



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 REGION II  
 101 MARIETTA STREET, N.W.  
 ATLANTA, GEORGIA 30323

Report No.: 50-400/86-61

Licensee: Carolina Power and Light Company  
 P. O. Box 1551  
 Raleigh, NC 27602

Docket No.: 50-400

License No: CPPR-158

Facility Name: Harris 1

Inspection Conducted: July 28 - August 1 and August 11 - 15, 1986

Inspectors: P. A. Taylor 9/2/86  
 P. A. Taylor Date Signed

J. L. Mathis 9/2/86  
 J. L. Mathis Date Signed

Approved by: Frank Jape 9/2/86  
 F. Jape, Section Chief Date Signed  
 Engineering Branch  
 Division of Reactor Safety

SUMMARY

Scope: This routine unannounced inspection was conducted in the areas of previous enforcement matters, preoperational test results evaluation, review of engineering safety features functional test procedure, preoperational test witnessing, follow-up of licensee response to IEB 84-03 and plant tour.

Results: No violations or deviations were identified.

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*M. A. McDuffie, Senior Vice President, CP&L
- \*R. A. Watson, Vice President, Harris Nuclear Project
- \*J. L. Willis, Plant General Manager
- \*\*C. S. Hinnant, Manager Startup
- \*G. A. Myer, Projects General Manager
- \*H. W. Bowles, Director Onsite Nuclear Safety
- \*N. J. Chiangi, Manager Quality Assurance/Quality Control
- \*D. L. Tibbitts, Director, Regulatory Compliance
- \*J. L. Dority, Startup Supervisor, Electrical
- \*\*D. C. Whitehead, Supervisor, Operations, QA
- \*\*R. T. Biggerstaff, Principal Engineer, Onsite Nuclear Safety
- B. Clark, Startup Supervisor, Technical Support
- R. Delcastilho, Startup Engineer
- C. Morgan, Startup Engineer

Other licensee employees contacted included engineers, technicians, operators, and office personnel.

#### NRC Resident Inspector

- \*G. F. Maxwell

- \*Attended exit interview on August 1, 1986
- \*\*Attended exit interview on August 15, 1986

### 2. Exit Interview

The inspection scope and findings were summarized on August 1 and August 15, 1986, with those persons indicated in paragraph 1 above. The inspectors described the areas inspected and discussed in detail the inspection.

(Open) IEB 84-03, Reactor Vessel Cavity Seal. The licensee has committed to providing a supplemental response to this bulletin to address the source of borated makeup to the reactor vessel cavity, the test method to be used and to expand on seal installation instructions.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.



### 3. Licensee Action on Previous Enforcement Matters

(Closed) Deviation 400/86-38-02, Failure to Fully Incorporate Acceptance Criteria of FSAR Test Summary 14.2.12.1.16, Emergency Diesel Generator Test

The FSAR test summary requires that the diesel generator performance test to be evaluated per the eight criteria listed in Regulatory Guide 1.108, Section C.2.e, Valid Tests and Failures. Criteria 7 and 8 of this section were not incorporated into test procedure 1-5095-P-01, Revision 2, 1A-SA Diesel Generator Performance. The licensee corrected this discrepancy by issuing test change notice (TCN) 5 and TCN1 to incorporate the criteria for the 1A-SA and 1B-SB diesel generators, respectively. In addition, the licensee reviewed several other preoperational tests and identified no generic problem in this area. This review was documented in QA surveillance report 86-133.

### 4. Unresolved Items

Unresolved items were not identified during the inspection.

### 5. Preoperational Test Results Evaluation (70400, 70329, 70322, 70325)

The inspectors reviewed the following completed preoperational test procedures:

- 1-2090-P-01, SIS Accumulator Blowdown Test
- 1-2090-P-02, ECCS Check Valve Leakage Test
- 1-2080-P-02, Charging/Safety Injection Pump 6.9Kv Breaker  
Preoperational Test
- 1-5232-P-02, 1B-SB Safety 125-VDC System
- 1-6013-P-01, MCB-ACP Transfer Test
- 1-8010-P-02, Containment Building Hot Penetration Test
- 1-8170-P-01, Airborne Radioactivity Removal System
- 1-1090-P-01, Engineering Safety Features Logic Test
- 1-1090-P-04, Engineered Safety Feature Light Panel Test
- 1-1090-P-06, Reactor Protection System Logic Test

The above test procedures were reviewed to verify that:

- Test changes were approved in accordance with administrative procedures,
- The test changes did not affect the basic objectives of the tests,
- Test steps and data sheets were initialized and dated as required,
- Test data were within acceptance criteria specified,
- Test deficiencies had been resolved including retesting, where required,



- Management had evaluated the test results as required by administrative, controls.

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

#### 6. Preoperational Test Procedure Review (70304, 70306)

The inspectors reviewed preoperational Test Procedure 1-1090-P-03, Revision 1, Engineered Safety Features Integrated Test. The test procedure was reviewed to verify that it is consistent with the commitments and requirements specified in the following documents:

- FSAR Test Summary 14.2.12.1.59, Engineered Safety Features Integrated Test
- Regulatory Guides (RGs)
  - 1.68, Initial Test Programs for Water-Cooled Nuclear Power Plants
  - 1.79, Testing of ECCS for PWRs
  - 1.9, Selection, Design, Qualification of Diesel Generator
  - 1.41, Testing of Redundant on Site Power System to verify Load Group Assignments
  - 1.108, Testing of Diesel Generator Units Used as Onsite Power
  - IE Bulletin 80-06, ESF Reset Controls

The inspectors noted that RG 1.108 Section C.2 a(5) requires that immediately following the 24 hour full load test of the diesel generator per RG 1.108 Section C.2.a(3) that a initiation of a loss of offsite power be conducted in conjunction with ESF actuation signal to demonstrate proper startup and load sequencing of the diesel generators. The test described in test procedures 1-1090-P-03 differs from the above in that the 24 hours full load test of the diesel generators was conducted in June 1986 in accordance with test procedures 1-5095-P-03 and 1-5095-P-04. After reviewing the licensee's test method with management and the NRR reviewer for the Harris preoperational test program, the licensee was informed that since the testing sequence described in RG 1.108 will differ from the actual testing performed then an exemption to RG 1.108 tests should be issued and appropriate testing conducted be described in an Amendment to the FSAR. The licensee has initiated the change to the FSAR.

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

#### 7. Preoperational Test Witnessing (70312)

The inspectors witnessed portions of preoperational test 1-4085-P-03, Essential Service Chiller Water System. The procedure was reviewed for conformance to administrative controls. This included verifying that pertinent prerequisites were identified, initial test conditions system status and acceptance criteria were specified, the required reviews were performed, and management approval was indicated.

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The portions of the test witnessed by the inspectors included the verification of the following:

- Appropriate revisions of the test procedure were available and in use by the test personnel,
- Test prerequisites were met,
- Required plant systems were in service,
- Adequate coordination among the personnel involved in the tests,
- Test data were collected and recorded in accordance with administrative controls,
- Problems identified during testing were evaluated and corrective action taken.

The inspectors witnessed section 6.14 of preoperational test 1-4085-P-03. This section verified the chilled water flowrates to the system air handling units. The air handling unit throttle valves were adjusted to achieve desired flow rates. Flow versus differential pressure curve were used to convert measured dp to flow rate.

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

#### 8. Followup on IEB 84-03, Refueling Cavity Water Seal (92703)

The licensee's July 1, 1985, response to IE Bulletins 84-03 provided a summary of an evaluation for the potential and consequences of a refueling cavity water seal failure for the Shearon Harris Nuclear Power Plant. The licensee considered the design differences in the cavity seal plate used at Shearon Harris to those used at Haddam Neck and concluded that a gross seal failure of the magnitude experienced at Haddam Neck is not a credible event at the Shearon Harris Nuclear Power Plant.

The cavity seal at Shearon Harris plant consists of two inflatable seals positioned on both side of the ring girder. The ring girder which is a circular metal plate structure resting on support beams that spans the open area between the reactor vessel refueling flange and the refueling cavity liner (Attachment 1). The ring girder structure is designed seismic Category 1. When the cavity seal is installed, the ring girder spans the majority of the three (3) feet eleven (11) inches opening, but leaves two inch nominal gaps on both sides for the pressurized inflatable seals.

To ensure that the ring girder is installed in the proper position on the support beams, guide plates are welded to the bottom of the support beam. When installed, the girder guide plates straddle the support beams. These design features assures that the cavity seal gap dimensions are established and remain constant for each refueling outage.

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An inflatable seal is installed in the nominal two inch gaps on both sides of the ring girder. When inflated, the lower portions of the seals expand to press tightly against the reactor vessel refueling ledge and ring girder on one side, and refueling cavity liner and ring girder on the other side to form the water-tight seal.

To further reduce the possibility of a seal failure incident, the design has been modified to prevent the inflatable seal from pushing through the cavity gap as follows:

- 1) Metal plates have been welded around the side of the ring girder below the location of the inflatable seals and will act as "bottom stops" for the seals to prevent slippage down through the gap.
- 2) A circular metal ring welded to support bars which are attached to the cavity seal support beam provides additional surface for the inflatable seal to press against.

The inspectors reviewed maintenance procedure CM-M0074, Reactor Vessel Cavity Seal Assembly Installation and Removal, to verify that the procedure includes steps for inspection to assure the seal is properly in place. There is a check point in the procedure which requires a lead mechanic to visually inspect the seal to ensure it is correctly installed and that the wedge portion of the seal is seated against the metal surfaces.

The inspector reviewed Abnormal Operating Procedure (AOP)-031, Loss of Refueling Cavity Integrity, for the immediate actions and followup actions by the fuel handling operator to assure that guidance has been provided on how to respond to an uncontrolled decrease in refueling cavity water level.

Based on the inspection of the licensee response and plant procedures for meeting requirements of IEB 84-03, the bulletin will not be closed out at this time for the following reasons:

- The design/installation of the cavity seal as indicated in the response, dated July 1, 1985, does not adequately describe how the two inflatable seals are positioned on the side of the ring girder.
- The response states that the primary source of make-up water is from the Refueling Water Storage Tank (RWST) using the fuel pool cooling pumps or the fuel pool clean pump. This is not consistent with AOP-031 which requires the use of RHR pumps.
- There are no provisions in the procedure GP-009 to test the refueling cavity seal for leakage after the cavity is flood.

During the exit meeting on August 15, 1986, licensee management committed to provide a supplemental response to IEB 84-03 to correct the above discrepancies.

Attachment:  
Harris Refueling Cavity Seal Design

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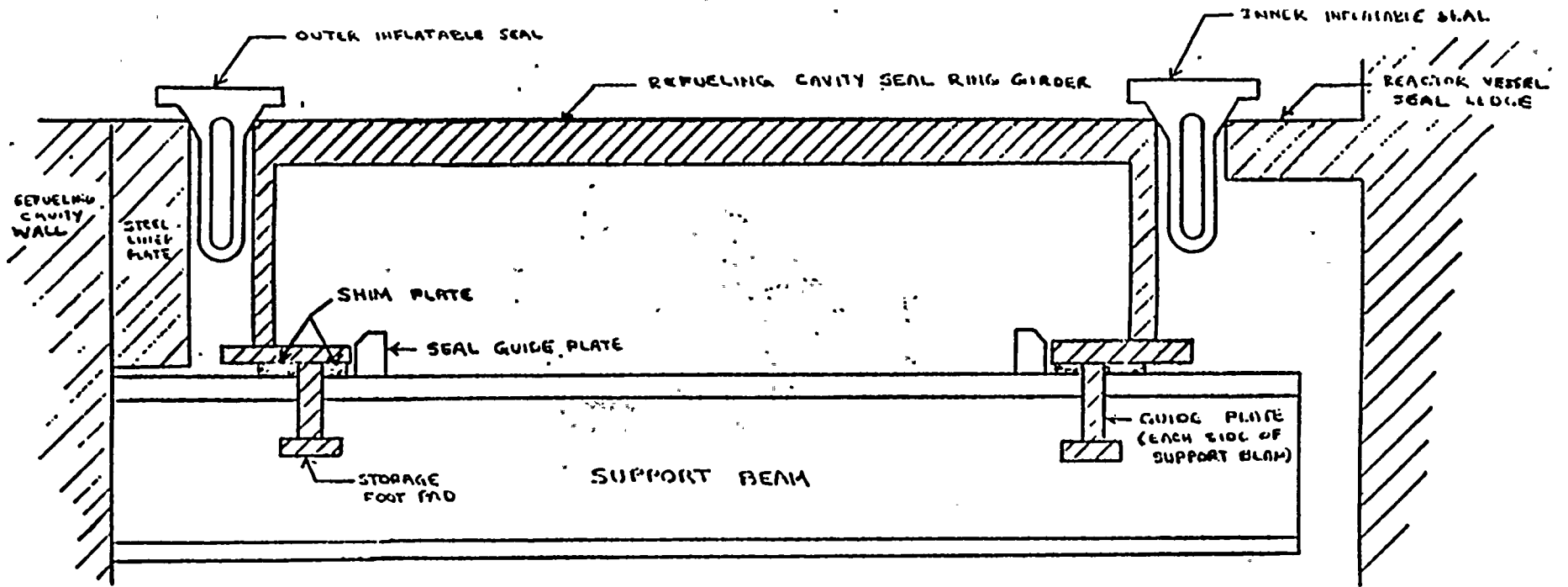
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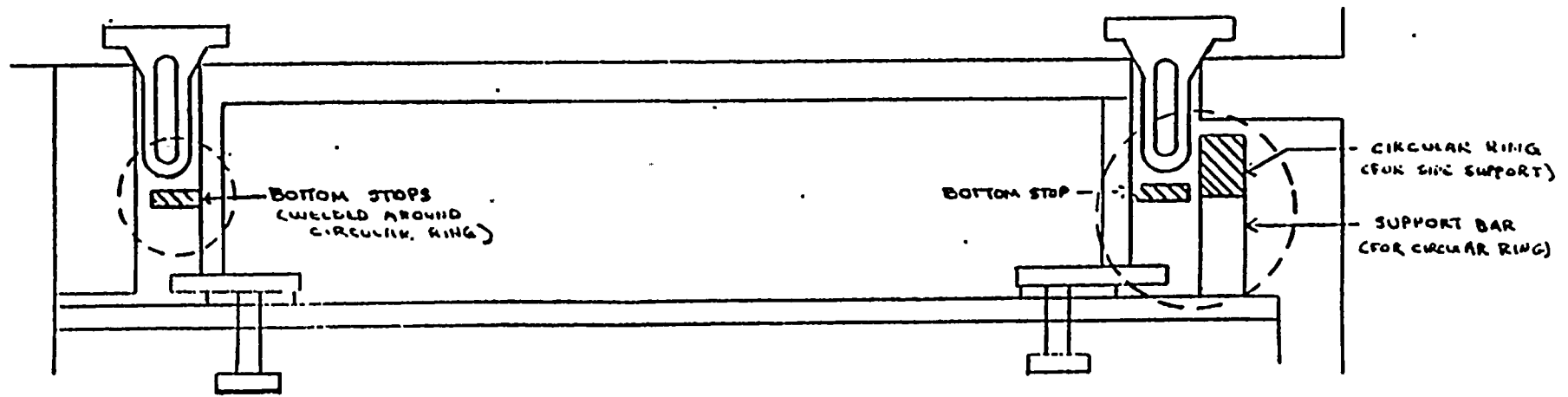
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### SHEARON HARRIS REFUELING CAVITY WATER SEAL DESIGN



ORIGINAL CAVITY SEAL DESIGN



MODIFIED CAVITY SEAL DESIGN