



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W.  
ATLANTA, GEORGIA 30303

Report Nos.: 50-325/84-09 and 50-324/84-09

Licensee: Carolina Power and Light Company  
411 Fayetteville Street  
Raleigh, NC 27602

Docket Nos.: 50-325 and 50-324

License Nos.: DPR-71 and DPR-62

Facility Name: Brunswick 1 and 2

Inspection at Brunswick site near Southport, North Carolina

Inspector: J. L. Coley

5/9/84  
Date Signed

Approved by: J. J. Blake  
J. J. Blake, Section Chief  
Engineering Branch  
Division of Reactor Safety

5/9/84  
Date Signed

SUMMARY

Inspection on April 16-20, 1984

Areas Inspected

This routine unannounced inspection involved 30 inspector-hours on site in the areas of independent inspection effort, inservice inspection (ISI) review of procedures, ISI observation of work and work activities, IE Bulletins, and previous enforcement items.

Results

Of the five areas inspected, no violations or deviations were identified.

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*C. Dietz, General Manager - Brunswick Nuclear Project
- \*B. Hinkley, Manager-Technical Support
- \*J. Chase, Manager-Operations
- \*C. Treubel, Acting Manager-Maintenance
- \*M. Hill, Manager-Technical & Administrative Support
- \*W. Dorman, Supervisor-Quality Assurance
- \*R. Poulk, Senior NRC Regulatory Specialist
- \*L. Wheatley, ISI Coordinator

Other licensee employees contacted included construction craftsmen, technicians, operators, mechanics, security force members and office personnel.

#### Other Organizations

Southwest Research Institute (SwRI), J. Ingamells, Project Leader  
SwRI, S. Todd, ISI Team Leader, Mechanized (UT)  
SwRI, R. Trude, ISI Team Leader, Piping (UT)  
General Electric (GE), L. Reaves, Supervisor  
GE, J. Brigg, Level III Examiner  
GE, T. Brickman, Level II Examiner

#### NRC Resident Inspector

- \*D. Myers, Senior Resident Inspector

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on April 20, 1984, with those persons indicated in paragraph 1 above. The licensee acknowledged the inspection findings.

### 3. Licensee Action on Previous Enforcement Matters

(Closed) Violation 50-324, 325/83-02-01, "Failure to Retain ISI Calibration Block for Recirculation System Safe-End Inspection."

CP&L's letter of response dated March 14, 1983, has been reviewed and determined acceptable by Region II. The licensee has requested one deviation from their initial response in that, a separate building will not be constructed as proposed to house the calibration blocks. The licensee has been satisfied with the controls imposed on the handling of these blocks

since the above mentioned violation. The controls consisted of a locked room for issued and storage of the calibration blocks. The room also has shelves with each block's identification and location designated and a sign-out system for control. The inspector has monitored the licensee's control of calibration blocks during several inspections and is satisfied with the controls presently invoked. This item is considered closed.

(Closed) Unresolved Item 325/83-02-02, "Revised Response to IE Bulletin 82-03 Required."

As a result of a review performed by this inspector and CP&L of the Brunswick Steam and Electric Plant's reply to IE Bulletin 82-03, several errors were revealed. These errors consisted of the following:

- (1) The percent carbon content used for the stress rule index calculations were for Unit 2, not Unit 1. This error was due to the vendor confusing Unit 1's higher docket number with Unit 2's. However, the IGSCC susceptibility ranking was different for the two units and the sample selected may change.
- (2) The licensee's reason for selection of welds to be inspected in accordance with IE Bulletin 82-03 was incorrect. The bulletin response indicated some of the samples were selected because of NUREG-0313 requirements. NUREG-0313 deals with piping designated "service sensitive" and Bulletin 82-03 deals with piping that is "non-service sensitive." However, specific service sensitive welds are included in the sample because they have a history of IGSCC not because of NUREG requirements.
- (3) Editorial errors
- (4) Sample size had to be increased.

CP&L's revised response dated February 7, 1983, to the above concerns has been reviewed and determined to be acceptable by Region II this item is considered closed.

#### 4. Unresolved Items

Unresolved items were not identified during this inspection.

#### 5. Independent Inspection Effort - (92706B) (Unit 2)

The inspector conducted a general inspection of each level of the Unit 2 containment and included the high pressure core injection room, the reactor core isolation cooling room, the north reactor heat removal room, and the torus. In addition to the above, the inspector also inspected the mainsteam isolation pit, feedwater heater room B, and the turbine building. The purpose of the inspection was to observe welding activities, Class 1 and 2 piping and component ISI activities, and other modification work in these areas. The inspector was particularly impressed with CP&L's progress in the

past six months in planning, staging, and execution of outage activities. In addition, housekeeping, care and preservation of equipment, training, personnel attitude, CP&L's cognizance of vendor personnel, and production appeared to be excellent.

Within the areas examined, no violations or deviations were identified.

6. Inservice Inspection - Review of Procedures (73052B) (Unit 2)

The inspector reviewed the following procedures to ascertain whether the licensee's procedures pertaining to the inservice inspection are consistent with regulatory requirements and licensee commitments. The applicable Code for the ISI activities is the ASME B&PV Code, Section XI (77S78);

<u>Vendor</u>	<u>Procedure No.</u>	<u>Title</u>
SwRI	SwRI-NDT-600-41, Revision 4	Manual Ultrasonic Examination of Ferritic Pressure Piping Welds
SwRI	SwRI-NDT-700-6, Revision 17	Mechanized Ultrasonic Examination of Ferritic Vessels Greater than 2.0 inches in thickness
SwRI	SwRI-NDT-300-1, Revision 23	Dry Powder Magnetic Particles Examination
GE	UT1.36, Revision 0	Procedure for Ultrasonic Examinations in Heat Exchangers

a. Each of the above listed ultrasonic procedures were reviewed for technical adequacy and to ascertain whether the procedures contain the following pertinent information:

- (1) The type of apparatus to be used including frequency range as well as linearity and signal attenuation accuracy requirements is specified.
- (2) The extent of coverage (beam angles, scanning surface, scanning rate and directions) as well as the scanning techniques are specified and are consistent with the ASME Code.
- (3) Calibration requirements, methods and frequency including type, size, geometry and material of calibration blocks as well as location and size of calibration reflectors within the block are clearly specified and consistent with the applicable ASME Code.
- (4) The sizes and frequencies of search units are specified and are consistent with the ASME Code.

- (5) Beam angle or angles are specified and are consistent with the ASME Code.
  - (6) Methods of compensation for the distance traversed by the ultrasonic beam as it passes through the material including distance - amplitude correction curves, electronic distance - amplitude correction and transfer mechanisms, if used, are specified and are consistent with the ASME Code.
  - (7) Reference reflectors for accomplishing transfer and the frequency of use of transfer mechanisms, if applicable, are specified and in accordance with ASME Code.
  - (8) The reference level for monitoring discontinuities is defined and the scanning gain setting specified and that these values are in accordance with the ASME Code.
  - (9) Methods of demonstrating penetration are established.
  - (10) Levels or limits for evaluation and reporting of indications are specified and are in accordance with ASME Code, Section XI.
  - (11) Method of recording significant indications is established and the reporting requirements are in accordance with licensee requirements.
  - (12) Acceptance limits are specified or referenced and are in accordance with the ASME Code, Section XI.
- b. SwRI procedure No. SwRI-NDT-300-1, Revision 23, for dry powder magnetic particles examination was reviewed to ascertain whether the procedure contained the following information:
- (1) Examination is to be done by the continuous method (current on while particles are being applied) and adequate material surface preparation is specified.
  - (2) If dry particles are used, the particle color provides good contrast with background and component surface temperature is less than 600°F.
  - (3) Examination is conducted with sufficient overlap to achieve 100% coverage, and two separate examinations are made with field directions perpendicular to each other.
  - (4) If Yoke method is used, pole spacing is within 3-6 inches and minimum lifting power is 10 lbs. for alternating current and 40 lbs. for direct current.
  - (5) Acceptance criteria are specified or referenced and are consistent with the applicable ASME Code Section.

Within the areas examined, no violations or deviations were identified.

7. Inservice Inspection - Observation of Work and Work Activities (73753B)  
(Unit 2)

The inspector observed ISI work and work activities to ascertain whether the inservice inspection of class 1 and 2 pressure retaining components were performed in accordance with regulatory requirements and licensee's commitments. The applicable code for the examinations is delineated in paragraph 6 above.

- a. The inspector reviewed the licensee's inservice inspection plans and schedules for the completion of work for the first 10 year interval and to ascertain whether component examinations meet the Technical Specifications, ASME Code Section XI and the ISI program accepted by the NRC. The inspector also reviewed the qualifications and certifications of the GE and SwRI examiners performing the examinations and evaluations.

The qualification and certification records were reviewed specifically to ascertain whether the certification records properly reflected the following:

- (1) Employee's name
- (2) Person certified
- (3) Activity qualified to perform
- (4) Level of certification
- (5) Effective period of certification
- (6) Signature of individual certifying title and level
- (7) Basis used for certification, such as the required number of training hours, etc., for the respective NDE method.
- (8) Annual visual acuity and color vision examination and periodic recertification.

- b. The inspector observed the ultrasonic examinations listed below to determine whether the following requirements were being met:

- (1) Approved NDE procedures were available, were being followed and specified NDE equipment was being used.
- (2) NDE examination personnel were knowledgeable of examination method and operation of NDE equipment.

- (3) NDE examination personnel with proper level of qualification and certification were performing the various examinations activities including designation of NDE method/technique to be used, equipment calibration, examination, and interpretation/evaluation/acceptance of test results.
- (4) Examination results, evaluation of results, and any corrective actions/repairs/replacements were being recorded as specified in the ISI program and NDE procedures.

Examinations of the following were observed:

<u>Vendor</u>	<u>Weld No.</u>	<u>Scans</u>
SwRI	RPV-Shell 1-2 Weld No. DA	Mechanized-Circumferial Weld, Scanned 28.6" in Clockwise Direction
SwRI	RPV-Shell 1-2 Weld No. DB	Mechanized-Circumferial Weld, Scanned 28.6" in Clockwise Direction
SwRI	RPV-Shell 1-2 Weld No. DC	Mechanized-Circumferial Weld, Scanned 28.6" in Clockwise Direction
SwRI	RPV-Shell 1 Weld No. E-1B	Mechanized-Vertical Weld, Parallel Direction
SwRI	RPV-Shell 1 Weld No. E-1B	Mechanized-Vertical Weld, Transverse Scan
SwRI	RPV-Shell 3 Weld No. E-3B	Mechanized-Vertical Weld Transverse Scan
GE	2-EII-HX-2A-SW-N4	Manual 45° Scans, Nozzle to Shell Weld
GE	2-EII-HX-2A-SW-C3	Manual 45° Scans, Lower Shell Weld

The following specific attributes were also verified for the welds listed above:

- The type of apparatus used, including frequency range as well as linearity and signal attenuation accuracy
- The extent of coverage (beam angles, scanning surface, scanning rate and directions) as well as the scanning technique

- Calibration, methods and frequency including the type, size, geometry and material of identified calibration blocks as well as location and size of calibration reflectors within the block are clearly determined and recorded.
  - The sizes and frequencies of search units
  - Beam angles or angles
  - Methods of compensation for the distance traversed by the ultrasonic beam as it passes through the material including distance - amplitude correction curves, electronics distance - amplitude correction
  - The reference level for monitoring discontinuities was as defined and the scanning gain setting was as specified
  - Methods of demonstrating penetration
  - Levels or limits for evaluation and recording of indications
  - Method of recording significant indications
  - Acceptance limits are determined
  - The test examination permits continuous observation of scanning pattern to achieve 100% volumetric coverage of welds and base metal sections designated for examination (automatic scanning)
  - There was a continuous recording of meaningful and reproducible data with accurate orientation to the reference points (automatic scanning)
  - The initial unit calibration, examination block calibration, and subsequent calibrations were being done in accordance with instruction manual and/or program procedure (automatic scanning).
- c. The inspector observed SwRI perform magnetic particles examination of the following piping welds in the RCIC Room:

<u>Weld No.</u>	<u>Configuration</u>
E11-RHR-20" A Suction #12	Pipe to Valve
E11-RHR-20" A Suction #11	Flute Head to Pipe

The inspector verified the following procedure requirements were being adhered to:

- (1) Examination by the continuous method (current on while particles are being applied) with adequate material surface preparation



- (2) When dry particles are used, the particle color provides good contrast with background and component surface temperature is less than 600°F.
- (3) Examination is conducted with sufficient overlap to achieve 100% coverage and two separate examinations are made with field directions perpendicular to each other.
- (4) When Yoke method is to be used, pole spacing is within three of six inches and minimum lifting power is 10 lbs. for alternating current and 40 lbs. for direct current.

Within the areas examined, no violations or deviations were identified.

8. IE Bulletins (92703B) (Units 1 and 2)

(Closed) IEB No. 84-01 "Cracks in Boiling Water Reactor Mark I Containment Vent Headers". On February 3, 1984, a through wall crack was discovered in the vent header at Hatch Unit 2. IE Bulletin 84-01 was issued which suggested that operating BWR plants with Mark I type containments, which Brunswick is one, should review their plant data on differential pressure between the wetwell and drywell for anomalies that could be indicative of cracks. The licensee informed the resident inspectors that they had reviewed history copies of procedures that would contain information pertinent to detection vent header degradation. These tests included: PT20.6 Drywell to Torus Leak Rate Test. This test is designed to verify that leakage between drywell and torus is less than the equivalent leakage through a one-inch diameter orifice at a differential pressure of 1 psi as required by the TS 4.6.4.1.c(3). Their reviews showed no evidence of degradation.

The resident inspectors witnessed performances of PT 02.3.1a suppression chamber to drywell vacuum breakers operability test on February 4. This PT is designed to ensure containment integrity between the wetwell and the drywell. The results of this pressure drop test were satisfactory and provided an increased confidence that no significant degradation of the vent header existed.

During the inspection the inspector performed an inspection of the Unit 2 vent header and of the nitrogen discharge piping. No problems were observed in the vent header or in the configuration of the nitrogen discharge into the torus. In addition, the inspector held discussions with the licensee's cognizant engineer and discovered that CP&L had completed a visual inspection of Unit 1 and had developed procedure SP. 84-014 for inspection of Unit 2. This inspection is tentatively scheduled to be completed the week of May 1-4, 1984. This bulletin is considered closed.

(Closed) IEB No. 82-03, Revision I, "Stress Corrosion Cracking in Thick-Wall Large-Diameter, Stainless Steel, Recirculation System Piping at BWR Plants."

Unit 1 was ultrasonically examined in accordance with IEB No. 82-03 and IGSCC was identified. As a result, NRC has requested, and the licensee has agreed to perform additional ultrasonic inspections of Brunswick Unit 1 recirculation system piping during next planned outage for Unit 1. The subsequent examinations will be performed to the more stringent requirements of IE Bulletin 83-02 which deals with the same subject. Specific requirements include the following:

- (1) Scope of reinspection should include both uninspected piping and piping previously inspected to a level of at least 20%. The expansion of the inspection sample if cracks are found should be in accordance with IEB No. 83-02;
- (2) All level II and level III UT examiners should be required to demonstrate competence in accordance with IEB No. 83-02 and level I examiners should demonstrate field performance capability; and
- (3) The leak detection and leakage limits for all BWRs should be made more restrictive to ensure timely investigation of unidentified leakage.

All licensee actions for Unit 1 in accordance with IEB-82-03, have been completed and this bulletin is considered closed.

Within the areas examined, no violations or deviations were identified.