



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

OFFICIAL COPY

Smith
July 13, 1981

Gentlemen:

The enclosed information notice provides early notification of an event that may have safety significance. Accordingly, you should review the information notice for possible applicability to your facility.

No specific action or response is requested at this time; however, contingent upon the results of further staff evaluation, a bulletin or a circular recommending or requesting specific licensee actions may be issued. If you have any questions regarding this matter, please contact this office.

Sincerely,

James P. O'Reilly
Director

Enclosures:

1. IE Information Notice No. 81-20
2. List of Recently Issued
IE Information Notices



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July 13, 1981

AddressesIn Reference To

- | | |
|--|--|
| 1. Alabama Power Company
Attn: R. P. McDonald
Vice President-Nuclear Generation
Post Office Box 2641
Birmingham, AL 35291 | 50-348 Farley Unit 1
50-364 Farley Unit 2 |
| 2. Carolina Power and Light Company
Attn: J. A. Jones
Senior Executive Vice President
and Chief Operating Officer
411 Fayetteville Street
Raleigh, NC 27602 | 50-325 Brunswick Unit 1
50-324 Brunswick Unit 2
50-400 Harris Unit 1
50-401 Harris Unit 2
50-402 Harris Unit 3
50-403 Harris Unit 4
50-261 Robinson Unit 2 |
| 3. Duke Power Company
Attn: L. C. Daill, Vice President
Design Engineering
P. O. Box 33189
Charlotte, NC 28242 | 50-491 Cherokee Unit 1
50-492 Cherokee Unit 2
50-493 Cherokee Unit 3
50-488 Perkins Unit 1
50-489 Perkins Unit 2
50-490 Perkins Unit 3 |
| 4. Duke Power Company
Attn: W. O. Parker, Jr.
Vice President, Steam Production
P. O. Box 2178
Charlotte, NC 28240 | 50-369 McGuire Unit 1
50-370 McGuire Unit 2
50-269 Oconee Unit 1
50-270 Oconee Unit 2
50-287 Oconee Unit 3
50-413 Catawba Unit 1
50-414 Catawba Unit 2 |
| 5. Florida Power and Light Company
Attn: R. E. Uhrig, Vice President
Advanced Systems and Technology
P. O. Box 529100
Miami, FL 33152 | 50-335 St. Lucie Unit 1
50-385 St. Lucie Unit 2
50-250 Turkey Point Unit 3
50-251 Turkey Point Unit 4 |
| 6. Florida Power Corporation
Attn: J. A. Hancock, Assistant
Vice President Nuclear Operations
P. O. Box 14042, Mail Stop C-4
St. Petersburg, FL 33733 | 50-302 Crystal River Unit 3 |

Addresses

In Reference To

- | | |
|---|--|
| 7. Georgia Power Company
Attn: J. H. Miller, Jr.
Executive Vice President
270 Peachtree Street
Atlanta, GA 30303 | 50-321 Hatch Unit 1
50-366 Hatch Unit 2
50-424 Vogtle Unit 1
50-425 Vogtle Unit 2 |
| 8. Mississippi Power and Light Company
Attn: N. L. Stampley
Vice President of Production
P. O. Box 1640
Jackson, MS 39205 | 50-416 Grand Gulf Unit 1
50-417 Grand Gulf Unit 2 |
| 9. Offshore Power Systems
Attn: A. R. Collier, President
P. O. Box 8000
Jacksonville, FL 32211 | 50-437 FNP 1-8 |
| 10. South Carolina Electric and Gas Company
Attn: T. C. Nichols, Jr., Vice President
Power Production and System
Operations
P. O. Box 764
Columbia, SC 29218 | 50-395 Summer Unit 1 |
| 11. Tennessee Valley Authority
Attn: H. G. Parris
Manager of Power
500A Chestnut Street Tower A1
Chattanooga, TN 37401 | 50-438 Bellefonte Unit 1
50-439 Bellefonte Unit 2
50-259 Browns Ferry Unit 1
50-260 Browns Ferry Unit 2
50-256 Browns Ferry Unit 3
50-518 Hartsville Unit 1
50-519 Hartsville Unit 2
50-520 Hartsville Unit 3
50-521 Hartsville Unit 4
50-553 Phipps Bend Unit 1
50-554 Phipps Bend Unit 2
50-327 Sequoyah Unit 1
50-328 Sequoyah Unit 2
50-390 Watts Bar Unit 1
50-391 Watts Bar Unit 2
50-566 Yellow Creek Unit 1
50-567 Yellow Creek Unit 2 |
| 12. Virginia Electric and Power Company
Attn: J. H. Ferguson
Executive Vice President-Power
P. O. Box 26666
Richmond, VA 23261 | 50-338 North Anna Unit 1
50-339 North Anna Unit 2
50-404 North Anna Unit 3
50-280 Surry Unit 1
50-281 Surry Unit 2 |

Addresses

In Reference To

13. Institute of Nuclear Power Operation
Attn: R. W. Pack
Lakeside Complex
1820 Waterplace
Atlanta, GA 30339
14. Southern Company Services, Inc.
ATTN: O. Batum, Manager
Nuclear Safety & Licensing
Department
P. O. Box 2625
Birmingham, AL 35202
15. Department of Energy
Clinch River Breeder Reactor
Plant Project Office
ATTN: Chief, Quality Improvement
P. O. Box 11
Oak Ridge, TN 37830
16. EDS, Nuclear, Inc.
ATTN: E. H. Verdery
330 Technology Park/Atlanta
Norcross, GA 30092

SSINS No.: 6870
Accession No.:
810330405
IN 81-20

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

July 13, 1981

IE Information Notice No. 81-20: TEST FAILURES OF ELECTRICAL PENETRATION
ASSEMBLIES

Summary of Observed Problem:

Environmental qualification testing of containment electrical penetration assemblies (EPA) by the D. G. O'Brien Company and similar NRC sponsored tests conducted by the Sandia National Laboratories disclosed a potential material application problem and/or a potential problem with the accelerated aging technique as applied during these tests. Following exposure of the assemblies to high temperatures during simulated aging and LOCA testing sequences (NUREG-0588), the grommet sealing material was observed to have extruded through the spacer assembly around the electrical conductors. The extruded grommet sealing material stripped insulation from the conductors resulting in electrical grounding during steam/chemical spray test conditions and failure of the assembly to satisfy the qualification test requirements.

The grommet material is a Dow Corning Company, Silgard 170 silicone RTV (elastomer). Extrusion of the material was attributed to confinement in the assembled EPA which did not allow for thermal expansion during exposure to sustained elevated temperatures during the thermal aging process.

Details:

The Sandia National Laboratory, under contract to the NRC, recently completed an independent environmental qualification test of a D. G. O'Brien model K EPA. The test EPA was obtained from the Duke Power Company's Catawba plant. The only other known application of EPAs of the same design is in the McGuire plant and two replacement units at Yankee Rowe. The EPAs are designed for low voltage power, instrumentation and control applications.

The test resulted in a failure (electrical grounding) of three of the 104 circuits passing through the penetration assembly. Ten additional circuits showed a reduction in resistance to ground to less than the 5×10^6 ohm acceptance requirement; however, electrical operability was maintained. Investigation of the failure disclosed the mechanism to be extrusion of the grommet material through a spacer plug containing the insulated conductors. The extruded grommet material stripped insulation from all of the conductors to a varying degree establishing a low resistance pathway between the conductors and a metallic plug sleeve. The electrical grounding was observed during the steam and chemical spray environment test. The extrusion of the grommet material was caused by mechanical confinement during exposure to elevated temperatures applied in the accelerated aging process.

In 1978 the D. G. O'Brien Company attempted to qualify this same EPA design to a set of test conditions applicable to the Virgil Summer plant. During that test the silicone grommet extrusion mechanism was observed and also resulted in the failure of the EPA. D. G. O'Brien concluded that the extrusion occurred because of mechanical confinement at elevated temperatures. In lieu of retesting the same design, D. G. O'Brien redesigned the module plug assembly for the Virgil Summer plant. The redesigned unit passed the Virgil Summer plant qualification test. It is noted that the retest did not include accelerated aging of the redesigned plug.

Qualification tests had been successfully performed for the McGuire plant in the 1975-1977 time period on the model K O'Brien connector. These tests did not thermally age the grommet material. The EPA was exposed to the same steam/chemical spray conditions used in the NRC/Sandia test.

The connector portion of the EPA design uses a Dow Corning Company, Silgard 170 silicone RTV material as a sealing grommet. When the individual connector modules of the EPA are placed in the fully assembled and tightened state, the grommet material is confined and unable to expand freely as the temperature of the assembly increases. During the NRC/Sandia test each individual connector module was tightened prior to thermal aging at 150°C and again prior to radiation exposure at approximately 50°C. Consequently, the sealing grommet was expanded and the extrusion process occurred twice prior to exposing the EPA to the simulated LOCA steam test. Similar tightening of the grommet was done during the testing for the Summer plant. This situation apparently caused excessive extrusion of the grommet material through the spacer plug containing the insulated conductors. The extrusion process stripped the insulation from the conductors thereby establishing an electrical failure mode.

Contact with the vendor, D. G. O'Brien, indicates that only Catawba, McGuire and Yankee Rowe units have the model K connectors with the same grommet seal arrangement. Duke Power Company has performed an evaluation and concluded that operation with the connectors is acceptable based on earlier successful testing and the early stage of plant operation. Additional testing of the connector is being performed by Duke Power Company.

No written response to this information is required. If you need additional information regarding this matter, please contact the Director of the appropriate NRC Regional Office.

Enclosure:
Recently issued IE Information Notices

Attachment
IN 81-20
July 13, 1981

RECENTLY ISSUED
IE INFORMATION

NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
81-19	Lost Parts in Primary Coolant System	7/6/81	All power reactor facilities with an OL or CP
81-18	Excessive Radiation Exposures to the Fingers of Three Individuals Incurred During Cleaning and Wipe Testing of Radioactive Sealed Sources at a Sealed- Source Manufacturing Facility	6/23/81	Specified licensees holding Byproduct licenses
81-16	Control Rod Drive System Malfunctions	4/23/81	All BWR facilities with an OL or CP
81-15	Degradation of Automatic ECCS Actuation Capability by Isolation of Instrument Lines	4/22/81	All power reactor facilities with an OL or CP
81-14	Potential Overstress of Shafts on Fisher Series 9200 Butterfly Valves with Expandable T Rings	4/17/81	All power reactor facilities with an OL
81-13	Jammed Source Rack in a Gamma Irradiator	4/14/81	Specified irradiator licensees
81-12	Guidance on Order Issued January 9, 1981 Regarding Automatic Control Rod Insertion on Low Control Air Pressure	3/31/81	All BWR facilities with an OL or CP
81-11	Alternate Rod Insertion for BWR Scram Represents a Potential Path for Loss of Primary Coolant	3/30/81	All BWR facilities with an OL or CP
81-10	Inadvertant Containment Spray Due to Personnel Error	3/25/81	All power reactor facilities with an OL or CP

OL = Operating
CP = Construction Permits

Licenses