PSNH

SEABROOK STATION
Engineering Office

Public Service of New Hampshire

New Hampshire Yankee Division

March 19, 1986

SBN- 972
T.F. B7.1.2

United States Nuclear Regulatory Commission
Washington, DC 20555

Attention: Mr. Vincent S. Noonan, Project Director
PWR Project Directorate No. 5

References: (a) Construction Permits CPPR-135 and CPPR-136, Docket Nos. 50-443 and 50-444

(b) PSNH Letter (SBN-903), dated November 27, 1985, "Resolution of Power System Branch Confirmatory Items", J. DeVincentis to G.W. Knighton

Subject: Resolution of Power System Branch Confirmatory Items

Dear Sir:

Enclosed please find Attachment 1 which incorporates additional information to our response to Confirmatory Item C-29, Compliance with Regulatory Guide 1.63, already transmitted to the staff via Reference (b). This additional information was requested by the Staff (PSB Reviewers).

Since the enclosed completes our response to Confirmatory Item C-29, we request its resolution be reflected in the next supplement to Seabrook Station's SER.

Very truly yours,

John DeVincentis, Director
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Enclosures

cc: Atomic Safety and Licensing Board Service List

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ATTACHMENT 1

ADDITIONAL INFORMATION FOR CONFIRMATORY

ITEM C-29, COMPLIANCE WITH

REGULATORY GUIDE 1.63

(Reference PSNH Letter SBN-903, dated November 27, 1985

C-29 - Compliance with Regulatory Guide 1.63

This confirmatory item pertains to the capability of the electrical penetrations to withstand short circuit current from power sources of limited capacity such as control power transformers. We are providing herewith the pertinent part of UE&C Calculation No. 9763-3-ED-00-37-F documenting the capability of the electrical penetrations to withstand such short circuit currents.

In the event of a short across a circuit inside containment fed from a control power transformer, the maximum short circuit current of 28.4 amperes will flow in the circuit without causing any damage to the penetration.

Based on discussions with the manufacturer of the Control Power Transformers (CPT) used in the Seabrook design, the following is an analysis of the modes of failures of a CPT with a shorted secondary (in this analysis, we consider that the fuse provided on all secondaries does not operate): Based on their experience and technical knowledge, the most probable mode of failure is the opening of the primary winding. The primary winding has the smaller size wire and it will fail turn-to-turn and eventually open.

Theoretically, another mode of failure can be postulated; i.e., primary and secondary winding weld together so that the secondary can see the 480 Volt system voltage and short circuit currents. For the reasons outlined below, we consider this kind of failure to have such low probability that it can be disregarded:

- The winding on the Seabrook CPT are potted.
- In addition to the potting, there is insulating material separating the primary from the secondary.
- There has to be some movement of the windings during the short so they can end up welded together. It is pointed out that in a CPT of the sizes used at the Seabrook design, there is not enough magnetic forces during a shorting of the secondary to cause such movement of the windings.

As discussed above, we do not believe that the primary and the secondary windings of the control power transformers (CPT's) can be welded together such that 480V is directly applied across the secondary winding. However, as requested by the NRC reviewer, we have reviewed this failure mode also.

Any fault on the CPT powered circuits will appear as a ground fault on the associated 480V system. Seabrook station 480V system is a high resistance grounded system with a maximum ground fault current of 2.92 amperes. Hence, under the above postulated condition the maximum possible current seen by the affected penetration conductors will be less than 2.92 amperes. Seabrook penetrations can easily withstand this current without any degradation.

Therefore, the circuits inside containment which are powered through the control power transformers, do not require dual protective devices for the penetration conductors.