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

November 2, 2015

Mr. Robert Braun
President and Chief Nuclear Officer
PSEG Nuclear LLC – N09
P.O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION - RELIEF FROM THE REQUIREMENTS OF THE ASME CODE (CAC NO. MF5332)

Dear Mr. Braun:

By letter dated November 25, 2014 (Agencywide Documents Access and Management System Accession No. ML14329B337), PSEG Nuclear LLC (the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) for relief from certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV Code), Section XI requirements at Hope Creek Generating Station.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii) (retitled paragraph 50.55a(z)(2) by 79 FR 65776, dated November 5, 2014), the licensee requested to use an alternative on the basis that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The NRC staff has reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that PSEG Nuclear LLC has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Therefore, the NRC staff authorizes the proposed alternative at Hope Creek Generating Station for a period of time not to exceed the useful life of the existing valve seats.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject request for relief remain applicable, including the third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please contact the Project Manager, Thomas Wengert, at 301-415-4037 or Thomas.Wengert@nrc.gov.

Sincerely,

for

Douglas A. Broaddus, Chief
Plant Licensing Branch 1-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosure:
Safety Evaluation

cc w/enclosure: Distribution via Listserv

UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ALTERNATIVE REQUEST NO. HC-I3R-07 REGARDING ASME CODE, SECTION XI

TO PERMIT STATION AUXILIARY COOLING SYSTEM VALVES NOT IN

COMPLIANCE WITH THE CONSTRUCTION CODE TO REMAIN IN SERVICE

PSEG NUCLEAR LLC

HOPE CREEK GENERATING STATION

DOCKET NO. 50-354

1.0 INTRODUCTION

By letter dated November 25, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14329B337), PSEG Nuclear LLC (the licensee) requested relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV Code) to permit previously replaced station auxiliary cooling system (SACS) valves not meeting the requirements of the construction code to remain in service for the life of each valve seat at Hope Creek Generating Station (HCGS).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii) (retitled paragraph 50.55a(z)(2) by 79 FR 65776, dated November 5, 2014), the licensee requested relief from article IWA-4221(c) of Section XI of the ASME Code to permit the continued use of ASME Code Class 3 SACS cross-tie valves, which are not currently in compliance with the construction code (i.e., ASME Code, Section III, Table ND-4622.7), for the life of each valve seat on the basis that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 REGULATORY EVALUATION

Adherence to Article IWA-4221(c) of Section XI of the ASME Code is mandated by 10 CFR 50.55a(g)(4), which states, in part, that throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports), which are classified as ASME Code Class 1, Class 2, and Class 3, must meet the requirements, except design and access provisions and preservice examination requirements, as set forth in Section XI of editions and addenda of the ASME Code.

Section 50.55a(z) of 10 CFR 50.55a, "Alternatives to codes and standards requirements," states that alternatives to the requirements of paragraphs (b) through (h) of this section or portions

thereof may be used when authorized by the U.S. Nuclear Regulatory Commission (NRC). A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate:

(1) Acceptable level of quality and safety. The proposed alternative would provide an acceptable level of quality and safety; or

(2) Hardship without a compensating increase in quality and safety. Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in quality and safety.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request, and the NRC to authorize, the alternative requested by the licensee.

3.0 TECHNICAL EVALUATION

3.1 The Licensee's Alternative Request

Pursuant to 10 CFR 50.55a(a)(3)(ii) (retitled paragraph 50.55a(z)(2) by 79 FR 65776, dated November 5, 2014), HCGS requests relief from Article IWA-4221(c) of ASME Section XI requirements during the HCGS Third 10-year Inservice Inspection (ISI). As permitted by IWA-4221(c), replacement components may comply with later edition/addenda of the original construction code (e.g., ASME Section III). However, contrary to IWA-4221(c), four replacement ASME Class 3 valves certified as complying with ASME Section III, Subsection ND requirements were later found not to be in compliance with the post-weld heat treatment exemptions of Table ND-4622.1-1. The licensee proposes to continue service of the four cross connection valves that are not in compliance with the construction code (i.e., ASME Code, Section III, Table ND-4622.7). The specific valves are SACS to fuel pool cooling cross connection valves:

- H1EG -1EGV-544, S/N 1-11938-01, SACS to Fuel Pool Cooling cross connection valve;
- H1EG -1EGV-545, S/N 2-11938-01, SACS to Fuel Pool Cooling cross connection valve;
- H1EG -1EGV-546, S/N 3-11938-01, SACS to Fuel Pool Cooling cross connection valve; and
- H1EG -1EGV-547, S/N 4-11938-01, SACS to Fuel Pool Cooling cross connection valve.

The HCGS Third 10-Year ISI interval began on December 13, 2007, and is scheduled to end on December 12, 2017. The Code of Record for the Third 10-Year interval is the ASME Section XI, 2001 Edition through 2003 Addenda. The applicable code of construction for the valves listed above is ASME Section III, 1974 Edition through 1975 Summer Addenda and is applicable for this relief request.

The basis for the licensee's request is that replacing the four cross-tie valves would cause the station hardship. The hardship is associated with the total personnel exposure of approximately 452 millirem (mrem) that would be realized to replace the four valves. The licensee determined that the installed valves are capable of satisfactorily performing their function without the

application of the elevated preheat or post-weld treatment. Therefore, the required replacement of the valves does not support a corresponding increase in quality or safety.

The licensee used the Entergy Operations, Inc., request for relief for River Bend Station, Unit 1 (RBS) by letter dated August 19, 2013 (ADAMS Accession No. ML13239A074), as supplemented by letter dated October 17, 2013 (ADAMS Accession No. ML13295A421), as precedence for its request.

3.2 NRC Staff Evaluation

Prior to authorizing the proposed alternative under 10 CFR 50.55a(z)(2), the NRC staff must conclude that the technical information provided in support of the proposed alternative is sufficient to demonstrate that compliance with ASME Code, Section XI, IWA-4221(c) would result in a hardship or unusual difficulty and would not provide a compensating increase in the level of quality and safety when compared to the proposed alternative.

In considering the first condition of 10 CFR 50.55a(z)(2), the NRC staff reviewed the information provided by the licensee in support of the licensee's contention that replacement of the valves constitutes a hardship. The licensee presents hardship discussion in terms of dose exposure and station risk impact. The projected dose was calculated by projecting the time to replace the four valves – 273 person-hours, of which 113 person-hours would be in the field and multiplying the hours by the dose rate in the field of 4 mrem/hour (hr). The projected exposure would be 452 mrem. The NRC staff considered the potential exposure as hardship as satisfying the first condition of 10 CFR 50.55a(z)(2).

In considering the second condition of 10 CFR 50.55a(a)(z)(2), whether adherence to the ASME Code requirement would provide an increase in quality and safety commensurate with the hardship or unusual difficulty imposed by meeting the code requirement, the NRC staff evaluated the technical basis and supporting documentation for the proposed alternative of leaving the valves in place. The licensee's supporting documentation presented NRC staff evaluation for similar valves installed at RBS. To demonstrate applicability of the RBS safety evaluation (SE) to HCGS, a comparison between the valves installed at RBS and HCGS was performed.

	RBS	HCGS
Code of construction for valve	ASME Section III 1974, 1975 Addenda	ASME Section III 1974, 1975 Addenda
Valve manufacturer	Weir Valves and Controls Company USA (WVCC)	WVCC
Valve body material	SA216 WCB	SA216 WCB
Carbon equivalent of valve body (CEq)	0.37-0.43	0.38
Carbon content valve body	0.19-0.23	0.21
Seat ring material	ASTM A240-97 A 316	ASTM A240-97 A 316
Weld rod (WR)	ARCOS 309L-16	ARCOS 309L-16
WR Lot No.	9E24E-24A Used on 8-inch TRICENTRIC valve	9E24E-24A
WVCC weld procedure	90-61-009 Rev. 4	90-61-009 Rev. 4
WVCC weld method	Shielded metal arc welding (SMAW)	SMAW

RBS purchased and installed valves from WVCC. The valves installed at RBS experienced the same condition as discussed for HCGS WVCC valves. During fabrication, the welding process used to install P-Number 8 seats to P-Number 1 bodies of the subject valves did not fully comply with Table ND-4622.1-1 of the ASME Code, Section III. The base material was not preheated to 200 degrees Fahrenheit (minimum) as required by Table ND-4622.1-1 for exemption from post-weld heat treatment. RBS demonstrated that the installed valves are capable of satisfactory performance without the application of elevated preheat or post-weld heat treatment, and RBS further proposed to allow the valves to remain in service for the life of each valve seat. The NRC staff finds that valves installed at HCGS are bounded by the analysis performed by RBS, and therefore, as shown by RBS, a low level of risk and sufficient level of quality and safety are maintained. The RBS studies and tests also show that the expected heat affected zone properties would be adequate to meet the requirements for the installed valves, thus proving their continued use is acceptable and that replacement is an unnecessary hardship. The NRC staff has concluded that RBS could leave the installed valves in service without replacement as documented in the RBS SE dated January 28, 2014 (ADAMS Accession No. ML13353A608).

Based on the RBS SE and the similarity between RBS and HCGS valves, the NRC staff finds that the absence of the ASME Code-required preheat may lead to some degradation of the quality and safety of the subject valves; however, the amount of degradation is very minor. Therefore, replacement of the valves under consideration as required to achieve ASME Code compliance does not provide a compensating increase in the level of quality and safety when compared to the proposed alternative.

Based on the above analysis, the NRC staff concludes that the technical requirements of 10 CFR 50.55a(z)(2) have been met, and the licensee's proposal provides reasonable assurance of structural and leak tight integrity of the subject components. The NRC staff,

therefore, finds no technical basis that would preclude it from authorizing an alternative to Article IWA-4221(c), Section XI, ASME Code, as requested by the licensee.

4.0 CONCLUSION

As set forth above, the NRC staff determines that the proposed alternative provides reasonable assurance of structural and leak tight integrity of the subject components and that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Therefore, the NRC staff authorizes the proposed alternative at HCGS for a period of time not to exceed the useful life of the existing valve seats.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject request for relief remain applicable, including the third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: John Huang

Date: November 2, 2015

If you have any questions, please contact the Project Manager, Thomas Wengert, at 301-415-4037 or Thomas.Wengert@nrc.gov.

Sincerely,

/RA REnnis for/

Douglas A. Broaddus, Chief
Plant Licensing Branch 1-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosure:
Safety Evaluation

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