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 PARISH, J.V. Washington Public Power Supply System
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SUBJECT: Part 21 rept re Westinghouse containment penetration modules
 Scotchcast strain relief & Varglas insulated conductors.
 Replaced six of 12 RPIS Scotchcast/Varglas modules & three
 Scotchcast/Okonite modules during refueling outage (R-9).

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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July 22, 1994
G02-94-170

Docket No. 50-397

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: **WNP-2, OPERATING LICENSE NPF-21
10CFR21 REPORT
WESTINGHOUSE CONTAINMENT PENETRATION MODULES
SCOTCHCAST STRAIN RELIEF AND VARGLAS INSULATED CONDUCTORS**

This letter is a 10CFR21 notification of a potential material defect/deviation.

Recent investigation into electrical problems for the non-safety related Rod Position Indication System at WNP-2 identified a degraded condition due to moisture intrusion and corrosion of conductors in containment electrical penetration modules. The supplied modules failed to perform their intended function under the operating conditions described in the technical procurement specification. Since the modules were procured for safety related applications, this constitutes a reportable condition per 10CFR21.21(c)(1).

The Supply System has completed the evaluation of the corrosion degradation phenomenon and concludes that the module defect is not currently a substantial safety hazard for existing applications at WNP-2. However, if the modules had been used in certain safety related applications, a substantial safety hazard could have resulted due to the loss of electrical continuity. The attachment to this letter provides additional details regarding the material defect.

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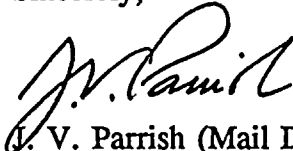
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10CFR21 REPORT

WESTINGHOUSE CONTAINMENT PENETRATION MODULES

Should you have any questions or desire additional information, please call me or D. A. Swank at (509) 377-4563.

Sincerely,



J. V. Parrish (Mail Drop 1023)

Assistant Managing Director, Operations

Enclosure

cc: LJ Callan, NRC - RIV
KE Perkins, Jr. NRC - RIV, Walnut Creek Field Office
NS Reynolds, Winston & Strawn
NRC Sr. Resident Inspector (Mail Drop 927N, 2 Copies)
INPO Records Center - Atlanta, GA
DL Williams, BPA (Mail Drop 399)



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ATTACHMENT

This attachment provides written notification details in accordance with 10CFR21.21(c)(3)(ii). Initial notification was made on July 15, 1994.

In accordance with 10CFR21.21(c)(4) the following is provided:

- (i) The name and address of the individual informing the Commission is:

J.V. Parrish, Assistant Managing Director, Operations
3000 George Washington Way
Washington Public Power Supply System
Richland, WA 99352

- (ii) Identification of the facility, activity, or basic component which contains a defect:

The basic component is a Westinghouse containment electrical penetration module with a section of Scotchcast strain relief material.

- (iii) Identification of the firm supplying the basic component which contains a defect:

Containment penetration modules were supplied by Westinghouse and installed in WNP-2 during initial construction. Imaging and Sensing Technology (IST) purchased the manufacturing facility for the modules from Westinghouse in May 1988.
The IST contact is:

Phil Ponzi, Chairman
Imaging and Sensing Technology
300 Westinghouse Circle
Horseheads, NY 14845
(607) 796-4433

The Westinghouse contact is:

R.B. Miller, Engineer, Nuclear Safety Department
Westinghouse Electric Corp., Energy Systems Business Unit
Energy Center
Pittsburgh, PA 15230
(412) 374-5953

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- (iv) Nature of the defect and safety hazard which could be created by such a defect:

A degraded condition was identified for the Rod Position Indication System (RPIS) at WNP-2 due to corrosion of conductors internal to the strain relief material in primary containment electrical penetration modules. The modules provide both non-safety related electrical continuity and safety related containment integrity functions. The degraded condition potentially affects electrical continuity but not containment integrity.

The defect consists of a material that was unable to perform its intended function in the specified operating environment. The modules contain a Scotchcast strain relief material which absorbs moisture (i.e. hygroscopic). The pressure boundary section is made of different material (Q1) which is not hygroscopic. The module is in a condensing environment and the use of a hygroscopic material, coupled with other factors (described below), provides for moisture intrusion and a corrosion mechanism which, left unchecked, permits conductor degradation and potential loss of electrical continuity.

Electrical Specification 28808-55, Contract No. 55, "Containment Electrical Penetrations," specified the normal operating environmental parameters. The hygroscopic material in the modules did not perform acceptably in the normal environment described in the specification. Scotchcast modules were supplied with two different conductor insulations, Varglas and Okonite.

The necessary factors for accelerated corrosion are moisture, a significant moisture intrusion path, ions, and electric potential with current flow. Moisture is normally present in the penetration environment. Contributing material factors include the hygroscopic properties of the Scotchcast and the use of a leachable halogenated fire retardant which permits disassociation of chloride ions. The Varglas insulated conductors act as corrosion accelerators because they provide a significant moisture intrusion path. Electric potential with current flow is dependent on equipment functional application.

With any of the four factors missing, it is improbable that accelerated corrosion will occur. Further, visual inspection, operational history review, and electrical insulation resistance (IR) testing establish module condition and operability.

The accelerated corrosion factors exist only in the Scotchcast/Varglas modules which have shown corrosion degradation, loss of signal, and significantly lower IR readings. Twenty-eight Scotchcast/Okonite modules were originally installed at WNP-2. Although susceptible to moisture intrusion through the Scotchcast, the Scotchcast/Okonite modules do not have a significant moisture intrusion path into the module because the Scotchcast adheres to the Okonite. Moisture intrusion into the Scotchcast/Okonite modules is therefore slow. No unacceptable degradation of the Scotchcast/Okonite modules has been identified and operability is established based on visual inspection, operational history, and IR testing. Therefore, this design problem is presently isolated to the Scotchcast/Varglas modules.

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22 Scotchcast/Varglas modules were originally installed at WNP-2. Corrosion degradation was isolated to the 12 non-safety related RPIS Scotchcast/Varglas modules. Six of the 12 RPIS modules were replaced during the R-9 refueling outage with IST modules which do not have Scotchcast or Varglas. The modules which were not replaced are operable based on visual inspection, operational history, and IR testing.

The remaining ten Scotchcast/Varglas modules have not evidenced either moisture intrusion or corrosion degradation to date. Of these 10 remaining modules which have not been replaced, four provide safety related but not post LOCA functions, one provides a Regulatory Guide 1.97, Category 2 function and is classified as augmented quality rather than safety related, and five do not provide a safety related function.

The four safety related modules serve Local Power Range Monitors (LPRMs) which provide neutron flux signal to the Average Power Range Monitors (APRMs). The APRMs provide continuous indication of thermal power and initiate rod withdrawal blocks or scrams prior to reactor power reaching or exceeding a limiting safety system setting.

The Regulatory Guide 1.97, Category 2 module supports area temperature monitoring and safety relief valve acoustic monitors. Temperature monitoring thermocouples are not subject to corrosion and the valve position indication system is capable of performing the safety relief valve monitoring.

If the identified Scotchcast/Varglas module condition had gone undetected in certain safety related applications, it could have resulted in a substantial safety hazard due to the loss of electrical continuity.

- (v) The date on which the information of defect was obtained:

May 9, 1994

- (vi) The number and location of all such components in use:

The Supply System presently has 38 Scotchcast modules installed at WNP-2. There are 16 Scotchcast/Varglas modules. There are 22 Scotchcast/Okonite modules.

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- (vii) Corrective action(s), organization responsible for the action, and corrective action completion schedule:

The corrective actions taken include:

1. Replacement of six of 12 RPIS Scotchcast/Varglas modules and three Scotchcast/Okonite modules during this refueling outage (R-9) with IST modules of a different configuration.
2. Replacement of three Scotchcast/Okonite modules with plugs.
3. Installation of penetration heat trace to ensure dryness in the penetrations for the RPIS Scotchcast/Varglas modules which are not replaced and four other safety related Scotchcast/Varglas modules.
4. Operator awareness training to alert Operators as to how electrical penetration module degradation would manifest itself in the control room.

Corrective actions planned include:

1. Replacement of the safety related Scotchcast/Varglas and Scotchcast/Okonite modules by the end of R-12.
2. Visual inspection of electrical penetration modules with Scotchcast which have not been replaced at each refueling outage.

Corrective action completion is scheduled prior to restart from R-12 refueling outage which is currently scheduled for the spring of 1997.

The Supply System is responsible for these corrective actions.

- (viii) Advice related to the defect which will be given to purchasers or licensees:

None will be provided by the Supply System.

The IST has informed the Supply System that Westinghouse records indicate the use of Scotchcast in module construction was discontinued in 1975. In addition, Westinghouse/IST indicates that they have informed the only other domestic utility to which penetrations containing Scotchcast have been supplied of the presence of Scotchcast in one of their modules. The module uses insulated and jacketed cable but not Varglas. The utility informed Westinghouse that they have not had any problems with the module. No additional advice is considered necessary.



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