PSNH PUBLIC SERVICE
Company of New Hampshire

SEABROOK STATION
Engineering Office:
1671 Worcester Road
Framingham, Massachusetts 01701
(617) - 872 - 8100

November 12, 1982

SBN-367
TF B7.1.2

United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. G. W. Knighton, Chief
Licensing Branch 3
Division of Licensing

References: (a) Construction Permits CPPR-135 and CPPR-136, Docket Nos. 50-443 and 50-444
(b) PSNH Letter SBN-289, dated July 2, 1982, "FSAR Section 8, Open Item List - Power Systems Branch (Electrical) J. DeVincencis to F. Miraglia
(c) USNRC Memorandum, dated October 14, 1982, "Notice of Meeting Regarding Open Items in the Safety Review", L. L. Wheeler to J. D. Kerrigan

Subject: Resolution of Open items - Power System Branch (Electrical)

Dear Sir:

Transmitted herewith are additional responses to certain open items listed in Reference (b) and (c). These open items were discussed with PSB representatives during a telephone conversation on 9/23/82.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

J. DeVincentis
Project Manager

GTs/dsm

B001

OPEN ITEM 10 Bus transfer capability.

RESPONSE: Additional information on the above subject is provided in the attached marked-up FSAR page, 8.3-25.

brings the system into operation including portions of the protection system and transfer of power among various offsite and onsite power supplies will be tested.

(c) →

3. Criterion 5 - Sharing of Systems or Components Between Units

Electrical structures, systems and components important to safety in the onsite power system are not shared between the two units, except in the instances discussed below.

This sharing will not impair their ability to perform their safety function, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining unit.

(a) The seismic Category I service water pump house provides one room and raceway system for the Train A equipment of both units, and another room and separate raceway system for the Train B equipment of both units (see Figure 1.2-46). A single failure cannot affect both trains of either unit.

(b) Individual ducts for underground feeders of Train A of both units share the same Class 1E duct bank and manhole system for a portion of the run from the service water intake structure to the Unit 1 area. Again, a single failure cannot affect both trains of either unit.

(c) Individual ducts for underground circuits of Train A of both units for the control room makeup air system share the same Class 1E duct bank and manhole system where the circuits travel through the opposite unit to the makeup air pits. The same is true for the Train B circuits. A single failure cannot affect both trains of either unit.

(d) Each of the two Train B service water cooling tower fans is capable of being connected to the Train B emergency bus of either unit (Figure 8.3-15). The two breakers connecting each fan to the two buses are mechanically and electrically interlocked to ensure that only one breaker can be closed at any time. A single failure cannot affect both trains of either unit.

4. Criteria 33, 34, 35, 38, 40, 41, 44

Onsite electric power interconnections and transfers are designed so that the safety functions of the reactor coolant makeup system, the residual heat removal system, the emergency core cooling system, the containment heat removal system, the containment atmosphere cleanup system and the

(c)

During reactor operation, the capability to transfer power from the unit auxiliary transformer source to the reserve auxiliary transformer source is continuously monitored. Alarms are provided in the main Control Room to alert the operator if synchronism is lost between the switchgear and the reserve source or if control power is lost to the reserve source circuit breaker.

Transfer of power from the unit auxiliary transformer source to the reserve auxiliary transformer source is not periodically tested at power because such transfers may introduce unwarranted challenges to the Electric Power System that may result in a plant trip.

For a discussion of transfer of power initiated by operation of the generator breaker, see Section 8.2.1.6.

OPEN ITEM 12a: Position 1 of BTP PSB-1

Response

In order to close out open item 12a, compliance with Position 1 of BTP PSB-1, we agreed to submit a list of equipment which would be available in the event of degraded grid voltage for the plant to reach hot shutdown.

The response to RAI 420.38, which is in the final stages of review, will include a list of equipment required to reach hot and cold safe shutdown. We have determined through a review of the preliminary response and through discussion with tne cognizant individuals, that the response will list equipment which will be available in the event of degraded grid voltage for the plant to reach hot shutdown.

This equipment will be available in the event of degraded grid voltage because of one or more of the following reasons:

1. Not powered by the degraded power source
2. Does not rely on electric power
3. In standby and therefore not connected to the degraded source
4. Equipment will run under degraded voltage conditions because of margin between equipment rating and duty
5. Not sensitive to degraded grid voltage (resistive load)
6. Time is available for corrective action.

The response to RAI 420.38 will be submitted before January 1, 1983.

OPEN ITEMS 13b, 15, 26b, 28 and 32 — Compliance with IEEE standards.

RESPONSE: See revised response to RAI 430.3 (attached).

430.3 (8.1) Section 8.1.5.2 of the FSAR indicates that the Seabrook design is in conformance with IEEE Standard 387-1972. Section 8.1.5.3 of the FSAR, on the other hand, implies that the Seabrook design is also in conformance with 387-1977 by reference to Regulatory Guide 1.9 (Revision 1). Similar inconsistencies exist between Sections 8.1.5.2 and 8.1.5.3 of the FSAR for IEEE Standard 308-1971 and Regulatory Guide 1.32 (Revision 2), IEEE Standard 317-1972 and Regulatory Guide 1.63 (Revision 2), IEEE Standard 384-1974 and Regulatory Guide 1.75 (Revision 2), IEEE Standard 338-1975 and Regulatory Guide 1.118 (Revision 2), IEEE Standard 484-1975 and Regulatory Guide 1.128 (Revision 1), and IEEE Standard 450-1972 and Regulatory Guide 1.129 (Revision 1).

Correct the inconsistencies and describe and justify each exception taken to IEEE Standards 308-1974, 387-1977, 317-1976, 384-1974, 338-1977, 484-1975 and 450-1975.

RESPONSE: The basic commitments to various industry standards pertinent to the electrical design of the Seabrook project have been established at the PSAR stage. We have and plan to adhere to these commitments as shown in Section 8.1.5.2. It should be pointed out that IEEE Standard 338-1975 and IEEE 379-1972 are additions to the FSAR listed standards as are the upgrading of IEEE Standard 344-1971 to 344-1975.

Over and above these commitments, it was decided at the FSAR stage to evaluate the extent of compliance to the most recent Regulatory Guides and Branch Technical Positions at the date of issuance of the FSAR. This evaluation is reflected in Sections 8.1.5.3 and 8.5.1.4 and in no way should be construed to reflect a commitment to the Regulatory Guide. We are aware that the listed Regulatory Guides often reference a later issue of an industry standard; however, Regulatory Guides such as 1.30, 1.40, 1.41, 1.53, etc., continue to reference superseded issues of industry standards in spite of the publication of revised standards. This unfortunate lack of coordination will always exist unless simultaneous revisions are made by industry and the NRC. It is obvious that the problem is not easily resolvable, and for this reason, we have established the ground rules reflected in the discussion above. The evaluation of the Seabrook design against the most recent Regulatory Guides provides an indication of how Seabrook design complies with recent NRC requirements.

In addition, an evaluation of the Seabrook design has been performed to the standards listed below having more recent issue dates than those listed in the FSAR. The purpose of the evaluation was to determine if there are any requirements of safety significance that the Seabrook design does not meet and which are included in the standards. The results of the evaluation are outlined below:

IEEE 308-1974: It is our engineering judgment that the Seabrook design meets the requirements of this standard. On test intervals for batteries and diesel generators, our design (Technical Specifications) exceeds the requirements of this standard because the intervals have been specified to meet even more recent industry standards such as IEEE-387 on diesel generators and IEEE-450 on batteries.

IEEE 387-1977: The basic difference between the 1977 version of the standards and the 1972 version is the incorporation of type testing requirements for diesel generators. Because the FSAR commits to the type test program of IEEE 387-1977, it is our engineering judgment that the Seabrook design meets this standard.

IEEE 317-1976: All major electrical containment penetrations were manufactured to meet the 1976 version of the standard. Some minor electrical penetrations, 3/4" to 1" size which are associated with the personnel air lock, the equipment hatch and the containment recirculation sump isolation valve encapsulation tank, were manufactured to meet the 1972 version. It is our engineering judgment that although these minor penetrations might not meet all the most recent requirements, they will perform their safety function.

IEEE 384-1974: The Seabrook design meets the requirements of this standard.

IEEE 338-1977: The Seabrook design meets the requirements of this standard.

IEEE 484-1975: Refer to RAI 430.31 for comments on this standard.

IEEE 450-1975: The Seabrook design meets the requirements of this standard.

OPEN ITEM 14 Non-safety loads powered from the Class 1E ac distribution system

RESPONSE: The response to this item was reflected in attachment L of our letter to the NRC, SBN-289, dated July 2, 1982. Apparently the reviewer did not receive this attachment. Another copy of this attachment is transmitted herewith.

ATTACHMENT L

430.26 As shown on Figures 8.3-7 and 8.3-8 of the FSAR, the 1500 hp startup feed pump is normally connected to non-safety-related Bus 4 with an alternate (manually initiated) feed from safety-related Bus E5. An electrical interconnection exists between a Class 1E and non-Class 1E bus. It is the staff position that no single failure in the interconnection, operator action or failure of the non-Class 1E load shall cause the paralleling of the Class 1E and non-Class 1E buses or failure of the Class 1E system. Provide a design that meets this staff position or justify noncompliance.

RESPONSE: We believe our design of the alternate feed for the startup feed pump (SUFP) meets the staff position.

The diesel generator is capable of starting and powering the startup feed pump when carrying the maximum Train A load listed in Table 8.3-1. In addition, operating procedures for establishing the alternate supply to the startup feed pump will require that the operator verify diesel generator loading to ensure that adequate margin is available for running of the startup feed pump.

Paralleling of the Class 1E and non-Class 1E buses will be positively prevented by the interlocking system. Presently, there is a two position ("Bus E5" - "Bus 4") key-locked switch which will have to be operated in order to be able to close the breaker on Bus E5 or Bus 4. We are upgrading this interlock such that when the switch is placed in position "Bus E5" it will send a trip signal to the circuitry of the SUFP on Bus 4 and vice versa. Furthermore, as pointed out in Note 7 of Figure 8.3-8, no 4 kV breaker is provided for the switchgear position in Bus E5 dedicated to the alternate feed of the SUFP. The operator, following a procedure, will have to remove the 4 kV breaker from the SUFP compartment on Bus 4, transport it to the Bus E5 switchgear room and insert it in the proper compartment of Bus E5.

From the above, it is evident that it will take two failures (one electrical and one human error) in order to parallel the two buses.

In regards to the concern of failure of the non-Class 1E load affecting the Class 1E system, we would like to point out that the connection of the startup feed pump to Bus E5 is not a normal operation; it will be done only under contingency conditions. Furthermore, the connection of the non-Class 1E load to the Class 1E bus will be done with a Class 1E breaker.

OPEN ITEM 17 Automatic transfer of loads and electrical interconnections between redundant divisions.

RESPONSE: The attached revised RAI 430.44 provides information addressing the above concerns.

430.44 (8.3.1) (8.3.2) Redundant Buses E5 and E6 are interconnected through Bus E52, MCC 523, Charger ED-13C-2B, 125 V Bus 12B, UPS ED-I-2B and Bus E63. Either eliminate or justify this interconnection.

Provide the results of an analysis that identifies and justifies all electrical interconnections between redundant divisions.

RESPONSE: (11/82) The interconnection decribed above is imaginary and from a practical standpoint is nonexistent. For this interconnection to exist, multiple failures of diverse equipment would have to occur first, followed by a transformation from a 3-Wire ac System to a 2-Wire dc System and back again to a 3-Wire ac System. The safety divisions which are purported to be interconnected are in addition effectively isolated through the inherent blocking feature between input and output of the chargers, the current limiting feature of the UPS and the charger and the various protective devices. If this imaginary interconnection is to be given any credence, then so must the equally imaginary interconnection that could exist between redundant divisions through the common ground path and ground grid at the station.

We have performed an analysis to identify all other electrical interconnections between redundant divisions and it remains our position that there are no electrical interconnections between redundant divisions.

OPEN ITEM 18 Battery supports - interface between battery racks and battery cells.

RESPONSE: See revised response of RAI 430.33 (attached).

430.33 Recent operating experience has shown that an incompatibility between the battery rack and the battery may cause cracking of the battery case. The cracking may be caused in part by the improper support at the battery stress points. Describe the battery stress points and their relationship with battery rack supports.

RESPONSE: The Seabrook batteries utilize cells that have a plate support bridge that is molded separately from the cell jar. This permits even distribution of element weight across the entire bottom surface of the jar. This design results in a relatively stress-free plastic molding with the weight of the elements equally distributed across the container bottom.

In the racks, the cells, which have a base of 14-9/16 x 14-1/2 inches, sit on three 1.63-inch wide steel stringers located under the cell center line and $\pm$ 5 inches from the center. This evenly distributes the cell weight to minimize stress on the cell.

Concerns regarding the location of the rack steel stringers in relationship to the battery plate support bridges are addressed in the attached letter from the battery manufacturer.

Gould Inc., Industrial Battery Division
2050 Cabot Boulevard West, Langhorne, Pa. 19047
Telephone (215) 752-0555

CABLE: GOULNATBAT LANGHORNE, PA.
TWX: GOULD LAHN. 510-667-2056
GOULD LANG. 510-667-2066

GOULD
Electronics & Electrical Products

August 13, 1982

United Engineers & Constructors Inc.
30 South 17th Street
P.O. Box 8223
Philadelphia, PA 19101

Attn: G.M. Aggarwal
Supervising Electrical Engineer

Subject: Public Service Company of New Hampshire
Seabrook Station - Units 1 & 2
Storage Batteries
9763-006-137-1 SBU-58840

Dear Mr. Aggarwal:

In response to the subject regarding NRC's concern on container stress between the container and battery, we wish to respond as follows:

(1) Both the cell design and associated rack design were governed by Gould and represent the current state-of-the art with respect to element and/or cell support.

(2) The battery and rack interface was tested as designed through our seismic qualification program; ref: Wylie Test Report No. 44681-1 of 10-27-81.

(3) The seismic loads experienced during this test were quite significant as indicated by the required and test response spectra. The batteries and racks used at Seabrook Unit 1 were typical of the cells and racks tested.

(4) The distribution of stresses at the bridge/container bottom as well as those at the cell bottom and rack rail interface have been successfully accomodated as evidence by the tests aforementioned.

(5) The Gould design feature of the separated bridge concept has done away with the potential stress problem that existed prior to our M & N line design initiated in 1970.

We trust the above satisfies those concerns referenced in your letter of July 21, 1982.

[(OTHER SUBJECT NOT RELATED TO THE BATTERY CONCERNS)]

Very truly yours,

Raymond R. Fletcher
Manager, Marketing Utilities

RRF:dh

cc: Bob Bevan - Brown Boveri Electric
Ramesh Desai - Gould
B. Hopewell - Gould
G. Morris - U.E. & C.

OPEN ITEM 20 — The NRC requested that the load profiles for the safety-related batteries be included in the FSAR.

RESPONSE: The FSAR has been revised accordingly to incorporate these profiles.

OPEN ITEM 22 Submerged electrical equipment as a result of a LOCA.

RESPONSE: For additional information on the above item see attached revised RAI 430.62.

430.62 Identify all electrical equipment, both safety and non-safety, that may become submerged as a result of a LOCA. For all such equipment that is not qualified for service in such an environment provide an analysis to determine the following:

1. The safety significance of the failure of this electrical equipment (e.g. spurious actuation or loss of actuation function) as a result of flooding.

2. The effects on Class 1E electrical power sources serving this equipment as a result of such submergence; and

3. Any proposed design changes resulting from this analysis.

RESPONSE: All electrical equipment that may become subme. ,ed as a result of a LOCA is listed in Table 430.62-1.

TABLE 430.62-1

EQUIPMENT OR COMPONENT OF EQUIPMENT LOCATED IN THE CONTAINMENT BELOW THE FLOOD LEVEL OF (-) 20'-8"

VALVE LIST

TAG	V-VITAL NV - NON-VITAL	EQUIPMENT OR COMPONENT SUBMERGED	APPLICATION
CS-V-59	NV	Solenoid & Limit Switch	RCP LD Seal Water Return
CS-V-145	NV	Solenoid & Limit Switch	Letdown HX-E-2 to HX-E8
CS-V-170	NV	Solenoid & Limit Switch	Letdown HX-E-3 to RCDT
CS-V-175	NV	Solenoid & Limit Switch	Excess Letdown Line
CS-V-176	NV	Limit Switch	Excess Letdown Line
CS-V-177	NV	Limit Switch	HX-E2 to Cold Leg 4
CS-V-180	NV	Solenoid & Limit Switch	HX-E2 to Cold Leg 1
CS-V-185	NV	Solenoid & Limit Switch	HX-E2 to Pressurizer
CS-V-168	V	Motor Operator	RCP Seal Water Isolation
NG-V-17	NV	Solenoid & Limit Switch	Accumulator 9A Ni Line
NG-V-19	NV	Limit Switch	Accumulator 9B Ni Line
NG-V-21	NV	Solenoid & Limit Switch	Accumulator 9C Ni Line
NG-V-23	NV	Limit Switch	Accumulator 9D Ni Line
RC-LCV-459	NV	Solenoid & Limit Switch	Letdown Isolation Valve
RC-LCV-460	NV	Solenoid & Limit Switch	Letdown Isolation Valve
RC-LCV-81	NV	Solenoid & Limit Switch	RC Loop 3 Letdown to HX-E2
RMW-V-28	NV	Solenoid	RMW-TK 12 to RC TK 11
RMW-V-180	NV	Solenoid	RC-P-1B Seal Pressurizer Equalizing Valve
RMW-V-181	NV	Solenoid	RC-P-1A Seal Pressurizer Equalizing Valve
RH-V-27	V	Solenoid & Limit Switch	HX-E-9B Header Test
RH-V-28	V	Solenoid & Limit Switch	HX-E-9A Header Test
RH-V-49	V	Solenoid & Limit Switch	HX-E-9A Injection Test
RH-V-54	NV	Solenoid & Limit Switch	SI-P-6A Discharge Test
RH-V-55	NV	Limit Switch	SI-P-6B Discharge Test
SI-V-03	V	Stem Mounted Limit Switch	Accumulator Iso. Valve Stem Limit Switch
SI-V-04	NV	Limit Switch	Accum. Test Valve
SI-V-15	NV	Solenoid & Limit Switch	Accum. Fill Valve
SI-V-17	V	Stem Mounted Limit Switch	Accum. Iso. Valve Stem Limit Switch
SI-V-18	NV	Solenoid & Limit Switch	Accum. Test Valve
SI-V-23	NV	Solenoid & Limit Switch	Accum. Fill Valve
SI-V-32	V	Stem Mounted Limit Switch	Accum. Iso. Valve Stem Limit Switch

TABLE 430.62.1 (Continued)

VALVE LIST

TAG	V-VITAL NV - NON-VITAL	EQUIPMENT OR COMPONENT SUBMERGED	APPLICATION
SI-V-33	NV	Solenoid & Limit Switch	Accum. Test Valve
SI-V-38	NV	Limit Switch	Accum. Fill Valve
SI-V-47	V	Stem Mounted Limit Switch	Accum. Iso Valve - Stem Limit Switch
SI-V-48	NV	Solenoid & Limit Switch	Accum Test Valve
SI-V-53	NV	Solenoid & Limit Switch	Accum Fill Valve
SI-V-131	V	Limit Switch	SI - Cold Leg Test
SI-V-132	NV	Limit Switch	SI - Hot Leg 3 Test
SI-V-133	NV	Limit Switch	SI - Hot Leg 2 Test
SI-V-134	V	Solenoid & Limit Switch	SI - Hot Leg Test
SI-V-158	V	Solenoid	Charging Pump Test
SI-V-160	V	Limit Switch	SI Pump - Test Line Iso. Valve
WLD-FV-1403	NV	Solenoid & Limit Switch	RCDT Transfer Valve

TABLE 430.62.1 (Continued)

INSTRUMENTATION LIST

SAFETY-RELATED INSTRUMENTS THAT MAY BECOME SUBMERGED

TAG	DESCRIPTION	ACTION
NI-NE-41 A/B	Power Range Neutron Detectors	Not required post-LOCA
NI-NE-42 A/B	Power Range Neutron Detectors	Not required post-LOCA
NI-NE-43 A/B	Power Range Neutron Detectors	Not required post-LOCA
NI-NE-44 A/B	Power Range Neutron Detectors	Not required post-LOCA
RM-RM-6535A	Manipulator Crane Radiation Monitor	Not required post-LOCA
RM-RM-6535B	Manipulator Crane Radiation Monitor	Not required post-LOCA
RC-FT- 414, 415, 416	RC System Loop 1 - Flow	Will be raised above the flood level
424, 425, 426	RC System Loop 2 - Flow	Will be raised above the flood level
434, 435, 436	RC System Loop 3 - Flow	Will be raised above the flood level
444, 445, 446	RC stem Loop 4 - Flow	Will be raised above the flood level

TABLE 430.62-1 (Continued)

NON-VITAL INSTRUMENTS THAT MAY BECOME SUBMERGED

TAG	DESCRIPTION
CAH-TE-5640 - 5647	NI Detector Wall Temp.
CAS-AE-8815	Hydrogen Analyzers in RC TK 55 Area
CAS-AE-8816	Hydrogen Analyzers in RC CS-E-3 Area
CAS-AE-8817	Hydrogen Analyzers in Cntmnt. Valve Rm.
CAS-AE-8818	Hydrogen Analyzers in CS-E-2 Area
COP-PT-1787	
CS-PT-124	Excess Letdown HX, CS-E-3 Outlet Pres.
CS-TE-126	Regenerative HX, CS-E-2 Charging Line Temp.
CS-FT-154 - 157	RCP Low Range Leakage Flow
CS-FIS-191 - 194	RCP Seal Flow
LD-LT-8333	Sump B Level
RC-LT-9405	Press. Relief Tank Level
RM-RX-6578 - 6581	Radiation Monitor
SF-LT-2629	Refueling Canal Level
SM-XS, XT-6701	Seismic Monitor
SM-XS, ST-6709	Seismic Monitor
WLD-LT-1403	RCDT, TK 55 - Level
WLD-TE-1403	RCDT, TK 55 - Temp.
WLD-FT-1406	RCDT, TK 55 - Flow
WLD-FT-1411	RCDT, EX E-43 Inlet Temp.
WLD-TE-1413	RCDT, EX E-43 Outlet Temp.
WLD-PT-1412	RCDT, EX E-43 Pump P33 A/B Discharge Pres.
WLD-PT-1420	RCDT, EX E-43 Pump P33 A/B Section Pres.
WLD-LSH-6266	Containment Drains Sump A Level
WLD-LSH-6267	Containment Drains Sump B Level

TABLE 430.62-1 (Continued)

MISC. NON-VITAL EQUIPMENT THAT MAY BECOME SUBMERGED

PUMPS

TAG	DESCRIPTION
RC-P-271	Pressurizer Relief Tank, TK 11, Recirc. Pump
SF-P-272	Refueling Canal Drain Pump
WLD-P-5A, 5B	Containment Sump A Pumps
WLD-P-5C, 5D	Containment Sump B Pumps
WLD-P-33A, 33B	RCDT, TK 55, Pumps

INSTRUMENT RACKS

Individual instruments located on these racks have been identified above.

CONTROL PANELS

TAG	DESCRIPTION
WLD-CP-280	Containment Sump A - Control Panel
WLD-CP-281	Containment Sump B - Control Panel

LIGHTING

TAG	DESCRIPTION
ED-X-16F	Transformer Supply for Panel L17
ED-X-16A	Transformer Supply for Panels PP-8B and EL 13
ED-X-16J	Transformer Supply for Panel L41
Panel L41	Lighting Panel

TERMINAL BOXES

TAG	DESCRIPTION
X45	Pressurizer Heater Backup Group C
X46	Pressurizer Heater Backup Group D

1. The followi g analysis discusses the safety significance of the failure as a result of flooding of the electrical equipment listed in Table 430.62-1.

   A. Valves - Safety-Related

      (1) Stem-mounted Limit Switches for SI Accumulator Valves

      Stem-mounted limit switches only provide an alternate valve position indication. Failure of these switches could cause loss of the alternate valve position indication circuits but would not affect valve operation; valve position indication will still be provided by the normal valve limit switches.

      (2) RCP Seal Water Isolation Valve, CS-V-168

      This motor-operated valve is driven closed upon a containment isolation signal, therefore, this valve would fail in its safe position. Submergence will not change the fail-safe position. Motor-operated valves are powered from individual circuits of a motor control center so failure of this circuit would not affect the remaining loads on the motor control center. Failure of the limit switch internal to the operator could effect the valve position indication at the control switch on the MCB and also the post-accident monitor (PAM) light indication of this valve.

      This circuit will be modified by adding an interposing relay to the circuit of CS-V-168 . The relay will be located in the control building thus not affected by flood and will prevent loss of the remaining PAM monitor circuits upon flooding of the valve.

      (3) SI Pump Cold and Hot Leg Test Line Isolation Valves SI-V-131, and SI-V-160 and Charging Pump Test Line Isolation Valve, SI-V-158

      These Train B air-operated valves are closed on a containment isolation signal and submergence will not alter their position.

      Loss of power on this circuit will also cause loss of power to two other safety-related valves, SI-V-174 and SI-V-70, which are powered from the same circuit. These valves which are not subject to submergence are already closed on safety injection or containment isolation signals, therefore loss of power results only in loss of valve position indication at the MCB control switches. The limit switches for valves SI-V-131, V-158 and V-160 are also used in the Train B PAM monitor light circuits, and this circuit may also be lost.

These circuits will be modified by adding interposing relays to the circuits of SI-V-131, SI-V-158 and SI-V-160. The relays will be located in the control building thus not affected by flood and will prevent loss of the remaining Train B PAM monitor circuits upon flooding of the above valves.

(4) SI Hot Leg Test Line Isolation Valves, SI-V-134

This valve is a normally closed test valve that also receives a containment isolation signal to ensure that it is closed. Valve SI-V-134 is a Train A valve, and loss of power on this circuit, because of submergence, will cause loss of power to four other safety-related valves which are not subject to submergence, SI-V-165 and V-173 (already closed on safety injection) and SI-V-62 and V-157 (already closed on containment isolation). Valve position indication at their respective MCB control switches will be lost.

Limit switch contacts for SI-V-134 are also used in the PAM monitor light circuits. An interposing relay will be added to SI-V-134 circuit to prevent loss of the remaining PAM monitor circuits upon flooding of SI-V-134.

(5) RHR Test Valves RH-V-27 and RH-V-49

These valves are normally closed Train A test valves that receive a containment isolation signal. The open contact of the containment isolation signal isolates the solenoids. If the containment isolation signal is reset, the circuit for RH-V-27 and V-49 could fail resulting in loss of power. This circuit failure would also cause loss of power to safety-related valve RH-V-16, and solenoids for FY-618-1 and HCV-606. Valve RH-V-16 is already closed on containment isolation. Loss of power to FY 618-1 and HCV-606 solenoids will result in full flow of the RH System A loop through the RHR heat exchanger E-9A and the closing of the bypass line. This scenario is addressed in response to RAI 440.133. Valve position indication for these valves at the MCB control switches RH-V-27 and V-49 will be lost.

Limit switch contacts for RH-V-27 and RH-V-49 are also used in PAM monitor light circuits. Interposing relays will be added to these valve circuits to prevent loss of the remaining PAM monitor circuits upon flooding of the above valves.

(6) RHR Test Valve RH-V-28

Valve RH-V-28 is a normally closed Train B test valve that also receives a containment isolation signal. The open contact of the containment isolation signal isolates the solenoid. This valve is similar to RH-V-27 (above) and failure of this circuit would result in loss of power to safety-related valve RH-V-17 and solenoids for FY-619-1 and HCV-607. This will result in full flow through RHR heat exchanger E-9B. Valve position indication for these valves at the MCB control switches will be lost.

Limit switch contacts for RH-V-28 are also used in PAM monitor light circuits. An interposing relay will be added to this valve circuit to prevent loss of the remaining PAM monitor circuits upon flooding of the above valve.

B. Valves - Non-Safety

Non-safety-related, air-operated valves that may be submerged following LOCA, are listed in Table 430.62-1. Failure of the stem-mounted limit switch or pilot solenoid may cause the entire valve circuit to lose power with the results that any other non-safety-related valves on that particular circuit may de-energize to their fail safe position. Valve position indication will also be lost.

C. Instrumentation

All safety-related instrumentation, with the exception of the excore neutron detectors and maniulator crane radiation monitors is located or will be relocated above the flood level. The excore neutron detectors and manipulator crane radiation monitors are not required following a LOCA.

Non-safety-related instrumentation located below the flood level may fail. None of this instrumentation is required following a LOCA.

D. Miscellaneous Non-Safety-Related Equipment

(1) Pumps

Those pump motors that may become submerged and fail are either protected by redundant Class 1E breakers or are de-energized during normal plant operation. Failure of the particular circuit will not affect other circuits. These non-safety-related motors are not required following a LOCA.

(2) Control Panels

The sump pump control panels are not required following a LOCA.

(3) Lighting

The lighting system inside containment is normally off. Control of the system is at control stations located outside the personal air lock. Failure of lighting equipment due to flooding will not affect other circuits.

(4) Pressurizer Heater Terminal Boxes

Flooding of the terminal boxes for pressurizer heater backup groups C and D, will cause de-energization of these heaters. Pressurizer heater backup groups A and B which are part of the NUREG-0737 requirements, will not be affected because their terminal boxes are above the flood level. Backup groups A and B are fed from the diesel generators.

The above analysis demonstrates that there is no safety significance from the failure of the equipment described above as a result of flooding. In areas where safety concerns were identified, the modifications mentioned above will be implemented to alleviate these concerns.

2. A. There is no detrimental effect on the Class 1E electric power sources as a result of equipment submergence.

All submerged equipment can be divided into the following three categories:

Category 1: Class 1E load supplied by a Class 1E power supply.

Category 2: Non-Class 1E load supplied by a Class 1E power supply.

Category 3: Non-Class 1E load supplied by a non-Class 1E power supply.

For Category 1 and 2 equipment, Class 1E power supply is protected by the Class 1E protective device which feeds the circuit of the submerged equipment. Only the circuit which feeds the submerged equipment is de-energized. For Category 3 equipment there is no connection to the Class 1E power supply; therefore, there is no effect due to submergence.

B. Instrumentation

Safety-related and non-safety-related instruments are powered through separate instrumentation panels. These panels are powered from separate distribution circuits. Protective devices of the internal power supplies further isolate the individual circuits from the distribution system. Therefore, the Class 1E power sources will not be affected by submergence of any instrumentation.

C. Miscellaneous

(1) Pumps

The non-vital pumps that may be submerged are powered from the non-Class 1E power system. Failure of these motor circuits will not affect the Class 1E sources.

(2) Control Panels

The control panels for the containment sump pumps are powered from non-Class 1E sources and their failure will not affect the Class 1E system.

(3) Lighting System

The lighting system inside the containment is normally de-energized during plant operation; therefore, the Class 1E power sources will not be affected.

(4) Pressurizer Heater Terminal Boxes

Backup heater groups C and D are not powered from the Class 1E power system and their failure will not affect the Class 1E system.

3. Proposed Design Changes

A. Safety-Related Valves

As discussed in Item 1, interposing relays will be added to certain valve circuits to electrically isolate the valve PAM monitor light circuit from the valve limit switch circuit. This modification prevents submergence of the valve limit switch from tripping the entire PAM monitor light circuit. No additional changes are proposed.

B. Non-Safety-Related Valves

No design changes are proposed.

C. Instrumentation

Safety-related reactor coolant flow transmitters will be raised above the flood level.

No additional design changes are proposed.

D. Miscellaneous Equipment

No design changes are proposed.

OPEN ITEM 27 Compliance with the guidelines of NUREG-0737.

RESPONSE: The attached revised RAI 430.53 provides the requested information.

430.53 Describe how the Seabrook design complies with the guidelines of NUREG-0737, Items II.F.3.1 and II.G.1.

RESPONSE: Item II.E.3.1

The Seabrook design complies with the guidelines of NUREG-0737 and the "clarification" to NUREG-0737. A description of the pressurizer heaters is provided in FSAR Section 5.4.

One pressurizer heater bank can be supplied from the Train A diesel generator and one bank can be supplied from the Train B diesel generator during loss of off-site power. Each bank can establish and maintain natural circulation at hot standby conditions. Each bank can be supplied from either off-site power or from one diesel generator.

As demonstrated in FSAR Table 8.3-1, the standby power supply has the capacity to supply the pressurizer heaters without load shedding.

Changeover of the pressurizer heaters from normal off-site power to emergency on-site power can be accomplished manually in the Control Room.

Motive and control power connections to the Class 1E buses for the pressurizer heaters are through Class 1E devices.

Because of our design (see RAI 430.149), the pressurizer heaters are not automatically shed from the emergency buses upon the occurrence of a safety injection actuation signal.

Item II.G.1

The design complies with the guidelines of NUREG-07[illegible] the "clarifications" to NUREG-0737.

Motive and control components of the PORVs and the PORV block valves can be supplied from the off-site power source or the on-site power source.

Motive and control power connections to the Class 1E buses for the PORVs and block valves are through Class 1E devices.

The pressurizer level indication instrument channels are powered from the vital instrument buses. The vital buses can be powered from the off-site power sources or on-site power sources.

The design of the PORV block valves provides the capability to close the valves and retains the capability to open the valves.

The motive and control power for the block valves is from a different emergency bus from the source supplying the PORVs.

Changeover of power to the PORV and block valves from off-site power to on-site power can be accomplished from the Control Room.

Additional information regarding compliance with NUREG-0737 has been provided in our letter SBN-212 to the NRC dated February 12, 1982, to the attention of: Mr. F. Miraglia, Chief, Licensing Branch #3.

OPEN ITEM 29 EPS Testing - Start of the cooling tower pump during the diesel generator load sequence testing.

RESPONSE: The attached marked-up FSAR page 8.3-18 addresses the above concern.

emergency bus parameters such as voltage and incoming line circuit breaker positions (open or closed). Depending upon whether an accident condition (SI) is also present, the EPS provides appropriate contact outputs to the various safety related loads to start them in a programmed time sequence. Momentary signals are provided to circuit breakers and starters of loads which are required to start at a specific time ("definite start loads" see Tables 8.3-1 and 8.3-2, Sheet 1 of 2); maintained permissive contacts are provided for loads whose starting is also dependent upon the presence of a process signal ("indefinite start loads," see Tables 8.3-1 and 8.3-2, Sheet 2 of 2).

Indicating lights for the sequencing steps are provided on the main control board to assist operation. Loading is started when the diesel generator reaches rated speed and voltage and the generator circuit breaker closes (approximately 10 seconds after the diesel start signal).

Table 8.3-1 shows the order and time at which the loads are automatically and sequentially applied to the diesel generator during a combined loss of offsite power and accident condition.

(A) →

Table 8.3-2 shows the order and time at which the loads are automatically and sequentially applied to the diesel generator during a loss of offsite power.

Whenever a tower actuation (TA) signal is received: the cooling tower pumps receive an automatic start signal and, the service water pumps are automatically tripped and locked out.

As noted on Tables 8.3-1 and 8.3-2, either the cooling tower pump or the service water pump, but not both, will be loaded on the diesel generator. Upon loss of off-site power, all service water pumps and cooling tower pumps receive a trip signal. At sequence interval 37 seconds (step 5), both the cooling tower pump and the service water pump receive a start permissive from the EPS. If a TA signal is also present, the cooling tower pump will start, otherwise the service water pump will start.

After step 5, automatic starting of the cooling tower pump is blocked by the EPS until step 8 (52 seconds), such that, if a TA signal is received between 37 to 52 seconds the cooling tower pump will start at 52 seconds. The cooling tower pump will start immediately if a TA signal is received any time after sequence interval time 52 seconds.

The diesel generator has been tested and/or analyzed to demonstrate its ability to successfully start a load larger than the

47

(A)

During the diesel generator load sequence testing, which is performed at least every 18 months, the design accident load will be tested by simulating a loss of off-site power with a safety injection signal and a tower actuation signal. In this way, the test will simulate the load of Table 8.3-1 as close as practical.

OPEN ITEM 30 Additional information on bypass and inoperable status indication.

RESPONSE: The attached marked-up FSAR pages, 8.1-6 and 8.1-5, provide additional information on the above subject.

~~RG 1.47 (5/73)~~	~~"Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems"~~
RG 1.53 (6/73)	"Application of the Single-Failure Criterion to Nuclear Power Plant Protection Systems" -- Refer to Subsection 7.1.2
RG 1.62 (10/73)	"Manual Initiation of Protection Actions" -- Refer to Subsection 7.3.2
RG 1.68 (Rev 2)	"Preoperational and Initial Startup Test Program for Water-Cooled Power Reactors" -- Refer to Subsection 14.2.6
RG 1.73 (1/74)	"Qualification Tests of Electric Valve Operators Installed Inside the Containment of Nuclear Power Plants" -- Refer to Section 3.11
RG 1.81 (Rev 1)	"Shared Emergency and Shutdown Electric Systems for Multi-Unit Nuclear Power Plants"
RG 1.89 (11/74)	"Qualification of Class IE Equipment for Nuclear Power Plants" - Refer to Section 3.11
RG 1.93 (12/74)	"Availability of Electric Power Sources" -- Refer to Subsection 16.3/4.8
RG 1.100 (Rev 1)	"Seismic Qualification of Electric Equipment for Nuclear Power Plants" -- Refer to Section 3.10
RG 1.106 (Rev 1)	"Thermal Overload Protection for Electric Motors on Motor Operated Valves" -- Refer to Subsection 8.3.1.1
RG 1.118 (Rev 2)	"Periodic Testing of Electric Power and Protection Systems"
RG 1.128 (Rev 1)	"Installation Design and Installation of Large Lead Storage Batteries for Nuclear Power Plants"
RG 1.129 (Rev 1)	"Maintenance, Testing and Replacement of Large Lead Acid Storage Batteries for Nuclear Power Plants" - Refer to Subsection 8.3.2
RG 1.131 (8/77)	"Qualification Tests of Electric Cables, Field Splices, and Connections for Light-Water Cooled Nuclear Power Plants" - Refer to Subsection 8.3.1.4

b. The design of the electric power system is in accordance with the following regulatory guides, with clarifications as noted:

RG 1.9 (Rev 2) "Selection of Diesel Generator Set Capacity for Standby Power Supplies"

Position C.4 requires that frequency should be restored to within 2% of nominal in less than 60% of each load sequence time interval. For diesel generators, frequency can only recover when load acceleration is completed. Load acceleration may, on rare occasions, exceed 60% of the load sequence time interval, therefore, frequency recovery in this time period is not possible. This fact presents no problem. The effect of extended load acceleration times has been considered in the diesel generator loading calculation. Voltage and frequency profiles, developed from the loading calculations and actual load test data, confirm that capability for successful load sequencing is not compromised by extended load acceleration times. Refer to Subsection 8.3.1. 45

Position C.14 requires that the engine run at full load for 22 hours following 2 hours at short time rated load. For Seabrook, a "Load Capability Qualification" test was performed per IEEE 387-1977. The engine was run at full load for 24 hours after reaching equilibrium temperature, but before 2 hours short time rated load test.

RG 1.22 (Rev 0) "Periodic Testing of Protection System Actuation Functions" 45

The design is in accordance with RG 1.22 as supplemented by Regulatory Guide 1.108, Rev. 1, entitled "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants". Refer to Subsection 8.3.1

RG 1.32 (Rev 2) "Criteria for Safety-Related Electric Power Systems for Nuclear Power Plants"

Physical Independence of electric systems is in accordance with Attachment "C" of AEC letter dated December 14, 1973, entitled "Physical Independence of Electric Systems" (Appendix 8A). Refer to Subsection 8.3.1

(D) →

RG 1.63 (Rev 2) "Electric Penetration Assemblies in Containment Structures for Water-Cooled Nuclear Power Plants"

The electrical penetration assemblies are designed to withstand, without loss of mechanical integrity, the maximum fault current vs. time conditions that could occur as a result of single random failures of circuit overload devices. In addition to the 15 kV switchgear breakers, the medium voltage 15 kV penetrations are also protected by fuses inserted in the feeders outside containment. These fuses are

(D)

RG 1.47 (5/73) "Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems"

With the exception of the Emergency Diesel Generator System, the Electric Power System is not required to have inoperable status indication because it is not expected to be bypassed or deliberately induced inoperable more frequently than once per year. Reference regulatory position C.3(b).

Inoperable status indication is provided for the Emergency Diesel Generator System as a result of data provided by the NRC indicating that Diesel Generator Systems have been declared inoperable more frequently than once per year.

OPEN ITEM 33 Compliance with Regulatory Guide 1.63.

RESPONSE: Our submittal SBN-322 dated September 9, 1982, addressed the above subject; additional information is provided for the following items:

a) Penetration protection for the reactor coolant pumps motor feeders.

b) Testing of protective devices used to satisfy Regulatory Guide 1.63.

c) Penetration protection for 460 volt distribution panels located inside containment.

d) Use of thermal overload relays in penetration protection.

e) Capability of penetrations to handle long duration overcurrent.

a) Penetration protection for the reactor coolant pumps motor feeders.

Additional information on the above subject is provided in the FSAR. See attached marked up page, 8.3-3.

pump motors. These fuses are located in a seismic Category I building and are part of the protection for the containment electrical penetrations as required by Regulatory Guide 1.63. In addition, a measure of backup protection is provided by the reactor coolant pump circuit breaker and the 13.8 kV bus incoming line circuit breaker. DC control power from separate battery sources is provided for these breakers to preclude the loss of a single dc source from preventing the tripping of both the RCP and the incoming line breaker. For the penetration protection coordination curve, see Figure 8.3-47. (B) 45

b. 4160 Volt Distribution System

1. Arrangement

The 4160 volt distribution system for each unit is shown in Figures 8.3-1, 8.3-7, 8.3-8, and 8.3-9. For each unit, the system consists of four buses, two of which are the redundant Class 1E emergency buses supplying the redundant engineered safety features loads. These safety loads are divided into two separate and independent Trains A and B, as shown on Figures 8.3-8 and 8.3-9. The preferred power supply to each 4160 volt bus is from a UAT. An alternate source is available to each bus through a RAT. A standby power supply, consisting of a diesel generator, is available to each emergency bus. Buses E5 and E6 are the equipment designations of the redundant Class 1E buses.

Redundant Class 1E Buses E5 and E6 are located in completely separate, but adjacent rooms in the seismic Category I control building, as shown on Figure 8.3-27. Buses E5 and E6 are connected to the auxiliary transformers via non-Class 1E non-segregated phase bus duct.

The bus duct is supported by seismically qualified supports in the control building. Taps in the bus duct provide the power to non-safety-related Buses 3 and 4 from the bus duct runs to Buses E5 and E6, respectively. The tie between the non-safety related bus ducts and the Class 1E switchgear is through Class 1E air circuit breakers.

2. Switchgear

All Class 1E switchgear has identical electrical ratings:

(a) Buses - 2000 ampere continuous rating, braced for 80,000 amperes momentary.

(b) Incoming line breakers - 2000 ampere continuous rating, 350 MVA nominal interrupting capacity.

(B)

Although these breakers are not Class 1E, the construction of the 13.8 kV switchgear is similar to the construction of the Class 1E 4 kV switchgear. Periodic testing of these breakers according to the Technical Specifications further verifies their reliability.

A fault on one of the RCP motors assuming failure of its switchgear will be isolated by the fuses provided. Backup protection is provided by the incoming feeder to the switchgear; credit is taken for the 13.8 kV breakers mentioned above to provide backup protection because if it is assumed that the seismic event damages the nonseismic qualified 13.8 kV switchgear, then it will have to be assumed that the nonseismic qualified power source will also be damaged by the same event; thus, the circuit will be deenergized.

b) Testing of protective devices used to satisfy Regulatory Guide 1.63.

The attached marked-up FSAR page, 8.3-22 provides information on the above subject.

for motors is NEMA Class B as a minimum, with the actual insulation class selected on the basis of environment and service conditions in which the motor is required to operate. The factors taken into consideration in selection of the insulation system are resistance to radiation, resistance to moisture, resistance to chemicals, ambient temperature and pressure. The motor enclosure is selected to protect against adverse environmental conditions. Winding temperature detectors and bearing thermocouples are provided on large motors to alarm high temperature conditions.

The motor suppliers are required to verify that actual test data confirm that the torque margin is equal to or greater than that of the calculated data. A further check of motor capability is the preoperational testing conducted at the site under plant light load conditions, to simulate the maximum voltage practically obtainable, and under plant heavy load conditions, to simulate the minimum voltage practically obtainable (reference Section 14.2.6, exceptions to Regulatory Guide 1.68).

j. <u>Provisions for Periodic Testing and Maintenance</u>

The onsite ac distribution system for engineered safety features loads is designed and installed to permit periodic inspection and testing in accordance with General Design Criterion 18, IEEE Standard 308-1971, Regulatory Guide 1.118, Rev. 2 and IEEE 338-1977 to ensure: 45

1. The operability and functional performance of the components of the system, and

2. The operability of the system as a whole under design conditions.

Switchgear and accessories for the auxiliary power system are easily accessible for inspection and testing.

The 13.8 kV, 4160 volt and 480 volt switchgear circuit breakers may be tested when the individual equipment is deenergized. The breakers can be placed in the test position and tested functionally.

The first and second level undervoltage schemes (see Subsection 8.3.1.1.b.4) are designed to permit periodic testing during normal plant operation.

Breakers for engineered safety features auxiliaries are exercised on a schedule similar to that for the auxiliaries controlled by the breakers. Transfer schemes can be exercised during normal operation, or by simulation of the necessary conditions. Timing checks can be performed on transfer schemes. Protective relays are provided with test plugs or test switches to permit testing and calibrating the devices.

Containment penetration conductor overcurrent protective devices are periodically tested according to the requirements of the Technical Specifications.

c) Penetration protection for 460 volt distribution panels located inside containment.

The attached marked-up FSAR pages, 8.3-9 and 8.3-9a provide information on the above subject.

device may possibly be affected because of its proximity. However, in this instance, no penetration damage can occur because all short circuit current flow will be diverted to the new fault located at the protective device. Therefore, there is no conceivable electrical failure that could prevent both the protective devices from operating and at the same time allow the fault current to flow through the penetration. 47

460 volt loads inside the containment, which are fed directly from the 480 volt unit substation, satisfy the requirements of Regulatory Guide 1.63 by utilizing the load breaker as primary protection and the unit substation incoming feeder breaker as backup protection. See Figure 8.3-48 for an example. 45

Feeders for 460 volt distribution panels (lighting panels), located inside containment, are provided with two thermal magnetic molded case breakers in series to satisfy the requirements of Regulatory Guide 1.63.

460 volt loads inside the containment which are normally used only during shutdown (e.g., cranes, refueling machines, welding receptacles, etc.) are not provided with redundant protection because their circuits are de-energized and padlocked at the unit substation or motor control center during normal plant operation. Verification of the circuits being de-energized is part of the Technical Specifications. Though some of these circuits may be required for brief durations during plant operation such as prior to or after refueling outages, lack of redundant protection is justified because of the very limited usage in this mode and the fact that such usage will be under Technical Specification requirements.

Control circuits powered from 120 V ac or 125 V dc distribution panels have dual protective devices (circuit breakers and/or fuses) to provide penetration protection in accordance with Regulatory Guide 1.63.

Control circuits powered from limited capacity power sources such as control power transformers (maximum capacity 150 VA) and instrumentation circuits do not require dual protection because the short circuit versus time capacity of their power sources is within the penetration capabilities. 47

7. Special 480 Volt Criteria

(a) Protection of Containment Electrical Penetrations

The Class 1E and non-Class 1E 480 volt unit substations, 460 volt motor control centers and the distribution panels which feed loads inside the containment are all qualified to meet Class 1E requirements and are located in seismic Category I structures. 460 volt loads inside the containment are fed from distribution equipment with special provisions to satisfy the requirements of Regulatory Guide 1.63 for containment electrical penetration protection. These provisions are outlined below.

460 volt loads inside containment which are fed from motor control centers or distribution panels are provided with one of the following special arrangements to insure that the penetration integrity is maintained.

(1) Circuits of motors 5 hp and less are provided with two identical combination starters. Both units are located in the same compartment of the MCC. See Figure 8.3-~~49~~ 50 for typical coordination curves.

(2) Circuits of motors greater than 5 hp are provided with a thermal magnetic breaker in series with a combination starter. Both the breaker and the combination starter are located in the same compartment of the MCC. See Figure 8.3-~~48~~ 49 for typical coordination curves.

(3) Feeder circuits, including the pressurizer heater circuits, are provided with two identical thermal magnetic breakers. Both breakers are located in the same compartment of the MCC or panel.

The motor control centers containing these special protective devices are located in the Control Building switchgear area, with one exception, the panels for the pressurizer heater circuits are located in the electrical penetration area outside the containment. Both the primary and the backup protective devices are qualified 1E devices.

There are no high or moderate energy lines in the above areas, therefore, only faults within the electrical devices could conceivably damage these protective devices. If a protective device fails catastrophically while clearing a short circuit, the second protective

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d) Use of thermal overload relays in penetration protection.

Refer to FSAR Figure 8.3-50; it can be seen in this typical protection scheme that the thermal overload relays identified in the figure by numbers (2) and (4) are utilized to protect the penetration from a "low grade" fault whose magnitude will not trip the magnetic part of the protective device.

e) Capability of penetration to handle long duration overcurrents.

(Reference RAI 430.56)

The manufacturer of the penetrations has furnished damage curves which establish the duration and magnitude of overcurrents that the penetrations can sustain. Typical curves are shown on FSAR Figures 8.3-47, 8.3-48, 8.3-49 and 8.3-50.

It can also be seen in these figures that the curves of the protective devices are, in all cases, to the left of the penetration damage curves; thus, the protection provided will assure that long or short duration overcurrents that are capable of damaging the penetration will be interrupted before they cause damage.

In regard to the following open items appearing in Reference (c) of the cover letter, we are providing the following response:

OPEN ITEM - Physical Independence (GDC17)

a. Independence between Class 1E and non-Class 1E.

c. Identification of safety related associated circuits.

RESPONSE

a. Our response to RAI 430.149, transmitted via our letter SBN-347, dated October 26, 1982, provides information on this subject.

c. The open item refers to safety related associated circuits; there are no safety related associated circuits at Seabrook; however, as it has been explained in RAI 430.149 and in the FSAR, the associated circuits in the Seabrook design meet the requirements placed on Class 1E circuits but they are not safety related.

The physical identification of the associated circuits is addressed in Section 8.3.1.3 of the FSAR.

Regarding the identification of associated circuits on documents; there is no requirement for the associated circuits to have specific identification on documents i.e., Train association, etc., and therefore none is provided. Our method of identification of safety related circuits is in accordance with IEEE Standard 494. Documents clearly identify what is nuclear safety related and what is not.