PSNH PUBLIC SERVICE
Company of New Hampshire

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

September 1, 1982

SBN- 318
T.F. B 7.1.2

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

Attention: Mr. Frank J. Miraglia, Chief
Licensing Branch No. 3
Division of Licensing

References: (a) Construction Permit CPPR-135 and CPPR-136, Docket Nos. 50-443 and 50-444
(b) USNRC Letter, dated July 27, 1982, "Request for Additional Information", F. J. Miraglia to W. C. Tallman

Subject: Response to 410 Series RAIs; (Auxiliary Systems Branch)

Dear Sir:

We have enclosed responses to the subject RAIs (410.51-55) which you forwarded in Reference (b). These responses have necessitated revisions to FSAR Section 7.4. The annotated pages of FSAR Section 7.4 are also enclosed. Please note that the ongoing review with Instrumentation and Control Systems Branch has also necessitated revisions to FSAR Section 7.4. All FSAR Section 7.4 revisions will be included in a future amendment to the OL Application.

A draft copy of these responses was forwarded to the NRC Project Manager (Louis Wheeler) on August 24, 1982.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

John R DeVincentis

J. DeVincentis
Project Manager

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410.51 At a meeting with the staff on June 23, 1982, the applicant took the position that the staff's requirement for a source range neutron flux monitor (SRM) on the remote shutdown panels was not necessary, since the applicant meets the Appendix R requirements for a "direct-reading" of reactivity with an intermediate range neutron flux monitor (IRM) on the remote shutdown panels.

In order for us to evaluate whether the IRM can adequately perform the functions expected of the SRM, the applicant should provide the following information:

a. Provide a diagram of the operable ranges of the SRM, IRM and power range neutron flux monitor (PRM) as a function of power level. Indicate the levels to be expected in a normal shutdown (normal T and K) as a function of time after shutdown (over several hours);

b. State at what point on the IRM scale criticality would be expected to occur for dilution starting at different times after shutdown;

c. Discuss the effect of reactor coolant temperature on IRM readings [lower temperature causes more attenuation. Sensors are calibrated for high temperature];

d. Discuss the response times of the operator during an increase in reactivity if the first alarm comes from the IRM vs. SRM.

RESPONSE: One full-range flux monitor will be provided at each remote shutdown location. FSAR Section 7.4.1.2 (attached) has been marked up to reflect this change.

410.52 In Sections 3.1.1.4 and 3.1.2.1 of Fire Protection of Safe Shutdown Capability, the applicant assumes that the operator will trip the reactor, will trip all four reactor coolant pumps and will close all four main steam isolation valves prior to evacuation of the main control room. Additional information to verify this capability is required. It is our position that in the event of a fire which rapidly makes the control room uninhabitable allowing the operator only time to trip the reactor, that the capability to trip the four reactor coolant pumps (RCPs) and close the four MSIVs be provided outside the main control room, in the event off-site power is maintained or lost. Verify that failure to trip the RCPs or close the MSIVs in the event of a control room evacuation does not result in an unacceptable plant condition, or verify whether the RCPs can be tripped and MSIVs closed outside the control room, that the delay in doing so will not result in a violation of any of the criteria as listed in Section III.L of Appendix R to 10 CFR Part 50.

RESPONSE: As discussed in the July 15 and 16, 1982, meeting at Seabrook Station, it is our position that a control room evacuation would be a deliberate and planned evolution with sufficient time to trip the reactor, reactor coolant pumps (RCPs) and close the main steam isolation valves (MSIVs). The condition you postulated (a fire which rapidly makes the control room uninhabitable) has never been identified as a potential concern by the NRC Chemical Engineering Branch. Therefore, our procedures will call for the operators to perform the three operations described above before evacuating the control room.

However, because of other design conditions with respect to our fire protection evaluation, we have included the capability to trip all four MSIVs from each remote shutdown panel, thereby satisfying one of the NRC concerns. FSAR Section 7.4.1.3 (attached) has been marked up to reflect this change.

The 13 kV breakers for the RCPs are in the 13 kV switchgear located in the non-essential switchgear room, Elevation 21'-6", adjacent to switchgear room A. These breakers are provided with a local mechanical trip mechanism which does allow for tripping the RCPs from outside the control room. FSAR Section 7.4.1.3 (attached) has been marked up to reflect this change. Furthermore, there is no immediate concern with the failure to trip the RCPs prior to control room evacuation since their operation does not affect the integrity of the primary system.

410.53 The applicant should address the means provided for assuring the function of the safe shutdown capability when considering fire induced failures in associated circuits. The enclosure provides the staff concern with associated circuits. The enclosure also provides guidance needed by the applicant to review associated circuits of concern and the information to be provided for staff evaluation. The applicant should address Part II.C of the enclosure.

RESPONSE: Section 3.2 of the Fire Protection of Safe Shutdown Capability will be revised as follows to address associated circuits and associated circuits of concern:

3.2 Associated Circuits

3.2.1 Definition of Associated Circuits of Concern

Circuits other than those directly required for the Safe Shutdown functions which have the potential to affect or prevent post-fire safe shutdown are considered associated circuits of concern. Associated circuits of concern are defined as those cables (Class 1E and non-Class 1E) that:

a. Have a physical separation less than that required by Section III.G.2 of Appendix R, and

b. Have one of the following:

1) a common power source with the safe shutdown equipment (redundant or alternative) and the power source is not electrically protected from the circuit of concern by coordinated breakers, fuses or similar devices, or

2) a connection to circuits of equipment whose spurious operation would adversely affect the safe shutdown capability (e.g., RHR/RCS isolation valves, PORVs, steam atmospheric dump valves, etc.), or

3) a common enclosure (e.g., panel) with the shutdown cables (redundant or alternative) and

a) are not electrically protected by circuit breakers, fuses or similar devices, or

b) will allow propagation of fire into the common enclosure.

3.2.2 Discussion of Methodology

Sections 3.2.2.1, 3.2.2.2 and 3.2.3.3 in conjunction with Figure 3.2-1 describes the methodology utilized to address the following types of associated circuits:

a. Common power source

b. Spurious operation

c. Common enclosure

Only circuits that are considered to be associated circuits of concern have been addressed in the review.

3.2.2.1 Common Power Source

As stated in FSAR Section 8.3.1.4, all non-Class 1E circuits are associated with either Train A or Train B in accordance with the provisions of FSAR Appendix 8A Section 4.5a. Based on this design consideration, associated circuits can be powered from the Class 1E electrical distribution emergency (EDE) system or from the non-Class 1E electrical distribution (ED) system and further may be routed in the same raceways and terminate in the same enclosure as Class 1E circuits. Although all safe shutdown circuits are powered from the EDE system, not all safe shutdown circuits are considered to be Class 1E. There are no safe shutdown circuits powered from the ED system.

Associated circuits that are powered from the EDE system, and are associated with the safe shutdown circuits by a common power supply, are protected by a coordinated circuit breaker and, hence, are not considered to be associated circuits of concern.

The above design consideration eliminates as associated circuits of concern all circuits which have no deleterious impact on safe shutdown.

3.2.2.2 Spurious Operation

The review of each system required to satisfy the Safe Shutdown functions included all valves necessary to operate the system or maintain the system process boundaries. This assures that the safe shutdown system will operate as designed. If valves or other equipment from one train (i.e., Train A) are required for operation or could prevent operation of the other train (i.e., Train B), then additional reviews are performed to determine the failure modes and provide manual actions or operations of other equipment that would prevent the spurious operation from affecting safe shutdown. An example of this is the primary component cooling water containment isolation function which requires that both Train A and Train B valves remain open. The inboard containment isolation valve is the same train as the pumps which supply primary component cooling water while the outboard valve is of the opposite train but could be operated manually upon loss of power or damage to electrical circuit.

To prevent the spurious operation of various safety injection system valves, containment isolation valves and service water valves, the engineered safety features actuation system logic and the tower actuation logic are disabled by tripping their power supplies after a control room evacuation.

In several instances (e.g., RHR/RCS isolation valves), the power supplies are permanently disabled (breaker tripped and locked out) to prevent spurious operation.

The spurious operation of valve protecting high-low pressure interfaces is discussed in Section 3.3.

3.2.2.3 Common Enclosures

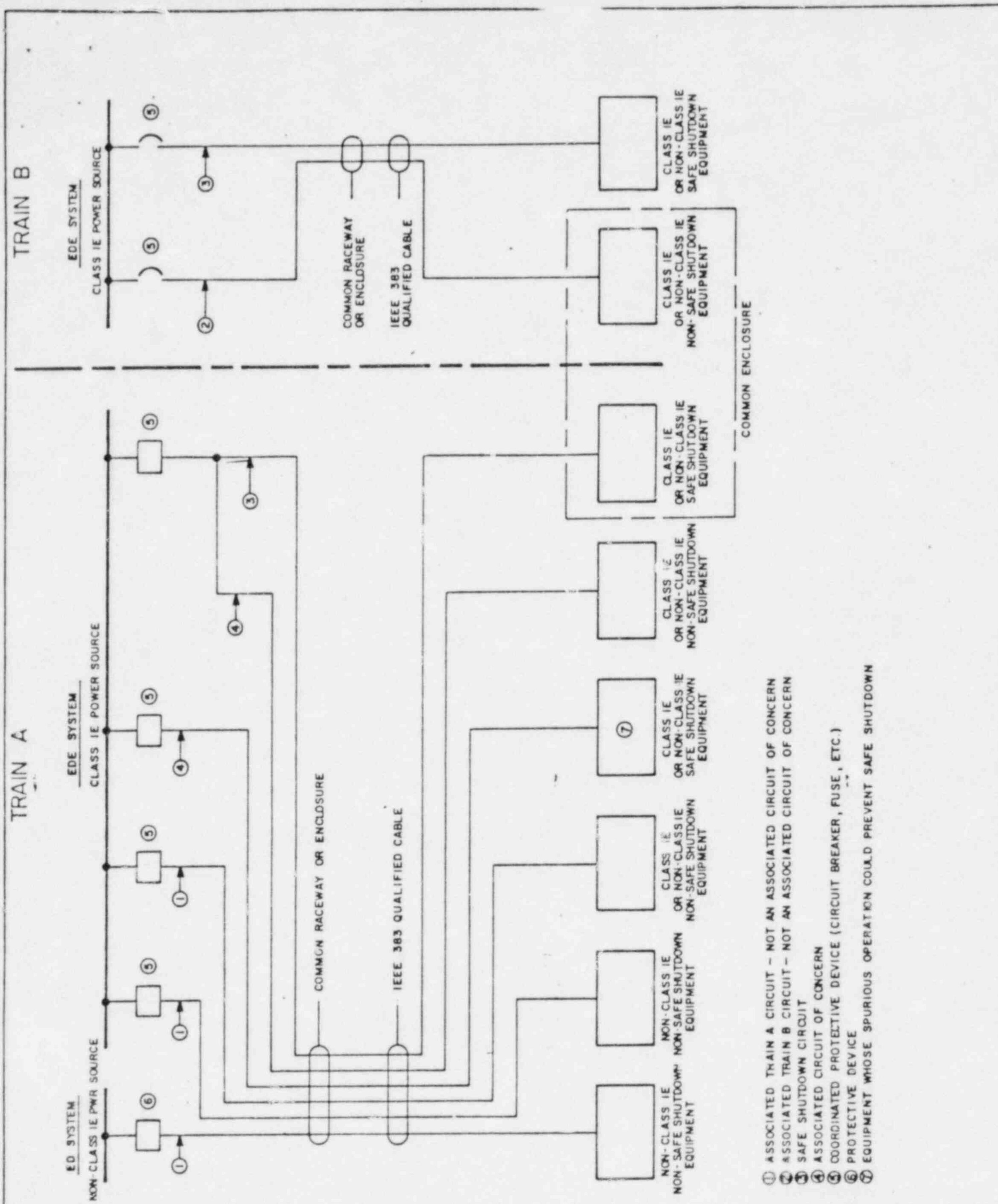
The deleterious effects of fire on associated circuits in common enclosures is eliminated by the following three design considerations:

a. Coordinated circuit breakers, fuses or similar devices will assure that the associated circuit failure does not prevent the redundant train from performing its safe shutdown function.

b. The cables are qualified to IEEE Standard 383; hence, the propagation of the fire from one train to the redundant train in another fire area/zone is very unlikely.

c. Train and channel separation for cable routing is assured by a computerized cable routing program which does not allow cables with different circuit code assignments to be routed in the same raceways.

Based on the above design considerations, associated circuits in common enclosures are not considered associated circuits of concern.



ASSOCIATED CIRCUITS OF CONCERN

FIGURE 3.2-1

410.54 The applicant should commit to develop and implement alternate shutdown procedures. These procedures should address manpower requirements and manual actions to accomplish shutdown. A summary of these procedures should be provided for our review.

RESPONSE: The plant shall develop and implement alternate shutdown procedures which will delineate all functions required to accomplish a safe shutdown from control stations outside of the main control room. These shutdown functions shall assure that performance goals delineated in Appendix R, paragraph III.L.2 are satisfied:

a. Reactivity Control
b. Reactor Coolant Makeup
c. Decay Heat Removal
d. Process Monitoring
e. Support Functions

The procedures shall specify manual actions and address manpower requirements. These procedures will be available three months prior to plant startup.

410.55 The applicant's submittal does not indicate whether repairs are required to achieve safe shutdown. It is our position that systems and components used to achieve and maintain hot standby conditions must be free of fire damage and capable to maintain such conditions for the duration of the hot standby condition without repairs. Systems and components used to achieve and maintain cold shutdown should be either free of fire damage or the fire damage to such systems should be limited such that repairs can be made and cold shutdown achieved within 72 hours. Repair procedures for cold shutdown systems must be developed and material for repair maintained on-site. It is our position that electrical or pneumatic jumpers are not a suitable method of repair for cold shutdown.

RESPONSE: The systems and equipment selected for safe shutdown, including cold shutdown, are such that at least one train of equipment is free of fire damage and, hence, no repairs are required.

7.4.1.1 Monitoring Indicators

The characteristics of these indicators, which are provided outside as well as inside the control room, are described in Section 7.5. The necessary indicators are as follows:

a. Water level indicator for each steam generator

b. Pressure indicator for each steam generator

c. Pressurizer water level indicator

d. Pressurizer pressure indicator

e. Reactor coolant loops 1 and 4 hot and cold leg temperature indicators

410.51 f. ~~Intermediate range neutron flux detectors~~ Neutron Flux (All Ranges)

g. Volume control tank level

h. Primary component cooling water loops A and B temperatures

i. Emergency feedwater flow

7.4.1.2 Controls

a. General Considerations

1. The turbine is tripped (note that this can be accomplished at the turbine as well as in the control room.)

2. The reactor is tripped (note that this can be accomplished at the reactor trip switchgear as well as in the control room.)

[redacted]

410.52 5. For selected equipment having dual independent motor controls outside the control room (which duplicate the manual functions inside the control room), the controls are provided with a key locked mode selector switch which transfers (guillotine) control of the switchgear from the control room to a local station(s). Placing the local selector switch in the local operating position will give an annunciator alarm in the control room, and will turn off the motor control position lights on the control room panel. Selection of the "local" position defeats all automatic trip functions except equipment protective trips and undervoltage load shedding.

3. Main steam isolation valves will be tripped in the control room prior to evacuation of control room (these valves can also be tripped from the Remote Safe Shutdown Panels).

4. All four reactor coolant pumps are tripped from the control room prior to evacuation of control room (pumps can be tripped from outside the control room at the 13 Kv switchgear)

located at remote shutdown panels and duplicate functions available in the control room (see Dwg. 9763-M-503749).

6. Main Steam Isolation Valves (MSIV) and Bypass Valves

410.52 Remote manual control with selector switches are provided at the remote shutdown panels. These controls duplicate functions available in the control room. Capability also exists for tripping MSIV's from the Remote Safe Shutdown Panels. (see Dwgs. 9763-F-503668 and M-503669).

7. Pressurizer Auxiliary Spray Valves

Remote manual control with a selector switch is provided at the remote shutdown panel. These controls duplicate functions available in the control room (see Dwg. 9763-M-503350).

8. Pressurizer Relief Valves

Remote manual control with selector switches are provided at the remote shutdown panel. The controls duplicate functions available in the control room (see Dwg. 9763-M-503746).

9. Reactor Coolant Pump Seal Return Valves

Remote manual control with selector switches are provided at the remote shutdown panel. The controls duplicate functions available in the control room (see Dwg. 9763-M-503333).

10. Reactor Coolant Pump Seal Injection Valves

Remote manual control with selector switches are provided at the MCC in switchgear room A. The controls duplicate functions available in the control room (see Dwg. 9763-M-503391).

11. Excess Letdown Isolation Valve

Remote manual control with a selector switch is provided at the remote shutdown panel. The control duplicates functions available in the control room (see Dwg. 9763-M-503389).

12. Charging Flow Isolation Valves

Remote manual control with selector switches are provided at the remote shutdown panels. These controls duplicate functions available in the control room (see Dwg. 9763-M-503351).