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VIRGINIA ELECTRIC AND POWER COMPANY, RICHMOND, VIRGINIA 23261

October 10, 1980

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
Attn: Mr. O. D. Parr, Chief
Light Water Reactors Branch No. 3
Division of Project Management
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Serial No. 823
PSE&C/KSB:vml:wang

Docket Nos. 50-339

Dear Mr. Denton:

PRIMARY AND SECONDARY ELECTRICAL PROTECTION
OF CONTAINMENT PENETRATIONS FOR
NORTH ANNA POWER STATION, UNIT 2

In compliance with your letters of August 3, 1979 and November 30, 1979 on electrical penetration protection for North Anna 2, we hereby submit the primary and secondary (independent back-up) electrical penetration protection for the power, control, and instrumentation electrical circuits. Enclosed are twenty copies each of "Electrical Penetration Protection-Power Circuits (Primary and Secondary)," "Electrical Penetration Protection-Control Circuits (Primary and Secondary)," and "Electrical Penetration Protection-Instrumentation Circuits."

Each of these Documents includes the following information for their respective circuit classification:

1. Identification of each electrical circuit that penetrates the containment.

2. Identification of each penetration type and conductor size.

3. Description of the primary and secondary protective devices.

4. Time-current characteristic curves showing the fault current-vs-time regime for the primary and secondary protective devices, the fault current-vs-time regime for the penetrations, and the coordination between the two. An analysis was made to ensure that the maximum temperature when combining the penetration temperature rise due to the maximum fault with the peak LOCA temperature did not exceed the maximum temperature for which the penetration is qualified. This analysis assumed no heat generated by fault current passing through the penetration was lost from the penetration.

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The following clarifications apply to the instrumentation circuits:

1. Time-current characteristic curves are not shown for the majority of penetrations because the maximum fault current is less than the penetration continuous rating in those cases. Secondary protection is not required for these cases.

2. For the penetrations of the following circuits, a maximum fault current has not yet been obtained from the equipment manufacturers. To ensure protection of the penetration, primary and secondary protection are applied to these circuits. Time-current characteristic curves have not been included because of the small size of the primary and secondary protective fuses with respect to the penetrations' continuous ratings. The curves will be provided upon request.

   A. Drive assemblies A, B, C, D, E

   B. Drive assemblies A-2, B-2, C-2, D-2, E-2

   C. Five path transfer devices for drive assemblies A, B, C, D, E

   D. Evacuation horn

The following clarifications apply to the control circuits:

1. For curves IB-1, IB-2A, IB-2B, IB-3, IB-4, IB-5, IB-6, IB-7, IB-8, IB-9, and IB-10 a continuous rating of 25 amps has been used instead of 12 amps. The 12 amp rating applies with 12 amps in each of the 140 conductors. Since this is not a feasible case for control circuits of this nature, we have applied a more realistic case: a shared load of 20 amps in 138 conductors. This current equals a minimum of twice the full load expected and is applied simultaneously to the conductors while the actual loads occur intermittantly. Under this condition, any 2 of the 140 conductors are capable of carrying 25 amps continuously. This rating has been derived by test.

2. The protection scheme is designed around the highest possible fault current available. The current shown on the curves is the current calculated using only line impedance from the circuit's source. No credit has been taken for power supply or Controller Impedances. In addition, internal protection devices located in power supplies or controllers are not incorporated into the analysis, even though these factors decrease available fault current and offer additional steps of protection.

3. For those AC and DC circuits which are ungrounded and have a fuse in each leg of the circuit, these fuses serve as primary and secondary protection for the penetration.

4. The fault current for curve IB-9 will be no greater than 500 amps.

5. For those circuits which do not have a full load current specified, the full load current will not materially affect the penetration analysis.

6. The penetration in curve IB-2B is a #14 feed thru with single and double seal integrity characteristics shown.

The following clarification applies to the power circuits:

1. Eight circuits associated with non-class 1E loads that do not need to be energized when containment integrity must be maintained do not have secondary protection. When containment integrity is required, the circuit breakers providing the power feeds to these circuits will be open.

This submittal completes the requirements set forth in paragraph 2-C-10 on Page 6 of the Facility Operating License NPF-7 issued on August 21, 1980. The secondary protection will be installed and operational prior to resuming power operation following the first refueling outage for Unit 2.

If further information is required, please contact this office.

Very truly yours,

Sam C. Brown, Jr.
Senior Vice President
Power Station Engineering
and Construction

cc: Mr. Victor Stello, Director
Office of Inspection & Enforcement

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation