad examination is not addressed in the Nickel-Alloy Nozzles and Penetrations Program Inspection Plan but will be included in the review of the industry initiative MRP-227, an initiative that is being instituted by the licensee¹. The staff finds this an acceptable method of managing degradation of these components.

4.0 CONCLUSION

As set forth above, the NRC staff determines that the licensee has satisfactorily complied with the four items contained in the H.B. Robinson Steam Electric Plant, Unit 2, License Amendment Application Commitment no. 31, "Nickel-Alloy Nozzles and Penetrations Program Inspection Plan." The staff concludes that the elements of Commitment no. 31, have been satisfactorily fulfilled and that the Nickel Alloy Inspection Plan provides reasonable assurance that aging of the components under consideration will be adequately managed.

Primary Contributor: Jay Wallace, NRR/DE

Date: June 7, 2012

¹ The staff notes that Table 4-1 in MRP-126 indicates that reactor vessel core support blocks are made of Alloy 600/82/182 material, but Table 3-3 in MRP-227 indicates that they are made of stainless steel. This inconsistency will be addressed in the review of the plant specific MRP-227 submission.

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Sincerely,

/RA/

Heather M. Jones, Project Manager
Subsequent Renewal, Guidance, and Operations
Branch

Division of License Renewal
Office of Nuclear Reactor Regulation

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ADAMS Accession No.: ML12167A144

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Letter to R. Gideon from H. Jones dated July 5, 2012

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