VIRGINIA ELECTRIC AND POWER COMPANY

RICHMOND, VIRGINIA 23261

November 21, 1990

90 NOV 26 All : 06

United States Nuclear Regulatory Commission
Region II
101 Marietta Street, N. W.
Suite 2900
Atlanta, Georgia 30323

Serial No. 90-705
NO/ETS R4
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
CONTROL ROOM PRESSURE BOUNDARY
ELECTRICAL PENETRATION INSPECTION RESULTS

The Control Room pressure boundary electrical penetrations were inspected to evaluate the condition of the penetrations as a follow-up to NRC Information Notice 88-04. The inspection effort identified deficiencies in the current 'as-installed' configurations for the electrical penetrations.

The results of the electrical penetration inspections were discussed with your staff on October 23, 1990. In accordance with the staff's request, Virginia Electric and Power Company is providing the results of the inspections. The inspection results are provided in the Attachment. In addition, a discussion of the safety impact and planned corrective actions are included.

The Control Room electrical penetration inspections results and the evaluation of the remaining plant fire barrier were reviewed and approved by the Station Nuclear Safety and Operating Committee.

At the completion of the fire penetration seal evaluation program a summary report will be provide for your information.

If you have additional questions, please contact us.

Very truly yours,

W. L. Stewart
Senior Vice President - Nuclear

Attachment

IE01

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

Mr. W. E. Holland
NRC Senior Resident Inspector
Surry Power Station

ATTACHMENT

INADEQUATE FIRE RATING OF ELECTRICAL PENETRATION SEALS CONTROL ROOM PRESSURE BOUNDARY SURRY POWER STATION UNITS 1 & 2

ELECTRICAL PENETRATION SEAL INSPECTION IN THE CONTROL ROOM PRESSURE BOUNDARY

In response to NRC Information Notice 88-04 and NRC Information Notice 88-04, Supplement 1, Virginia Electric and Power Company developed a Fire Penetration Seal Evaluation Program for Surry Power Station. Implementation of this program was begun this past July when a walkdown of the Control Room (CR) Pressure Boundary electrical penetrations was conducted. The purpose of the walkdown was to inspect and document the condition of each individual CR Pressure Boundary seal and fire door. By October 23, 1990, 725 electrical penetrations had been evaluated and classified as follows:

293 seals qualified for a three hour rating.

289 seals needed repairs to qualified as a three hour seal.

143 seals could not be fully evaluated. These seals were accessible from one side only and adequate information could not be obtained to fully evaluate the seal.

The 289 seals needing repair were either empty sleeves with a single cap, or sleeves with inadequate depth of Dux Seal/Flamemastic or Silicone foam. The inspection acceptance criteria were very conservative in that there was no allowance for Engineering Evaluations that may have qualified a number of the seals that were not strictly in accordance with specifications. Therefore, the nonconforming penetrations were determined to be not in compliance with 10 CFR 50 Appendix "R" Section III.G.2.a., which requires separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a three hour fire rating. Compensatory action was taken as required by Technical Specifications when a non-compliance was identified during the inspection.

There are approximately 4900 electrical penetrations in the plant (both Units 1 and 2). The penetrations are in barriers that define fire areas. Fire areas containing safe shutdown equipment are listed in Table 1. Only ten of the fire areas in the station have a calculated fire duration of greater than 90 minutes and these areas have detection and fire suppression systems. Those areas with a duration of greater than one hour and no suppression system have automatic detection systems. The remaining fire areas have a fire duration of less than sixty minutes. For the remaining penetrations not evaluated in the control room study, some seals are expected not to qualify for a three hour rating using the same inspection program acceptance criteria. However, based on results of the CR penetration inspection, seals that do not qualify are expected to provide at least a one hour fire rating. The number of seals that do not qualify is expected to be a significantly lower percentage based on the fact that the single cap seal is expected to be found only in reinforced concrete walls and that a full 10 inch depth of foam, as required in the inspection acceptance criteria, is not required for a three hour fire rating.

Evaluation of the CR Pressure Boundary and the remaining seals indicates that the integrity of the station's fire barriers is functionally adequate and special compensatory actions are not required. The existing seals will provide an acceptable level of protection based on the following:

a. Fire detection and suppression systems are provided in fire areas where the expected fire duration is 90 minutes or greater.

b. Automatic fire detection is provided in fire areas where the expected fire duration is one hour or greater and no suppression is provided.

c. Based on the results of the CR pressure boundary seal inspection, seals in the remainder of the plant which do not meet the three hour fire rating are expected to provide at least a one hour fire rating and therefore provide adequate protection in the fire areas where the expected combustible loading duration is one hour or less.

d. Fire watches are posted in those areas identified by inspection as having fire seals which are not qualified for a three hour rating based on the consrevative inspection criteria of this porgram. Additional fire watches will be posted as necessary.

The condition of the station fire area barriers which now exists does not constitute a condition where the health and safety of the public are affected.

The observed condition is believed to have been caused by improper installation of the penetration seal material(s) during station construction and was not detected earlier because of inadequate post-construction inspection procedures. A review of the station drawings and test reports for three hour fire rated configurations indicates installation of the end caps and Dux Seal material was not in accordance with drawings and tested configurations. Repair procedures have been developed which provide station personnel with the correct repair method based on the type of seal material present. The surveillance procedure for fire barriers does not require an inspection acceptance criterion that evaluates the fire rating of the seals. Only the physical condition of the seal is verified.

Approximately 70% of the penetration seals that have been identified as not meeting the inspection acceptance criteria for a three hour seal have been repaired to date, and repair efforts are continuing. An inspection of the remaining CR pressure boundary penetrations and the remainder of the plant fire barrier penetrations will be initiated to locate and repair seals that do not meet the requirements for a three hour fire rating. There are approximately 4300 fire barrier penetrations remaining to be inspected. Initial attention will be directed toward inspecting for empty sleeves with single caps. It is our intention to programmatically inspect seals that do not fall into the empty sleeve configuration over a three year period factoring inspection results into the determination of program scope and schedule, with approximately one-third of the remaining penetrations inspected each year beginning in the second quarter of 1991.

The surveillance and maintenance procedures used to inspect, repair and seal fire barrier penetrations will be reviewed and revised as necessary to reflect the various configurations identified in the station.

During future inspections, seals which do not qualify as a three hour barrier will be identified, documented and repaired in accordance with the station's corrective action program. At the completion of the inspection program for the remaning fire barriers a summary report will be provided for your information

TABLE 1

SURRY POWER STATION
SAFE SHUTDOWN FIRE AREAS

	FIRE AREA	PROTECTION	BARRIER DURATION	FIRE RATING (hr)
01	Cable Vault and Tunnel -1	Detection, CO2, Manual Sprinklers	3	>180
02	Cable Vault and Tunnel -2	Detection, CO2, Manual Sprinklers	3	>180
03	Emergency Switchgear Room -1	Detection, Manual Halon	3	>180
04	Emergency Switchgear Room -2	Detection, Manual Halon	3	>180
05	Control Room	Detection	3	35
06	Emergency Diesel Generator -1	Detection, Manual CO2	3	149
07	Emergency Diesel Generator -2	Detection, Manual CO2	3	149
08	Emergency Diesel Generator -3	Detection, Manual CO2	3	149
15	Reactor Containment -1	Detection	3	71
16	Reactor Containment -2	Detection	3	71
17	Auxiliary Building	Detection, Note 2	3	18
18A	Fuel Oil Pump House -1	Detection, CO2	3	100
18B	Fuel Oil Pump House -2	Detection, CO2	3	100
19	Safeguards -1	Detection	3	<10
20	Safeguards -2	Detection	3	<10
28	Intake Structure	Detection, Note 2	Note 1	>180
31	Turbine Building	Limited Det. and/or Supp.	3	89
45	Mechanical Equipment Room -3	Detection	3	34
54	Charging Pump Service Water Pump Room	Detection	3	<10
55	Technical Support Center	Detection	3	28

NOTES:

1. Separate plant structure; fire rating not required.
2. Fire area includes fire suppression system(s) for special hazards (eg: CO2 for charcoal filters, deluge for oil reservoir, etc.).