UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

April 15, 2014

Mr. George T. Hamrick
Site Vice President
Brunswick Steam Electric Plant
8470 River Road SE
Southport, NC 28461-0429

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT – NRC POST-APPROVAL SITE INSPECTION FOR LICENSE RENEWAL, INSPECTION REPORT 05000325/2014009

Dear Mr. Hamrick:

On March 13, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed a Post-Approval Site Inspection for License Renewal at your Brunswick Steam Electric Plant, Unit 1, in accordance with NRC Inspection Procedure (IP) 71003. The enclosed report documents the inspection results, which were discussed on March 13, 2014, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations, and with the conditions of your license. The inspectors reviewed selected procedures and records, observed plant activities, and interviewed personnel.

Based on the inspection sample selected for review, no findings were identified. The inspectors determined that the overall implementation of Aging Management Program activities reviewed during the Unit 1 refueling outage was consistent with the License Renewal commitments.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its Enclosure, and your response (if any), will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS),

accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

RA

Omar Lopéz-Santiago, Chief (Acting)
Engineering Branch 3
Division of Reactor Safety

Docket No.: 50-325
License No.: DPR-71

Enclosures:
NRC Post-Approval Site Inspection
For License Renewal, Inspection
Report 05000325/2014009
w/Attachment: Supplemental Information

cc: Distribution via ListServ

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X PUBLICLY AVAILABLE NON-PUBLICLY AVAILABLE SENSITIVE **X** NON-SENSITIVE

ADAMS: **X** Yes ACCESSION NUMBER: _____ **X** SUNSI REVIEW COMPLETE **X** FORM 665 ATTACHED

OFFICE	RII:DRS	RII:DRS	RII:DRS	RII:DRP		
SIGNATURE	RA	RA	RA	RA		
NAME	B.Collins	M. Coursey	O. Lopez-Santiago	G. Hopper		
DATE	4/15 /2014	4/15 /2014	4/15 /2014	4/15 /2014		
E-MAIL COPY	YES NO	YES NO	YES NO	YES NO		

OFFICIAL RECORD COPY DOCUMENT NAME: S:\DRS\ENG BRANCH 3\INSPECTIONS\WORKING DOCUMENTS\INPUTS\INPUTS 2014\BRUNSWICK U1 IP71003-PHASE 1 IR 2014-009.DOCX

U.S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No:	50-325
License No:	DPR-71
Report No:	05000325/2014009
Licensee:	Carolina Power and Light (CP&L)
Facility:	Brunswick Steam Electric Plant, Unit 1
Location:	8470 River Road, SE Southport, NC 28461
Dates:	March 10 – 13, 2014
Inspectors:	B. Collins, Reactor Inspector (Lead) M. Coursey, Reactor Inspector
Approved by:	Omar Lopéz-Santiago, Chief (Acting) Engineering Branch 3 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000325/2014009; March 10 – 13, 2014; Brunswick Steam Electric Plant, Unit 1; Post Approval Site Inspection for License Renewal, Phase 1.

The report covers an inspection conducted by two regional inspectors in accordance with NRC Manual Chapter 2515 and NRC Inspection Procedure 71003.

Based on the sample selected for review, the inspectors determined that commitments, license conditions, and regulatory requirements associated with the renewed facility operating license were met. The inspectors also determined that the licensee had administrative controls in place to ensure completion of pending actions scheduled both prior and during the period of extended operation (PEO).

The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG 1649, "Reactor Oversight Process," Revision 4, dated December 2006.

NRC-Identified and Self-Revealed Findings

None

Licensee-Identified Violations

None

REPORT DETAILS

4. OTHER ACTIVITIES

4OA5 Other Activities

.1 Post-Approval Site Inspection for License Renewal – IP 71003 (Phase 1)

a. Inspection Scope

(1) Implementation of License Conditions and Commitments, including Aging Management Programs

The inspectors reviewed a sample of license renewal activities scheduled for the Unit 1 spring 2014 refueling outage, which was the last outage prior to the period of extended operation (PEO). The inspectors selected this refueling outage because it would present the best opportunity to observe the majority of the one-time inspections associated with license renewal commitments. The inspection's objective was to maximize observations of the actual implementation of license renewal activities before the beginning of the PEO (September 9, 2016), and verify that the licensee completed the necessary actions to: (a) comply with the conditions stipulated in the renewed facility operating license; (b) meet the license renewal commitments described in NRC Safety Evaluation Report (SER) documented in NUREG-1856, publicly available under ADAMS under accession number ML043060411, and (c) meet the future inspection activities described in the Updated Final Safety Analysis Report (UFSAR) supplement submitted pursuant to 10 CFR 54.21(d). The license renewal application (LRA) for the Brunswick Steam Electric Plant is publicly available on ADAMS under accession number ML061730123/129.

The inspectors reviewed supporting documents; conducted interviews with licensee staff; observed in-process outage activities; and performed visual inspection of structures, systems, and components (SSCs) including those not accessible during power operation. The commitment items and Aging Management Programs (AMPs) selected for the inspection sample are summarized below based on their description in Appendix A of the LRA. The specific inspection activities conducted for each AMP are also described below. Specific documents reviewed are listed in the report attachment.

One-Time Inspection Program (UFSAR Chapter 18.A.1.1.15 and NRC SER Commitment Item 11)

Commitment Item 11 specified that the licensee would develop and implement a One-Time Inspection Program that uses one-time inspections to verify the effectiveness of various aging management programs and confirm the absence of various aging effects. The Program scope included Water Chemistry and Fuel Oil Chemistry verifications specified by NUREG-1801, as well as plant-specific inspections where inspection results could reasonably be extrapolated through the period of extended operation. Many of the one-time inspections the inspectors observed and/or reviewed were required by the

One-Time Inspection Program, but were accomplished through the management of other programs, described in the subsequent sections of this report.

The inspectors reviewed the licensing basis, implementing procedures, engineering evaluations, personnel qualifications, and relevant conditions to verify that the one-time inspection program was conducted as stated in the commitment. The inspectors also verified that for those one-time inspections which were not complete at the time of the inspection, the licensee had a plan in place to complete these inspections prior to the start of the PEO.

Buried Piping Program (UFSAR Chapter 18.A.1.1.17 and NRC SER Commitment Item 13)

Commitment Item 13 specified that the licensee would: develop and implement procedure requirements to ensure an appropriate inspection on as-found coating and material condition is performed whenever buried piping in the scope of the program is exposed, or as a minimum, once every 10 years; add precautions concerning excavation and use of backfill to the excavation procedure to include precautions for License Renewal piping; and add a requirement that coating inspections shall be performed by qualified personnel and that a coating engineer should assist in evaluation of any coating degradation noted during the inspection. These actions were intended to address loss of material due to general, pitting and crevice corrosion on buried carbon steel, stainless steel, and cast iron piping components.

The inspectors reviewed the licensing basis, implementing procedures, engineering evaluations, and relevant condition reports to verify that the buried pipe inspections were conducted as stated in the commitment. Additionally, the inspectors directly observed the inspection of a portion of recently-excavated service water piping (1-SW-494-12-046, Diesel Generator Jacket Water Cooler Service Water Supply Line) to verify that inspection procedures were followed and any adverse conditions found were entered in the licensee corrective action program and evaluated properly in accordance with the license renewal commitment.

Non-EQ Cable Inspections (UFSAR Chapter 18.A.1.1.25 and NRC SER Commitment Item 18)

Commitment Item 18 specified that accessible non-environmental qualification (EQ) electrical cables and connections installed in adverse localized environments would be visually inspected at least once every 10 years with the initial inspection being completed prior to the end of the initial operating license term. These inspections would confirm that changes in ambient conditions would not lead to age-related degradation of the cable jackets and connector coverings as a result of reduced insulation resistance and subsequent electrical failure.

The inspectors reviewed the licensing basis, implementing procedures, engineering evaluations, personnel qualifications, and relevant condition reports to verify that the non-EQ cable inspections performed during the spring 2014 outage were implemented as stated in the commitment.

Reactor Vessel and Internals Structural Integrity Program (UFSAR Chapter 18.A.1.1.30 and NRC SER Commitment Item 22)

Commitment Item 22 specified that the licensee would enhance the existing Reactor Vessel and Internals Structural Integrity Program by: incorporating augmented inspections of the top guide; establishing inspection criteria for the VT-3 examination of the Core Shroud Repair Brackets; revising the scope of the Program described in the UFSAR Supplement to state that the Program implements the Boiling Water Reactor Vessel Internals Project (BWRVIP) guidelines listed below; and revising the scope of the Program described in the UFSAR Supplement to manage aging issues associated with the Core Spray lines and spargers, the steam dryers and feedwater spargers, the core plate plugs, and the Access Hole Cover welds.

- BWRVIP-03, Reactor Pressure Vessel and Internals Examination Guidelines
- BWRVIP-18, BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines
- BWRVIP-25, BWR Core Plate Inspection and Flaw Evaluation Guidelines
- BWRVIP-26, BWR Top Guide Inspection and Flaw Evaluation Guidelines
- BWRVIP-27, BWR Standby Liquid Control System/Core Plate Delta-P Inspection and Flaw Evaluation Guidelines
- BWRVIP-38, BWR Shroud Support Inspection and Flaw Evaluation Guidelines
- BWRVIP-41, BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines
- BWRVIP-47, BWR Lower Plenum Inspection and Flaw Evaluation Guidelines
- BWRVIP-48, Vessel ID Attachment Weld Inspection and Flaw Evaluation Guidelines
- BWRVIP-49, Instrument Penetration Inspection and Flaw Evaluation Guidelines
- BWRVIP-74A, BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines for License Renewal
- BWRVIP-76, Core Shroud Inspection and Flaw Evaluation Guidelines
- BWRVIP-94, Program Implementation Guide
- BWRVIP-139, Steam Dryer Inspection and Flaw Evaluation Guidelines

The inspectors reviewed licensing basis documents, AMP administrative procedures, and implementing inspection procedures to verify that the program was developed as described in the LRA and the corresponding SER. Additionally, the inspectors reviewed final examination data sheets, and portions of the corresponding digital video disks (DVDs), for the Enhanced Visual Examination (EVT-1) of the Top Guide Grid Cell 26-15, to verify that the implementation of the program was in accordance with the established procedures, and consistent with the program attributes described in the in the licensing basis documents.

Flow-Accelerated Corrosion Inspection Program (UFSAR Chapter 18.A.1.1.5 and NRC SER Commitment Item 2)

Commitment Item 2 specified that prior to the PEO, the Flow Accelerated Corrosion (FAC) Program would be updated to include additional components potentially susceptible to FAC. The processes in the existing FAC Program would be used to evaluate and predict the susceptibility of piping to FAC using a computer model specifically developed for FAC analysis. The FAC model would predict FAC rates in piping, and calculates the time remaining until reaching the defined critical wall thickness. The detection of wall thinning would include various examination methods

such as Ultrasonic testing (UT), Radiographic testing (RT), and visual examinations. The enhanced examination methods and frequencies would be based on industry and plant specific operating experience as opposed to computer modeling. Examinations to detect erosion, erosion-corrosion, as well as FAC, would be performed as part of the existing Program on those additional components identified.

The inspectors reviewed licensing basis documents, AMP administrative procedures, and implementing inspection and test procedures to verify that the program was developed as described in the LRA and the corresponding SER. The inspectors directly observed the UT examination of 1-HD-35-24-D-4, a 24" elbow in the Heater Drains system. The inspectors also reviewed documentation associated with this inspection. The inspectors reviewed these activities to verify that the implementation of the program was in accordance with the established procedures and consistent with the program attributes described in the licensing basis documents.

Selective Leaching Inspection Program (UFSAR Chapter 18.A.1.1.16 and NRC SER Commitment Item 12)

Commitment Item 12 specified that the licensee would inspect components susceptible to selective leaching. The commitment specified that these inspections would be completed on a one-time, sampling basis, and that qualitative acceptance criteria would be developed prior to implementation of the inspections. The commitment stated that confirmation of selective leaching would be performed by metallurgical evaluation or other testing methods. The commitment stated that these inspections would be completed prior to entry into the PEO.

The inspectors reviewed licensing basis documents, AMP administrative procedures, and implementing inspection and test procedures to verify that the program was developed as described in the LRA and the corresponding SER. Additionally, the inspectors reviewed final examination data sheets for the several completed inspections to verify that the implementation of the program was in accordance with the established procedures, and consistent with the program attributes described in the in the licensing basis documents.

Inaccessible Medium Voltage Cables (UFSAR Chapter 18.A.1.1.27 and NRC SER Commitment Item 20)

Commitment Item 20 specified that the licensee would inspect in-scope, medium-voltage cables exposed to significant moisture and significant voltage. The commitment specified that these inspections would occur prior to the PEO and at least once every 10 years thereafter to provide an indication of the condition of the conductor insulation. The specific type of test performed will be determined prior to the initial test, and is to be a proven test for detecting deterioration of the insulation system due to wetting, such as power factor, partial discharge, polarization index, or other testing that is state-of-the-art at the time the test is performed. The commitment defined significant moisture as periodic exposures that last more than a few days (e.g., cable in standing water) and stated that periodic exposures that last less than a few days (e.g., normal rain and drain) are not significant. The commitment defined significant voltage is defined as being subjected to system voltage for more than 25% of the time. The inspectors verified that this program is consistent with the corresponding program described in NUREG-1801.

The inspectors reviewed licensing basis documents, AMP administrative procedures, and implementing inspection and test procedures to verify that the program was developed as described in the LRA and the corresponding SER. The inspectors reviewed the documentation associated with the inspection of E2 1-1C-AC8-52 Feeder Cable, 2B Circulating Water (CW) Pump, and the 2D CW Pump. The inspectors reviewed these activities to verify that the implementation of the program was in accordance with the established procedures and consistent with the program attributes described in the licensing basis documents.

(2) Review of Newly-Identified SSCs

This inspection requirement will be completed during the second implementation phase of inspection procedure 71003.

(3) Review of the Description of AMPs and Time-Limited Aging Analysis (TLAA) in the UFSAR Supplement

The review of the description of AMPs and TLAAs in the UFSAR supplement submitted pursuant 10 CFR 54.21(d) will be completed during the second implementation phase of inspection procedure 71003.

(4) Review of License Renewal Commitment Changes

As part of the review of license renewal commitments described in section 4OA5.1.a of this report, the inspectors reviewed license renewal commitment change documents to verify the licensee followed the guidance in NEI 99-04, “Guidelines for Managing NRC Commitment Changes,” for any change to the commitments, including their elimination. The inspectors verified that the licensee properly evaluated, reported, and approved where necessary, changes to license renewal commitments listed in the UFSAR in accordance with 10 CFR 50.59.

The inspectors also reviewed the licensee’s procedures for commitment revision to obtain reasonable assurance that future changes to (or elimination of) license commitments would follow the guidance in NEI 99-04, and would properly evaluate, report, and approve changes to license renewal commitments listed in the UFSAR in accordance with 10 CFR 50.59.

b. Findings

No findings were identified. The inspectors determined that the licensee met the license renewal commitments, license conditions, and applicable regulatory requirements for the inspection samples selected for review. The inspectors determined that the overall implementation of Aging Management Program activities reviewed during the Unit 1 spring 2014 refueling outage were consistent with the license renewal commitments. The inspectors also determined that the licensee had administrative controls in place to ensure completion of pending actions scheduled both prior and during the period of extended operation.

4OA6 Management Meetings

.1 Exit Meeting Summary

On March 13, 2014, the inspectors presented the inspection results to Mr. George T. Hamrick, Site Vice President, and other members of the licensee staff. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel:

R. Rich, License Renewal Implementation
J. Lane, License Renewal Implementation
C. Mallner, License Renewal Implementation
M. Turkal, Licensing/Regulatory Programs

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened

None

Opened and Closed

None

Closed

None

LIST OF DOCUMENTS REVIEWED

Procedures
0BNP-TR-013, Basis Document for Reactor Pressure Vessel and Internals, Rev. 07
0BNP-TR-018, Reactor Pressure Vessel and Internals Inspection Plan, Rev. 05
0BNP-TR-034, License Renewal Buried Piping and Tanks Inspection Program, Rev. 0
0BNP-TR-037, License Renewal Electrical Cables and Connections No Subject to 10 CFR 50.49 Environmental Qualification Requirements Aging Management Program, Rev. 0
0BNP-TR-043, License Renewal Flow Accelerated Corrosion Aging Management Program, Rev. 0
0BNP-TR-051, License Renewal Open Cycle Cooling Water System Aging Management Program, Rev. 0
0BNP-TR-057, License Renewal Reactor Vessel and Internals Structural Integrity Aging Management Program, Rev. 0
0ENP-15, Reactor Vessel and Structural Integrity Program, Rev. 11
0ENP-649, One Time Inspection Program, Rev. 5
0ENP-650, Selective Leaching Inspection Program, Rev. 8
0PT-90.1, Vessel Internal Component Remote Examinations, Rev. 38
AD-EG-ALL-1610, Flow Accelerated Corrosion Implementation, Rev. 0
AD-EG-ALL-1613, Buried piping Integrity Program Implementaion, Rev. 0
EGR-NGGC-0108, NGG Fleet Engineering Program: Cable Aging Management Program, Rev. 4
EGR-NGGC-0507, Cable Aging Management Program, Rev. 03
ESG0091N, Selective Leaching Inspection Training Guide, Rev. 2

MNT-NGGC-0024, Excavation and Backfill, Rev. 04
NDEP-0437, Manual Ultrasonic Examination Procedure for Ferritic Pipe Welds (PDI), Rev. 7
NDEP-0454, Digital Ultrasonic Thickness Measurement, Rev. 4
NDEP-1012, Gridding of Components for Flow Accelerated Corrosion (FAC), Rev. 10
PD-EG-ALL-1610, Flow Accelerated Corrosion Program, Rev. 0
REG-NGGC-0110, Regulatory Commitments, Rev. 4

Work Orders
1926457-01, Tan Delta Testing of 2-CW-2D-PMP-M Cable
2021748-05, Tan Delta Testing of 2-CW-2B-PMP-M
2041570-01, License Renewal Online Cable Inspections
2069402-01, License Renewal, Online Cable Inspections
2076276, Tan Delta Testing of E2-1C Feeder Cable
2101202-01, Unit 2 Refueling Outage Cable Aging Management Inspections
2119034, Buried Piping Inspection of 1-SW-494-12-46
2136421-01, Unit 1 Refueling Outage Cable Aging Management Inspections

Condition Reports
CR 523321, Selective Leaching of Valve 1-SW-V443
CR 566187, BNP License Renewal Selective Leaching Program Assessment
CR 674671, License Renewal One-Time Inspection Program
CR 674832, Buried Piping Program Observations from IP 71003 Phase 1

Other Documents
Applied Test Systems, Inc. Certificate of Compliance: Ultrasonic Reference Blocks (ATS Order No. G03-1331)
Brunswick March 2014 Outage Cable Inspection Summary (preliminary report), dated 3/5/2014
BSEP 12-0094, Letter from Annette Pope to U.S. Nuclear Regulatory Commission: “Report of 10 CFR 50.59 Evaluations and Commitment Changes,” dated August 15, 2012
Cable Replacement Guide Based Upon Tan Delta Testing of 2-CW-2B-PMP-M
Cable Replacement Guide Based Upon Tan Delta Testing of 2-CW-2D-PMP-M Cable
Cable Replacement Guide Based Upon Tan Delta Testing of E2-1C Feeder Cable
ESG0007N, Common ESP Training Guide, Rev. 04
GE Inspection Technologies Krautkrmaer Transducer Certification (SN 01BYT4)
Industrial Testing Laboratory Services, LLC Certificate of Qualification and Certification Summary (Matowitz)
Industrial Testing Laboratory Services, LLC Certificate of Qualification and Certification Summary (Pride)
L-14-002, Nuclear Generation Group Ultrasonic Linearity Report, dated 3/2/2014
Laboratory Testing, Inc. Certified Test Report, Ultragel II Couplant, dated 5/26/2011
NE-11-33-2, Brunswick Unit 1 Cable and Connection Inspection Summary Report, Rev. 0
NE-11-33-3, Brunswick Unit 2 Cable and Connection Inspection Summary Report, Rev. 0
Progress Energy Flow Assisted Corrosion Test Data Sheet (1-HD-35-24-D-4), dated 3-11-14
Progress Energy NDE Examiner Certification Review (Glesener)
Progress Energy NDE Examiner Certification Review (Michael)
Progress Energy Ultrasonic Testing NDE Certification Records (Malinowski)
Selective Leaching Inspection Form (1-DW-V205), dated 6/4/12
Selective Leaching Inspection Form (1-FP-V133), dated 8/19/13
Selective Leaching Inspection Form (1-FP-V305), dated 8/26/13
Selective Leaching Inspection Form (1-FP-V315), dated 8/26/13

Selective Leaching Inspection Form (1-FP-V329), dated 9/4/13
Selective Leaching Inspection Form (1-SWB-2D-2), dated 12/10/13
Selective Leaching Inspection Form (1-SW-V443), dated 3/12/12
Selective Leaching Inspection Form (2-FP-PW16), dated 8/1/13
Selective Leaching Inspection Form (2-FP-V133), dated 8/19/13
Selective Leaching Inspection Form (2-FP-V284), dated 2/3/14
Selective Leaching Inspection Form (2-FP-V302), dated 9/30/2013
Selective Leaching Inspection Form (2-FP-V305), dated 10/01/13
Selective Leaching Inspection Form (2-FP-V451), dated 8/19/13
Selective Leaching Inspection Form (2-FP-V5), dated 3/6/13
Selective Leaching Inspection Form (2-FP-V92), dated 7-31-13