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10 CFR 50.55a

SERIAL: BSEP 02-0102

U. S. Nuclear Regulatory Commission
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BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 1
DOCKET NO. 50-325/LICENSE NO. DPR-71
INSERVICE INSPECTION PROGRAM FOR THE THIRD 10-YEAR INTERVAL -
EVALUATION OF LEAKAGE AT BOLTED CONNECTIONS

Ladies and Gentlemen:

In accordance with subparagraph IWB-3144(b) of the 1989 Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Carolina Power & Light (CP&L) Company is submitting the enclosed evaluations, for the Brunswick Steam Electric Plant (BSEP), Unit No. 1, of leakage identified at ASME Class 1 bolted connections.

The third 10-year Inservice Inspection (ISI) Program is based on the 1989 Edition of the ASME Code, Section XI. By letter dated August 7, 2000 (i.e., Serial: BSEP 00-0086), CP&L submitted a request for relief, designated as Relief Request RR-17, Revision 4, *Leakage at Bolted Connections*. The submittal requested relief from the requirements of subparagraph IWA-5250(a)(2) of the ASME Code, Section XI. As an alternative, CP&L proposed to follow the requirements of ASME Code case N-566-1, *Corrective Action for Leakage Identified at Bolted Connections Section XI, Division 1*. By letter dated January 3, 2001, the NRC approved Relief Request RR-17, Revision 4.

Subparagraph IWB-3144(b) requires that evaluation analyses of examination results for the affected components be submitted to the regulatory authority having jurisdiction at the plant site. The evaluations of the examination results for leakage at bolted connections identified during BSEP, Unit 1 Refueling Outage 14 are documented in the enclosed integrity disposition data sheets for Class 1 pressure retaining bolting.

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Please refer any questions regarding this submittal to Mr. Leonard R. Beller, Supervisor - Licensing/Regulatory Programs, at (910) 457-2073.

Sincerely,

A handwritten signature in black ink, appearing to read "E T O'Neil". The signature is written in a cursive, somewhat stylized font.

Edward T. O'Neil
Manager - Regulatory Affairs
Brunswick Steam Electric Plant

WRM/wrm

Enclosure: Integrity Disposition Data Sheets for Class 1 Pressure Retaining Bolting

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cc (with enclosure):

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Integrity Disposition Data Sheet For Class 1 Pressure Retaining Bolting

Refueling Outage: B114R1

Date: 03/24/02

OPT-80.1, Figure 9

The following leakage was found during OPT-80.1, RPV Pressure Test

1. Location and description of bolted connection leakage:
1B32-F031A, Recirc. Loop A, Discharge Valve, DW, El. 14', Az. 111. The valve was observed leaking 60 drops per minute from the body to bonnet bolted connection.
2. References:
 - System P&Ids – D25018-1A/1B, D25048-2A/2B
 - Foreign Print – 5364
 - Tech Manual – 50274
3. Number and age of bolts:
28 studs and nuts greater than 12 years old
4. Bolt and component material
 - Body to bonnet studs – A193 grade B7
 - Bonnet nuts – A194 grade 8
5. Corrosiveness of the process fluid that is leaking:
The process fluid for the above bolted connections is reactor coolant. Reactor coolant is demineralized water with hydrogen and zinc addition. As such, the coolant is slightly acidic, having an almost neutral pH. With the loss of the hydrogen addition, the pH of the coolant will become more acidic. Since interruptions of the hydrogen addition are infrequent, the corrosiveness of the reactor coolant is minimal because of its generally neutral environment.

In summary, the susceptibility of the bolting to corrosion because of the reactor coolant leakage is minimal. As such, the integrity of the bolted connection will not be compromised.
6. System function of the leaking bolted connection:
Recirc discharge valve closes to isolate the loop on a LOCA ECCS signal to prevent LPCI flow diversion, pressure retaining boundary, isolation for pump and valve maintenance.
7.

<u>Leakage History</u>	<u>Corrective Action</u>
B112R1 - 1/8" continuous stream, body to bonnet	Seal during heatup
B113R1 - no leakage found	NA
B114R1 – 60 dpm, body to bonnet	Seal during heatup

Evaluation

The inspection results (VT-2) indicated the "as found" condition of the bolting was acceptable. The 60 dpm leakage identified for this bolted connection is insignificant and will seal up during the plant heatup and operations, as has been shown for other similar valves located in the DW on the Recirc system. No corrective action is required for this condition.

System Engineer: _____

Date: 5/13/02

Integrity Disposition Data Sheet For Class 1 Pressure Retaining Bolting

Refueling Outage: B114R1

Date: 03/24/02

OPT-80.1, Figure 9

The following leakage was found during OPT-80.1, RPV Pressure Test

1. Location and description of bolted connection leakage:
1B32-F023B, Recirc. Loop B, Suction Valve, DW, El. 5', Az. 315. The valve was observed leaking 120 drops per minute from the body to bonnet bolted connection.
2. References:
 - System P&Ids – D25018-1A/1B, D25048-2A/2B
 - Foreign Print – 5364
 - Tech Manual – 50274
3. Number and age of bolts:
28 studs and nuts greater than 12 years old
4. Bolt and component material
 - Body to bonnet studs – A193 grade B7
 - Bonnet nuts – A194 grade 8
5. Corrosiveness of the process fluid that is leaking:
The process fluid for the above bolted connections is reactor coolant. Reactor coolant is demineralized water with hydrogen and zinc addition. As such, the coolant is slightly acidic, having an almost neutral pH. With the loss of the hydrogen addition, the pH of the coolant will become more acidic. Since interruptions of the hydrogen addition are infrequent, the corrosiveness of the reactor coolant is minimal because of its generally neutral environment.

In summary, the susceptibility of the bolting to corrosion because of the reactor coolant leakage is minimal. As such, the integrity of the bolted connection will not be compromised.
6. System function of the leaking bolted connection:
Recirc suction valve is a seal in open and close type valve. The valve is interlocked with its associated pump such the valve must be fully open to start the loop's Recirc pump, pressure retaining boundary, isolation for pump and valve maintenance.
7.

<u>Leakage History</u>	<u>Corrective Action</u>
B112R1 - no leakage found	NA
B113R1 - no leakage found	NA
B114R1 – 120 dpm, body to bonnet	Seal during heatup

Evaluation

The inspection results (VT-2) indicated the "as found" condition of the bolting was acceptable. The 120 dpm leakage identified for this bolted connection will seal up during the plant heatup and operations as has been shown for other similar valves located in the DW on the Recirc system. Work order 234972 was generated to verify seal during heatup.

System Engineer: _____

Date: _____

5/7/02

Integrity Disposition Data Sheet For Class 1 Pressure Retaining Bolting

Refueling Outage: B114R1

Date: 03/24/02

OPT-80.1, Figure 55B/55D

The following leakage was found during OPT-80.1, RPV Pressure Test

1. Location and description of bolted connection leakage:

- 1-B11-CRD (14-19) Control Rod Drive Assembly, DW, El. 23', Az. 000, 16 dpm
- 1-B11-CRD (22-47) Control Rod Drive Assembly, DW, El. 23', Az. 000, 30 dpm
- 1-B11-CRD (22-23) Control Rod Drive Assembly, DW, El. 23', Az. 000, steady stream
- 1-B11-CRD (42-35) Control Rod Drive Assembly, DW, El. 23', Az. 000, 8 dpm

2. References:

- GE Dwg. 36242107A
- FP-05920
- GE Memo date August 3, 1993, Control Rod Drive Flange Leakage Guidelines

3. Number and age of bolts:

Each flange contains eight cap screws. Since the cap screws are replaced every time a CRD mechanism is replaced or rebuilt, the service age will vary. However, all cap screws were replaced between 1991 and 2001. As such, the service age will be assumed to twelve years.

4. Bolt and component material

- Cap screws – SA-193 grade B7 (AISI 4140) Approval per SEEF 94-0009
- Flanges – SA-182, F304 per GE Spec. 22A6485

5. Corrosiveness of the process fluid that is leaking:

The process fluid for the above bolted connections is reactor coolant. Reactor coolant is demineralized water with hydrogen and zinc addition. As such, the coolant is slightly acidic, having an almost neutral pH. With the loss of the hydrogen addition, the pH of the coolant will become more acidic. Since interruptions of the hydrogen addition are infrequent, the corrosiveness of the reactor coolant is minimal because of its generally neutral environment.

In summary, the susceptibility of the bolting to corrosion because of the reactor coolant leakage is minimal. As such, the integrity of the bolted connection will not be compromised.

6. System function of the leaking bolted connection:

Insert and withdrawal of the control rod blades for reactivity control. Pressure retaining boundary.

7. Leakage History

Typically, there are several CRD assemblies, which exhibit leakage during a RPV hydro. Leakage has not been observed on the above CRDs during the past 2 outages, B112R1 or B113R1.

Evaluation

The inspection results (VT-2) indicated the "as found" condition of the bolting (screws) was acceptable. The CRDs routinely exhibit leaking flange connections during a RPV pressure test. CP&L has established guidelines that follow the general guidance specified in the GE Memo dated August 3 1993, for system manipulations to reduce leakage flow to less than 30 dpm. Control Rod B11-CRD (22-23) was scrambled and inspection found zero leakage. The remaining CRDs above are expected to seal during heatup.

System Engineer: _____

Date

5/7/02

Integrity Disposition Data Sheet For Class 1 Pressure Retaining Bolting

Refueling Outage: B114R1

Date: 03/24/02

OPT-80.1, Figure 19/23/31

The following leakage was found during OPT-80.1, RPV Pressure Test

1. Location and description of bolted connection leakage:
IB21-F028A, MSIV Outboard Valve, RB, EI.020, WW – 5dpm
IB21-F028B, MSIV Outboard Valve, RB, EI.020, WW – 1dpm
IB21-F028D, MSIV Outboard Valve, RB, EI.020, WW – 5 dpm
2. References:
 - System P&Ids – D25021-1A
 - Foreign Print – 5364
 - Tech Manual – 50274
3. Number and age of bolts:
28 studs and nuts greater than 12 years old per valve
4. Bolt and component material
 - Body to bonnet studs – ASTM 540 grade B23
 - Body to Bonnet nuts – A194 grade 8
5. Corrosiveness of the process fluid that is leaking:
The process fluid for the above bolted connections is reactor coolant. Reactor coolant is demineralized water with hydrogen and zinc addition. As such, the coolant is slightly acidic, having an almost neutral pH. With the loss of the hydrogen addition, the pH of the coolant will become more acidic. Since interruptions of the hydrogen addition are infrequent, the corrosiveness of the reactor coolant is minimal because of its generally neutral environment.

In summary, the susceptibility of the bolting to corrosion because of the reactor coolant leakage is minimal. As such, the integrity of the bolted connection will not be compromised.

6. System function of the leaking bolted connection:
MSIVs fail closed on a variety of primary containment isolation signals, pressure retaining boundary, and valve maintenance.
7.

<u>Leakage History</u>	<u>Corrective Action</u>
B112R1	
• B21-F028A – body to bonnet (10dpm)	Adjusted
• B21-F028B – body to bonnet (10dpm)	Adjusted
• B21-F028D – body to bonnet (5dpm)	Adjusted
B113R1	
• B21-F028A – body to bonnet (3dpm)	Seal after startup
• B21-F028B – body to bonnet (5dpm)	Seal after startup
• B21-F028D – body to bonnet (1dpm)	Seal after startup
B114R1	
• B21-F028A – body to bonnet (5dpm)	Seal after startup
• B21-F028B – body to bonnet (1dpm)	Seal after startup
• B21-F028D – body to bonnet (5dpm)	Seal after startup

Evaluation

The inspection results (VT-2) indicated the “as found” condition of the bolting was acceptable. The three observed leaks with the rates of 1 to 5 dpm is considered insignificant and will seal up during plant heatup and operations, as have been shown previously by plant history. No corrective action is required.

System Engineer: Bob Stanley Date 7 MAY 2002