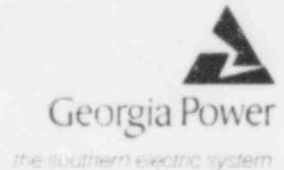


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Power Supply Engineering and Services

July 3, 1979



United States Nuclear Regulatory Commission  
Division of Reactor Operations Inspection  
Office of Inspection and Enforcement  
Washington, D. C. 20555

REFERENCE:  
RII: JPO  
50-321  
50-366

ATTENTION: Director

Gentlemen:

The following information is submitted as a follow-up to our letter of June 13, 1979, in response to IE Bulletins 79-01 and 79-01A.

A review of the environmental qualifications of Class 1E equipment located inside primary containment has been conducted for Hatch Units 1 and 2. Enclosed please find the responses to Bulletin 79-01 for each unit. The item numbering used in the responses is consistent with that of the Bulletin. It should be noted that the information included is of a "first cut" nature, particularly the information provided by General Electric in items 3h, i, and j. It is believed that the information contained in the enclosed responses is accurate; however, the qualifications are still under review. A revised report will be provided should it be necessary.

A separate response to Bulletin 79-01A is also enclosed.

Should you have any questions, please contact my office.

Very truly yours,

*R. W. Staffa*  
for R. W. Staffa  
Manager of Quality Assurance

JAB/bg  
Enclosures

xc: U. S. Nuclear Regulatory Commission  
Office of Inspection and Enforcement  
Region II - Suite 3100  
101 Marietta Street  
Atlanta, Georgia 30303  
ATTN: Mr. James P. O'Reilly

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## HATCH UNIT 1

1. Class IE equipment installed in HNP I drywell has been reviewed as described in IE circular 78-08 and has been found capable of functioning under postulated accident conditions as specified in the equipment specification with the exception of the items identified in our preliminary response dated June 13, 1979.

Responses to the IE bulletins related to examples listed in IE Circular No. 78-08 have been submitted to the NRC as indicated below:

- a. Connectors  
IE Bulletin Nos. 77-05 and 77-05A dated December 8, 1977.
- b. Penetrations  
IE Bulletin No. 77-06 dated December 8, 1977.
- c. Terminal Blocks  
IE Bulletin No. 78-02 dated February 14, 1978.
- d. Limit Switches  
IE Bulletin No. 78-04 dated March 29, 1978.
- e. Cable Splices  
Electrical cable splices associated with electrical penetration assemblies are of the following types:
  - (1) Bolted, crimp type lugs
  - (2) Inline splices
  - (3) Terminals for terminal block connections.

Prototype tests were performed on the types of terminations listed above to environmentally qualify them for Post-LOCA environment. Copies of the following test reports were submitted to the NRC as part of the response for HNP-2 from Georgia Power Company dated March 2, 1978.

- (1) GE Report, "Terminal Block LOCA Test for Electrical Penetration Assemblies," November 6, 1973.
- (2) Wyle Laboratory Report No. 53387, May 3, 1973.

- f. Other Potential Problems

- (1) Radiation and temperature effect on electrical cables. Prototype test on sample cables have demonstrated the capability of adequate performance during and after test conditions simulating LOCA environmental conditions.

b. Electrical Penetration Assemblies

- (1) Power, Control and Instrumentation Assemblies
- (2) Accident Environment
  - (a) Temperature of 281°F for two (2) hours followed by 160°F for twenty-four (24) hours.
  - (b) Pressure of 56 psig.
  - (c) Accumulated radiation dose of  $2.0 \times 10^7$  Roentgens.
  - (d) Relative humidity of 100 percent.
- (3) Qualifying Environment
  - (a) Temperature of 340°F
  - (b) Pressure of 65 psig.
  - (c) Accumulated radiation dose of  $3.3 \times 10^7$  Roentgens.
  - (d) Relative humidity of 100 percent.
- (4) Manner of Qualification

The test was performed in one continuous sequence where temperature and pressure were monitored throughout the test together with the leak rate measurement. The electrical tests were performed during and after the qualification test.

- (5) Supporting Qualification Documentation
  - (a) General Electric Company Qualification Test for electrical penetration assembly, April 30, 1971.

c. Drywell Cooling Unit

- (1) Fan Motor
- (2) Accident Environment - Post LOCA
  - (a) Temperature of 281°F
  - (b) Pressure - 56 psig.
  - (c) Relative Humidity - 100 percent.
  - (d) Cumulative radiation dosage  $10^9$  Rads.
- (3) Qualifying Environment
  - (a) Temperature of 300°F.
  - (b) Pressure - 80 psig.
  - (c) Relative Humidity - 100%
  - (d) Cumulative radiation dosage of  $1 \times 10^9$  Rads.

(4) Manner of Qualification

Sequential steps of thermal aging, irradiation and exposure to temperature, pressure and humidity.

(5) Supporting Qualification Documentation

- (a) Joy Manufacturing Company Report No. Ta-4081 - Qualification Test of a pin motor designed for service in nuclear containment.
- (b) Joy Manufacturing Company Report X-411, October 23, 1971 -- Definition and Comparison of Motor Insulation Systems.

d. Motor Operated Valves

- (1) Valve Operators
- (2) Accident Environment

- (a) Temperature of 281°F.
- (b) Pressure - 56 psig.
- (c) Relative Humidity - 100%.
- (d) Cumulative radiation dosage  $2 \times 10^8$  Rads.

(3) Qualifying Environment

- (a) Temperature of 340°F.
- (b) Pressure - 105 psig.
- (c) Relative Humidity - 100%.
- (d) Cumulative radiation dosage  $2 \times 10^8$  Rads.

(4) Manner of Qualification

The test has been performed sequentially where the test valve operators were exposed to radiation, exposure to temperature/pressure environment and electrical properties measurement.

(5) Supporting Qualification Documentation

Franklin Institute Research Laboratories Final Report F-C3441 - "Qualification of Test of Limitorque Valve Operators in Simulated Reactor Containment Post-Accident Steam Environment" prepared for Limitorque Corporation.

e. Connectors

There are no pin type connectors used to terminate class 1E cables inside the drywell.

f. Terminal Blocks

Terminal blocks associated with electrical penetration assemblies have been qualified by prototype test as per GE report, "Terminal Block LOCA Test for Electrical Penetration Assemblies, November 6, 1973".

g. Cable Splices

- (1) The environmental qualification for cable splices associated with electrical penetration assemblies located inside the drywell has been discussed in Item 1.e. of this response to IE Bulletin No. 79-01.
- (2) The cable splices associated with cable terminations at equipment cable box located inside the drywell were made with crimped terminal lugs and taped. The environmental qualification requirements for the taps are as follows:
  - (a) Accident Environment

Temperature of 281°F for two (2) hours followed by 160°F for twenty-four (24) hours.  
Pressure of 56 psig.  
Accumulated radiation dosage of  $2 \times 10^7$  Roentgens  
Relative Humidity - 100 percent,
  - (b) Qualifying Environment

\*Temperature of 324°F for four (4) hours followed by 252°F for seven (7) days.  
\*Pressure of 80 psig.  
\*Accumulated radiation dosage of  $2 \times 10^8$  Rads.  
\*Relative Humidity of 100 percent.
  - (c) Manner of Qualification

Sequential steps - Sample was initially aged in an air oven for 168 hours at 121°C, irradiated and exposed to temperature/pressure environment. Tested for electrical properties.
  - (d) Supporting Qualification Documentation

\*Okonite Engineering Report No. 141, February 29, 1972.  
\*Qualification of Okoguard EPR insulation for nuclear plant service (medium voltage cable and field splice) the Okonite Company, Form G-3 (February 16, 1979).

h. Main Steam Isolation Valve

- (1) Valve Operator
- (2) Qualifying Environment
  - (a) Temperature - 340°F.
  - (b) Pressure - 110 psig.
  - (c) Relative Humidity - 100%.
  - (d) Cumulative Radiation Dosage of  $3 \times 10^7$  Rads.
- (3) Supporting Qualification Documentation
  - (a) Rockwell Report No. 2792-03.
  - (b) GE Memo 126-62.

i. Recirc Pump Discharge Valve

- (1) Valve Operator
- (2) Qualifying Environment
  - (a) Temperature - 340°F.
  - (b) Pressure - Information immediately unavailable.
  - (c) Humidity - 100%.
  - (d) Radiation -  $2 \times 10^8$  Rads.
- (3) Supporting Qualification Documentation
  - (a) Test Reports FIRL - C2232-01.  
FIRL - C3271.  
FIRL - C3441.

j. Safety Relief Valves

- (1) Air Control Valve
- (2) Qualifying Environment
  - (a) Temperature - 340°F.
  - (b) Pressure - 65 psig.
  - (c) Humidity - 100%.
  - (d) Radiation -  $3 \times 10^7$  Rads.
- (3) Supporting Qualification Documentation
  - (a) GE Memo 126 - 62.

## HATCH UNIT II

1. Class 1E equipment installed in HNP-2 drywell has been reviewed as described in IE circular 78-08 and has been found capable of functioning under postulated accident conditions as specified in the equipment specification with the exception of the solenoid on the Reactor Sample Isolation Valve 2B31-AOV-F019 identified in our preliminary response dated June 13, 1979.

Responses to the IE Circular No. 78-08 have been submitted to the NRC as indicated below:

- a. Connectors  
IE Bulletin Nos. 77-05 and 77-05A dated January 9, 1978.

- b. Penetrations - IE Bulletin No. 77-06.

- 1.0 Plant Hatch Unit 2 utilizes containment electrical penetrations which depend upon an epoxy sealant and a nitrogen pressure environment to ensure containment leak tightness, and to ensure adequate functioning of electrical safety-related equipment (refer to HNP-2 FSAR section 3.8.2.1.4, Figs. 3.8-8 and 3.8-9). These penetrations are equipped with insulation jackets or insulating bushings at the point where the electrical conductors pass through the epoxy seal.
  - 1.1 No electrical failures have occurred in electrical penetrations either during start-up testing or operation.
- 2.0 The manufacturer's Operation and Instruction Manual requires that nitrogen (not air) be used to leak test the penetrations.  
In the past, although the as-found pressures were not required to be documented, pressure checks prior to periodic leak tests showed adequate nitrogen pressure.
  - 2.1 No degradation of insulation resistance or anomalous component operation has been detected during start-up testing or operation.
  - 2.2 No malfunction or failure has occurred during operation attributable to a breakdown of insulation resistance in electrical penetrations. Assurance of systems operability is confirmed by observing normal modes of operation, through periodic testing, and proper operation of systems control functions and equipment located within primary containment.

- 2.3 DC circuits are monitored by ground detection devices. Any grounds which occur are located and corrected. AC circuits are monitored by observing proper operation of equipment during operation and testing, by protective relays, and electrical devices associated with the circuits.
- 3.0 There is no need to maintain pressure within the penetration during a LOCA. The purpose of the pressurization is to assure leak tightness and minimize moisture in the seal. As long as the seal is leak tight during a LOCA, the existence of the nitrogen test pressure would be of no consequence.
- 3.1 Listed below are tests which were performed on the penetrations and the electrical circuits to ensure the equipment's ability to perform its design function.
- (a) Qualification tests at the manufacturer's shop are described in the General Electric "Electrical Penetration Assemblies Prototype Testing Qualification Report" issued March 16, 1970.
  - (b) Construction Assurance Testing during plant start-up, including circuit continuity, megger tests, and entire circuit checks after installation.
  - (c) Type A integrated leak rate tests and type B local leak rate tests on penetrations where leakages through individual penetrations were recorded.
- 3.2 The electrical penetrations for Plant Hatch Unit 2 were designed and procured in accordance with the Commission's regulations in effect at that time, which included GDC 4, Appendix A and Appendix B both of 10CFR 50.

c. Terminal Blocks

IE Bulletin No. 78-02 dated February 14, 1978.

No unprotected terminal blocks have been installed at HNP-2 as compliance with the commitment in the referenced response to the bulletin.

d. Limit Switches

IE Bulletin No. 78-04 dated April 25, 1978.

e. Cable Splices

The qualification documentations for the cable splices associated with electrical penetration assemblies have been submitted to the US Nuclear Regulatory Commission in the letter dated March 2, 1978, "Environmental Qualification of Primary Containment Class IE Terminations and Penetrations.



f. Other Potential Problems

1. Radiation and Temperature Effects on Electrical Cables  
Prototype tests on sample cables have demonstrated the capability of adequate performance during and after test conditions simulating LOCA environmental conditions.
2. A documentation search has been performed for HNP-2 and it has been determined that there are no NAMCO models SL2-C-11, SL3CML, SAI-31, SAI-32, DI200j, EA-700 and EA-770 switches installed inside the drywell. The Unit II MSIV Limit Switches have been verified to be NAMCO Model EA 740-8000 which are environmentally qualified for LOCA conditions.
3. Environmental Qualification Test Reports for HNP-2 Class 1E equipment installed inside the drywell have been submitted to the NRC in response to the FSAR second round questions Q221.14 and Q221.15. With regard to the environmental qualification of the termination of class 1E circuits inside the drywell, the information was submitted to the NRC in the Georgia Power Company's letter dated March 2, 1978. The qualifications for the HNP-2 Main Steam Isolation Valve Operator, Recirc Pump Discharge Valve Operator, and the Safety Relief Valve Air Control Valves are the same as those on HNP-1. These qualifications are listed in items 3.h, i, and j of the Unit 1 response to this bulletin.

I. & E. BULLETIN 79-01A

1. ASCO solenoid valves are used in the primary containment for the following functions.
  - a. Reactor Water Sample Isolation Valve - Unit 1 & 2
  - b. Main Steam Line Isolation Valve  
Operation Air Control Valves - Unit II only
  - c. Safety Relief Valve Air Control Valves - Unit 1 & 2
2.
  - a. The ASCO solenoid valves identified above are qualified to a LOCA environment with the exception of the Reactor Water Sample Isolation Valves identified in our preliminary response dated June 13, 1979.
  - b. A preventative maintenance program will be developed to replace the resilient parts of the above solenoids in accordance with the manufacturer's recommendations.