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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Hope Creek Generating Station
Facility Operating License No. NPF-57
NRC Docket No. 50-354

Subject: LICENSE RENEWAL COMMITMENT IMPLEMENTATION

The Renewed Operating License No. NPF-57 for Hope Creek Generating Station was issued on July 20, 2011. The renewed license included several license conditions related to the ASME Section XI, Subsection IWE aging management program and, in particular, to the Hope Creek drywell air gap drains. License condition (26) requires that drainage capability from the bottom of the drywell air gap be established on or before June 30, 2015. Activities to establish or verify these drains were included in the scope of Refueling Outage (RF) 17 and were worked during the outage that began on April 13, 2012 and ended on May 9, 2012.

As required by the license condition, within 90 days of the completion of each refueling outage, a summary of the results for boroscopic examinations, ultrasonic thickness (UT) measurements, leakage detection from penetrations, and corrective actions are provided in the Attachment. The results demonstrate that the activities completed prior to and during the outage have confirmed the presence of four functional air gap drains in approximately equal quadrants, and therefore, satisfy license condition 2.C.26. Implementation activities required per license condition 2.C.27 will continue into the next refueling outage.

There are no additional regulatory commitments included in this correspondence.

If you have any questions or require additional information, please contact Paul Bonnett at 856-339-1923.

Sincerely,

FOR J.F. PERRY

John F. Perry
Site Vice President – Hope Creek

Attachment – Hope Creek Generating Station License Renewal Commitment Implementation 90 Day Report for Refueling Outage (RF)17

A142
NRR

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Attachment

Hope Creek Generating Station License Renewal Commitment Implementation 90 Day Report for Refueling Outage (RF) 17

1. Background

The Renewed Operating License No. NPF-57 for Hope Creek Generating Station was issued on July 20, 2011. The renewed license included several license conditions related to the ASME Section XI, Subsection IWE aging management program and, in particular, to the Hope Creek drywell air gap drains. License condition (26) requires that drainage capability from the bottom of the drywell air gap be established on or before June 30, 2015. Activities to establish or verify these drains were included in the scope of Refueling Outage (RF) 17 and were worked during the outage that began on April 13, 2012 and ended on May 9, 2012.

The relevant license conditions are contained in Section 2.C of the renewed license and read as follows:

(26) The licensee will establish drainage capability from the bottom of the drywell air gap on or before June 30, 2015. The licensee will divide the drywell air gap into four approximately equal quadrants. Drainage consists of one drain in each quadrant for a total of four drains. Each drain will be open at the bottom of the drywell air gap and be capable of draining water from the air gap.

Until drainage is established from all four quadrants, the licensee will perform the following actions each refueling outage:

a. Perform boroscope examination of the bottom of the drywell air gap through penetrations located at elevation 93'-0" in four quadrants, 90 degrees apart. The personnel performing the boroscope examination shall be certified as VT-1 inspectors in accordance with ASME Section XI, Subsection IWA-2300, requirements. The examiners will look for signs of water accumulation and drywell shell corrosion. Adverse conditions will be documented and addressed in the corrective action program.

b. Perform ultrasonic thickness (UT) measurements of the drywell shell between elevations 86'-11" (floor of the drywell concrete) and 93'-0" (bottom of penetration J13) below penetration J13 area. 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 shall be used to 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. Evidence of drywell shell degradation will be documented and addressed in the corrective action program.

c. 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.

d. 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 boroscope examinations, UT measurements, leakage detected from penetrations, and if appropriate, corrective action.

(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.

2. Summary of Commitment Implementation

This report satisfies license conditions 26d and 27a above and partially satisfies license condition 27c. The specific license conditions addressed and/or resolved during the Hope Creek RF17 Refueling Outage are as follows:

A. Air Gap Drain Functionality (License Condition 26 satisfied)

Activities performed prior to and during the RF17 Hope Creek refueling outage have confirmed that there are four functional drains from the air gap as described in Technical Evaluation 80106392 (DEH 120211).

In February, 2012, three drain pipes were boroscopically examined to confirm that they are clear and able to port any leakage into the air gap away from the drywell shell. These drain lines are located at azimuths 80, 160 and 340 degrees.

During the RF17 refueling outage, the excavated tunnel at the 250 degree azimuth was inspected to confirm that the tunnel was slopped such that it would port any leakage into the air gap away from the drywell shell (a second excavated tunnel at azimuth 120 degrees was also inspected and confirmed that it was sloped to port any leakage into the air gap away from the drywell). The minor leakage described below that was experienced during the outage confirmed that any leakage would flow away from the drywell. Cosmetic grout was added as necessary at both tunnels to ensure a continuous flow path for leakage.

As a result of these activities and the boroscopic examinations described in the next paragraph, the three drains and the tunnel at the 250 azimuth were declared functional drains to satisfy license condition 26. The tunnel at the 120 azimuth was also confirmed to be a functional drain. This satisfies the license condition to have functional drains in each of four approximately equal quadrants around the drywell air gap.

B. Boroscope Examinations (License Condition 26a satisfied)

The boroscopic examinations of the bottom of the drywell air gap through the penetrations located at elevation 93' in four quadrants, 90 degrees apart, were performed by certified VT-1 inspectors in accordance with ASME Section XI, Subsection IWA-2300 requirements (50144280). The videos have been reviewed to confirm there was no water evident at the bottom of the air gap.

Boroscopic examinations were also performed from the excavated tunnels horizontally around the bottom of the air gap to confirm the configuration of the intersection of the drain piping with the air gap. Two of the three drain pipes were examined (see Technical Evaluation 80106392) to confirm that the drains were functional and would port any leakage away from the drywell shell.

C. UT Measurements (License Condition 26b satisfied and License Condition 27c partially satisfied)

The UT measurements prescribed by this commitment were performed. No significant corrosion to the drywell shell is occurring.

The Ultrasonic Thickness (UT) measurements taken during RF16 were used as baseline readings and have no wall thinning as compared to the readings taken in RF17, it is not possible to calculate a plant-specific corrosion rate so industry data will be used. Three water samples were taken from the J13 and J14 penetration sleeves in RF16 and water samples were taken from J13 and J19 penetration in RF17 (no water was observed from the J14 penetration in RF17). The pH ranged from 8.3 to 8.5 in RF16 (Att. 1), and 8.1 in RF17, consistent with water flowing down bare concrete, and the water reaching the bottom of the drywell air gap would be similar. Water in this pH range (i.e. basic) has a lower potential to cause corrosion than acidic water. The outer surface of the drywell shell is coated with an inorganic zinc coating to prevent corrosion. The coating was noted in good condition during boroscope examinations around the penetrations, air gap bottom, and inspection of the tunnels. There is no observed corrosion occurring in the drywell shell.

UTs were performed in RF16 and RF17 for the full circumference along the junction of the concrete floor and the drywell shell. The bottom of the drywell air gap is on the other side of this junction. No notable or significant shell thinning was observed when compared to the UTs taken in RF16 to those from RF17.

UTs were also performed on the drywell shell at the 225 degree azimuth below the group of 6 penetrations (including penetrations J13 and J14). The lowest UT on the plate below the group penetrations was 1.475" in RF16 and 1.470 in RF17. Comparing these measurements to the analysis limit of 1.4375" proves that 37.5 mils thickness margin remained in RF16 (18 months ago) and the current margin (from UTs taken during RF17) is 32.5 mils thickness margin. At a conservative corrosion rate of 5 mils per cycle the analysis limit would not be reached for over 9 cycles. The actual design limit is below the analysis limit. It should be noted that the lower readings on this 1.5" plate could be due to either original construction tolerances or potential minor corrosion.

Therefore, there is no significant corrosion to the drywell shell below the J13 penetration sleeve at 225 degree azimuth due to periodic exposure to reactor cavity water. Additionally, reactor cavity water reaching the bottom of the drywell air gap is not causing significant corrosion to the drywell shell at the interface of the floor of the air gap and the drywell shell.

In accordance with the Hope Creek Renewed Facility Operating License Condition 2.C.27, UT thickness measurements will be taken of the drywell shell below the J13 penetration sleeve area and around the full 360 degree circumference of the drywell between elevations 86'-11" and 88'-0" for the three refueling outages following establishing drainage from the bottom of the air gap from all four drains. These UT measurements will be compared to the results of the previous UT inspections to determine if corrosion is ongoing and to determine a corrosion rate. In the event a significant corrosion rate is detected, the condition will be entered into the corrective action process.

D. Monitoring of J13 Penetration Sleeve (License Conditions 26c and 27b satisfied)

During RF17, the J13 penetration sleeve was monitored daily for water leakage while the reactor cavity was flooded up (April 17 through April 30, 2012). In addition, the penetrations adjacent to penetration J13, the three open air gap drains and the excavated construction tunnels at 250 degree azimuth and 120 degree azimuth were monitored daily for water leakage while the reactor cavity was flooded up.

Walkdowns were also performed in the Torus Room to confirm that there was no leakage from other penetrations.

During the walk downs following reactor cavity flood-up, water was observed leaking from penetration sleeves at 225 degree azimuth (the vicinity of the J13 penetration) and the excavated access tunnel located between 250 and 290 degree azimuths. On April 20 and 21, leakage was identified from penetration sleeve J13, the leak rate varied from 6 drops per minute to 10 drops per minute. This coincided with a slow leak noted coming from the air gap in the construction tunnel at 250 degree azimuth. No water was noted leaking from any other areas. From April 22 to April 25, there was no evidence of active leakage from the J13 area, the 250 degree azimuth tunnel or other various areas. On April 26th, approximately 4 drops per minute leakage was observed coming out of the J19 penetration sleeve (note: penetration J13, J14 and J19 are at the same elevation and are separated approximately 25 inches. Again, leakage from the J19 penetration area (225 degree azimuth, elevation 95'-3") coincided with noted moisture on the ledge at the entrance to the 250 degree azimuth tunnel.

No other leakage was observed from other air gap penetration sleeves, there was no sign of leakage from the end of the three drywell air gap drains (at 80, 160 and 340 degree azimuths) and there was no evidence of water leakage from the excavated tunnel at 120 degree azimuth. The Reactor Cavity to Drywell Seal Rupture Drain Alarm did not actuate. The leakage stopped when the reactor cavity was drained.

E. Corrective Actions

The activities required to be completed during RF17 were completed and satisfied the Hope Creek License Conditions as described above.

The reactor cavity leakage is an ongoing investigation. The first steps of this investigation were taken during RF17 by capping the reactor cavity drains prior to flooding up the reactor cavity. As noted above, some minor leakage through penetrations J13, J19 and J37 and from the excavated access tunnel at the 250 degree azimuth was observed while the reactor cavity was flooded in RF17. The maximum leakage noted was between 6 and 10 drops per minute. The leakage investigation activities will continue in RF18. Additional investigatory actions will be defined for RF18 since the leakage only occurs while the reactor cavity is flooded. While the reactor

cavity leakage continues to exist, the actions prescribed by License Conditions 27b and 27c will be performed.

3. Conclusion

All activities associated with Hope Creek renewed operating license conditions 2.C.26 and 2.C.27 that were required to be completed during the RF17 refueling outage were completed. Activities completed prior to and during the outage have confirmed the presence of four functional air gap drains thus satisfying license condition 2.C.26. Implementation activities required per license condition 2.C.27 will continue into the next refueling outage.