



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

June 2, 2014

Mr. Thomas Joyce  
President and Chief Nuclear Officer  
PSEG Nuclear LLC  
P.O. Box 236, N09  
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION – COMPLETION OF REVIEW OF THE  
IMPLEMENTATION OF LICENSE RENEWAL LICENSE CONDITIONS  
2.C.(27).b AND 2.C.(27).c (TAC NO. MF3537)

Dear Mr. Joyce:

By letter dated February 7, 2014,<sup>1</sup> PSEG Nuclear LLC (PSEG or the licensee) for the Hope Creek Generating Station (Hope Creek) submitted a report summarizing the results of the ultrasonic thickness measurements taken during Refueling Outage (RFO) 18 in accordance with Renewed Facility Operating License No. NPF-57, License Condition 2.C.(27).c.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the information in the licensee's letter, and based on this review, the NRC staff finds that the licensee has completed the actions required by license conditions 2.C.(27).b and 2.C.(27).c for RFO 18. The NRC staff review of the licensee's submittal is summarized in the enclosure to this letter. This completes the NRC staff efforts for TAC No. MF3537.

If you have any questions regarding this letter, please contact me at (301) 415-3100.

Sincerely,

A handwritten signature in black ink, appearing to read "John G. Lamb".

John G. Lamb, Senior Project Manager  
Plant/Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-354

Enclosure:  
As stated

cc: Distribution via ListServ

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<sup>1</sup> Agencywide Documents Access and Management System (ADAMS) Accession No. ML14038A014.

OFFICE OF NUCLEAR REACTOR REGULATION  
REVIEW OF INFORMATION PROVIDED AS REQUIRED BY  
LICENSE CONDITION 2.C.(27).c RELATED TO DRYWELL EXAMINATIONS  
PSEG NUCLEAR LLC  
HOPE CREEK GENERATING STATION  
DOCKET NUMBER 50-354

1.0 INTRODUCTION

By letter dated February 7, 2014,<sup>1</sup> PSEG Nuclear LLC (PSEG or the licensee) submitted a report summarizing the results of the ultrasonic thickness (UT) measurements taken during Refueling Outage (RFO) 18 for the Hope Creek Generating Station (Hope Creek) in accordance with Renewed Facility Operating License No. NPF-57, License Condition 2.C.(27).c.

2.0 BACKGROUND

Renewed Operating License No. NPF-57 for Hope Creek was issued on July 20, 2011 (ADAMS Accession No. ML11116A148). The renewed license contains several license conditions related to License Renewal and, in particular, to the Hope Creek drywell air gap drains. Some portions of these License Conditions were included in the RFO 17 scope and were addressed during the outage that began on April 13, 2012, and ended on May 9, 2012. The licensee continued investigations that were included in the RFO 18 scope and that were addressed during the outage that began on October 11, 2013, and ended November 10, 2013.

3.0 REGULATORY EVALUATION

Renewed Operating License NPF-57 for Hope Creek contains several license conditions, including License Condition 2.C.(27).c, which require UT measurements of the drywell shell.

Specifically, License Condition 2.C.(27) delineates those activities required to be performed following the establishment of drainage capability from the drywell air gap (that is, following completion of license condition 2.C.(26)) and reads as follows:

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<sup>1</sup> Agencywide Documents Access and Management System (ADAMS) Accession No. ML12228A388.

(27) After drainage has been established from the bottom of the air gap in all four quadrants, the licensee will:

- a. Submit a report to the NRC staff in accordance with 10 CFR 50.4 describing the final drain line configuration and summarizing the testing results that demonstrate drainage has been established for all four quadrants.
- b. Monitor penetration sleeve J13 daily for water leakage when the reactor cavity is flooded up. In addition, perform a walkdown of the torus room to detect any leakage from other drywell penetrations. These actions shall continue until corrective actions are taken to prevent leakage through J13 or through the four air gap drains.
- c. Perform UT measurements of the drywell shell between elevation 86'-11" (floor of the drywell concrete) and elevation 93'-0" (bottom of penetration J13) below penetration J13 area during the next three refueling outages. In addition, UT measurements shall be performed around the full 360 degree circumference of the drywell between elevations 86'-11" and 88'-0" (underside of the torus down comer vent piping penetrations). The results of the UT measurements will be used to identify drywell surfaces requiring augmented inspections in accordance with IWE requirements for the period of extended operation, establish a corrosion rate, and demonstrate that the effects of aging will be adequately managed such that the drywell can perform its intended function until April 11, 2046. Within 90 days of completion of each refueling outage, submit a report to the NRC staff in accordance with 10 CFR 50.4 summarizing the results from the UT measurements and if appropriate, corrective action.

#### 4.0 TECHNICAL EVALUATION

##### 4.1 License Condition 2.C.(27).a

The action required by License Condition 2.C.(27)a was completed and the results were submitted to the NRC in PSEG Letter No. LR-N12-0212 dated July 19, 2012 (ADAMS Accession ML12228A388). The NRC responded via a letter dated May 13, 2013 (ADAMS Accession No. ML13114A965).

##### 4.2 License Condition 2.C.(27).b

The licensee monitored the J13 penetration sleeve daily for leakage while the reactor cavity was flooded during RFO 18 (October 15 through October 31, 2013). Also, the licensee monitored the penetrations adjacent to penetration J13 (J19, J14, J29, J24, and J37, called the "J13 penetration group") and the air gap drains daily for water leakage. The licensee observed water at the 225 degree azimuth from the J13 penetration group (specifically the J19

penetration) as well as the excavated access tunnel located at 250 degree azimuth (credited air gap drain).

On October 17, 2013, the licensee identified leakage from penetration sleeve J19 at a leak rate of approximately 20 drops per minute (dpm). On October 18, 2013, the licensee observed approximately 20 dpm leakage coming out of the excavated access tunnel at 250 degree azimuth, in addition to the leakage from the J19 penetration sleeve, which had continued. The last recorded active leakage by the licensee from the 250 degree azimuth access tunnel was October 27, 2013. The last recorded leakage from penetration sleeve J19 by the licensee was October 31, 2013. The licensee concluded that the leakage observed during the RFO 18 was similar to that observed in RFO 17. The licensee observed that all leakage stopped when the reactor cavity was drained.

#### 4.3 License Condition 2.C.(27).c

The licensee performed the UT measurements prescribed by License Condition 2.C.(27)c during RFO 18. Based on the UT measurements, the licensee concluded that no corrosion is occurring on the drywell shell.

UT measurements were performed by the licensee on the drywell shell at the 225 degree azimuth between 86'-11" and 93'-0" elevation (below the J13 penetration group). The lowest UT measurements occurred on a plate below the J13 penetration group and measured 1.475" in RFO 16, 1.470" in RFO 17 and 1.471" in RFO 18. Comparing the lowest reading of 1.470" to the analysis limit of 1.4375" shows approximately 32.5 mils thickness margin remains.

UT measurements were also performed by the licensee for the full circumference of the drywell shell between elevations 86'-11" and 88'-0". The lowest UT measurements at the bottom of the drywell were 1.480" in RFO 16, 1.477" in RFO 17, and 1.471" in RFO 18. Comparing the lowest reading of 1.471" to the analysis limit of 1.4375" shows that approximately 33.5 mils thickness margin remains. If a corrosion rate of 6 mils per cycle were to be assumed, the analysis limit of 1.4375 would not be reached for at least 5 cycles. The UT measurements will be taken again during the RFO 19 outage to confirm that no corrosion is occurring in the drywell shell.

License Condition 2.C.(27)c requires these UT measurement activities for the three RFOs following establishment of drainage capability from the bottom of the drywell air gap. RFO 18 is the first of these outages. Therefore, the licensee will continue these UT measurement activities for the next two RFOs (RFO 19 and RFO 20).

The reactor cavity leakage is currently an ongoing investigation by the licensee. The licensee will perform additional investigatory actions during RFO 19 since the leakage only occurs while the reactor cavity is flooded.

## 5.0 CONCLUSION

Based on this review, the NRC staff concludes that the licensee has completed the actions required by License Conditions 2.C.(27).b and 2.C.(27).c for RFO 18 at Hope Creek. The results of the UT measurements demonstrate there are currently no drywell surfaces requiring augmented inspections in accordance with IWE requirements for the period of extended operation. This completes the NRC staff's review under TAC No. MF3537.

June 2, 2014

Mr. Thomas Joyce  
President and Chief Nuclear Officer  
PSEG Nuclear LLC  
P.O. Box 236, N09  
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION – COMPLETION OF REVIEW OF THE IMPLEMENTATION OF LICENSE RENEWAL LICENSE CONDITION 2.C.(27).c (TAC NO. MF3537)

Dear Mr. Joyce:

By letter dated February 7, 2014,<sup>2</sup> PSEG Nuclear LLC (PSEG or the licensee) for the Hope Creek Generating Station (Hope Creek), submitted a report summarizing the results of the ultrasonic thickness measurements taken during Refueling Outage (RFO) 18 in accordance with Renewed Facility Operating License No. NPF-57, License Condition 2.C.(27).c.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the information in the licensee's letter, and based on this review, the NRC staff finds that the licensee has completed the actions required by license conditions 2.C.(27).b and 2.C.(27).c for RFO 18. The NRC staff review of the licensee's submittal is summarized in the enclosure to this letter. This completes the NRC staff efforts for TAC No. MF3537.

If you have any questions regarding this letter, please contact me at (301) 415-3100.

Sincerely,

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John G. Lamb, Senior Project Manager  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-354

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OFFICIAL AGENCY RECORD

<sup>2</sup> Agencywide Documents Access and Management System (ADAMS) Accession No. ML14038A014.