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Docket Nos.: 50-443
and 50-444

William C. Tallman
Chairman and Chief Executive Officer
Public Service Company of New Hampshire
Post Office Box 330
Manchester, New Hampshire 03105

Dear Mr. Tallman:

Subject: Request for Additional Information

The NRC staff has determined that additional information is required for the safety review of the Seabrook operating license application. Enclosed are the following Requests for Additional Information (RAIs):

Hydrologic and Geotechnical Engineering Branch (HGEB)(240.38-41)
Quality Assurance Branch (QAB)(260.28)
Auxiliary Systems Branch (ASB)(410.51-55)
Reactor Systems Branch (RSB)(440.136)
Operator Licensing Branch (OLB)(610.1-3)

The staff is available to discuss all of the above RAIs as may be required to provide any necessary clarification. In most cases these RAIs have been discussed with your representatives in past meetings and are forwarded herewith to formally document staff requirements.

Your responses to these RAIs should be forwarded to the NRC staff within 10 days of receipt of this request. The Seabrook Project Manager (Mr. L. Wheeler, 301/492-7792) is available to respond to any questions your staff may have.

Sincerely,

Original Signed By:

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

Enclosure:
RAIs as stated

cc w/encl.:
See next page

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PDR ADOCK 05000443
A PDR

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DATE	07/27/82	07/27/82					

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240 HYDROLOGIC AND ~~GE~~OTECHNICAL ENGINEERING BRANCH

240.38 (2.4.3) In your response to Question 240.32 (Hydrologic Engineering Question 240.02) you stated that the PMF on Hampton Harbor watershed combined with the PMH will increase the stillwater level at the plant site less than 0.1 feet above that calculated for the SPF combined with the PMH. However, no detailed analysis has been provided to support this assertion. Provide detailed analysis supporting this contention.

240.39 (2.4.5) Provide an evaluation of the effect on the wave overtopping rate resulting from the increased Design Stillwater Level using the combined PMF/PMH rather than SPF/PMH event.

240.40 (2.4.5) In your response to Question 240.34 (Hydrologic Engineering Question 240.04) you indicated that wave overtopping will not cause significant erosion because of its short duration. Our analysis indicates that the peak wave overtopping rate of the vertical seawall is in excess of 1600 cfs for a period of about 0.2 hrs. We conclude that this could result in the loss of fill material behind the vertical seawall and adjacent to the two class I electrical manholes (#13/14 and #15/16). Discuss the consequences of this loss of fill material or describe the measures planned to prevent it.

240.41 (2.4.2) (2.4.5) It is not apparent from our review of the ponding level on plant grade that concurrent intense precipitation was included in your wave overtopping runoff/ponding analysis. Therefore, provide a detailed analysis on the routing of the combined precipitation runoff from Probable Maximum Precipitation and wave overtopping runoff from the PMF/PMH event.

a) If credit is taken for flow through the storm drainage system, provide justification that the storm drainage system cannot become blocked during this event.

b) Identify the maximum water surface levels by location and elevation from the vertical seawall to the overflow weir (seawall).

c) Identify plant access openings and sill elevations that may be affected by the runoff on plant grade.

260.0 Quality Assurance Branch

260.28 Section 17.1.2.2 of the standard format (Regulatory Guide 1.70) requires the identification of safety-related structures, systems, and components controlled by the QA program. You are requested to supplement and clarify the Seabrook FSAR in accordance with the following:

a) The following items do not appear on FSAR Table 3.2-1, Table 3.2-2, Appendix 3H or Section 17.2.2.2. Add the appropriate items and provide a commitment that the remaining items are subject to the pertinent requirements of the Operational FSAR QA program or justify not doing so.

1. Fuel assemblies
2. Core support structure
3. Control rods
4. Control rod drive mechanisms
5. Steam generator steam flow restrictors
6. Containment building polar crane
7. Cask handling crane
8. Spent fuel pool liner
9. Biological shielding within the primary auxiliary building and fuel storage building
10. Missile barriers within the primary auxiliary building, fuel storage building, and other buildings and structures as appropriate
11. Pressurizer PORV block valves
12. Fuel transfer system and controls
13. Refueling machine
14. Spent fuel pool bridge and hoist
15. Containment interior concrete including emergency sump
16. Operators of safety-related valves
17. Supports for safety-related ducts, pipes, valves, motors, etc.

18. Motors for safety-related pumps

19. Containment emergency sump debris screen

20. Containment enclosure ventilation area ducting

21. Intake and discharge structures

b) The following items are in Table 3.2-2 with no indication that 10 CFR 50 Appendix B applies. Provide a commitment that the pertinent requirements of the FSAR Section 17.2 QA program will be applied to these items during the operations phase or justify not doing so.

1. Diesel generator cooling water systems (p 25)
   (a) Auxiliary coolant pumps
   (b) All remaining on-engine equipment and piping
2. Diesel generator starting systems (pp 25-26)
   (a) All remaining equipment and piping
3. Diesel generator lubrication systems (p 26)
   (a) Auxiliary lube oil pumps
   (b) All remaining on-engine equipment and piping
4. Diesel generator combustion air intake and exhaust systems (p 26)
   (a) Intake silencers
   (b) Air intake filters
   (c) Exhaust silencers
5. Diesel generator fuel oil storage and transfer systems (pp 24-25)
   (a) Fuel oil pumps
   (b) All remaining on-engine equipment and piping
6. Hydrogen analyzer (p 5)

c) Add the following items to sheet 4 of Table 3.2-1, "Onsite Power Systems" or justify not doing so.

Standby AC Auxiliary Power Systems (Class 1E)

1. Diesel generator packages including auxiliaries (e.g.,governor, voltage regulatory and excitation system).

2. Instrumentation, control and power cables (including underground cable system, cable splices, connectors and terminal blocks)

3. Conduit and cable trays containing Class 1E cables and their supports and other raceway installations whose failure during a seismic event could damage other safety-related systems or components
4. Valve operators
5. Protective relays and control panels
6. Electrical penetration for containment - vital and non-vital including primary and backup fault current protective devices
7. Emergency lighting battery packs
8. AC vital bus distribution equipment

DC Power Systems (Class 1E)

1. Cables
2. Conduit and cable trays containing Class 1E cables and their supports and other raceway installations whose failure during a seismic event could damage other safety related systems or components
3. Battery racks
4. DC switchgear, distribution panels and protective relays

d) Provide a commitment that modifications of the site and roof drainage systems, the seawall, retaining walls, and revetments surrounding the plant will be evaluated and accomplished under the pertinent requirements of the operational QA program to ensure against increasing the flood vulnerability of safety-related items.

e) Provide a commitment that the safety-related instrumentation and controls (I&C) described in Sections 7.1 through 7.6 of the FSAR plus safety-related I&C for safety-related fluid systems will be subject to the pertinent requirements of the FSAR QA program.

f) Enclosure 2 of NUREG-0737, "Clarification of TMI Action Plan Requirements," (November 1980) identified numerous items that are safety-related or of such importance to safety that they should have the pertinent requirements of the FSAR Operational QA program applied. These items are listed below. Provide such a commitment in Section 3 or 17.2 of the FSAR or justify not doing so.

	NUREG-0737 (Enclosure 2) Clarification Item
1. Plant-safety-parameter display console	I.D.2
2. Reactor coolant system vents	II.B.1
3. Plant shielding	II.B.2

		Clarification Item
4.	Post-accident sampling capabilities	II.B.3
5.	Valve position indication	II.D.3
6.	Auxiliary feedwater system	II.E.1.1
7.	Auxiliary feedwater system initiation and flow	II.E.1.2
8.	Emergency power for pressurizer heaters	II.E.3.1
9.	Dedicated hydrogen penetrations	II.E.4.1
10.	Containment isolation dependability	II.E.4.2
11.	Accident monitoring instrumentation	II.F.1
12.	Instrumentation for detection of inadequate core cooling	II.F.2
13.	Power supplies for pressurizer relief valves, block valves, and level indicators	II.G.1
14.	Automatic PORV isolation	II.K.3.1
16.	PID controller	II.K.3.9
17.	Anticipatory reactor trip on turbine trip	II.K.3.12
18.	Power on pump seals	II.K.3.25
19.	Emergency plans	III.A.1.1/III.A.2
20.	Emergency support facilities	III.A.1.2
21.	Inplant I_2 radiation monitoring	III.D.3.3
22.	Control room habitability	III.D.3.4

g) Section 17.2.2.2a should reference Table 3.3-1, Table 3.2-2, and Appendix 3H for the identification of items controlled by the pertinent requirements of the FSAR Operational QA program.

h) Section 17.2.2.2f references FSAR Section 12.5.3.8 regarding audits of the Health Physics program. Clarify the involvement of the PSNH QA organization in these audits. The QA organization should either perform the audits, furnish audit team leaders, or audit to verify the audits are in accordance with the commitments of the FSAR Operational QA program.

410 AUXILIARY SYSTEMS BRANCH

410.51 At a meeting with the staff on June 23rd, 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.

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 offsite 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.

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.

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.

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 onsite. It is our position that electrical or pneumatic jumpers are not a suitable method of repair for cold shutdown.

ASSOCIATED CIRCUIT GUIDANCE

I. INTRODUCTION

The following discusses the requirements for protecting redundant and/or alternative equipment needed for safe shutdown in the event of a fire. The requirements of Appendix R address hot shutdown equipment which must be free of fire damage. The following requirements also apply to cold shutdown equipment if the licensee elects to demonstrate that the equipment is to be free of fire damage. Appendix R does allow repairable damage to cold shutdown equipment.

Using the requirements of Sections III.G and III.L of Appendix R, the capability to achieve hot shutdown must exist given a fire in any area of the plant in conjunction with a loss of offsite power for 72 hours. Section III.G of Appendix R provides four methods for ensuring that the hot shutdown capability is protected from fires. The first three options as defined in Section III.G.2 provides methods for protection from fires of equipment needed for hot shutdown:

1. Redundant systems including cables, equipment, and associated circuits may be separated by a three-hour fire rated barrier; or,
2. Redundant systems including cables, equipment and associated circuits may be separated by a horizontal distance of more than 20 feet with no intervening combustibles. In addition, fire detection and an automatic fire suppression system are required; or,
3. Redundant systems including cables, equipment and associated circuits may be enclosed by a one-hour fire rated barrier. In addition, fire detectors and an automatic fire suppression system are required.

The last option as defined by Section III.G.3 provides an alternative shutdown capability to the redundant trains damaged by a fire.

4. Alternative shutdown equipment must be independent of the cables, equipment and associated circuits of the redundant systems damaged by the fire.

II. Associated Circuits of Concern

The following discussion provides A) a definition of associated circuits for Appendix R consideration, B) the guidelines for protecting the safe shutdown capability from the fire-induced failures of associated circuits and C) the information required by the staff to review associated circuits. It is important to note that our interest is only with those circuit (cables) whose fire-induced failure could affect shutdown. Guidelines for protecting the safe shutdown capability from the fire-induced failures of associated circuits are provided. These guidelines do not limit the alternatives available to the licensee for protecting the shutdown capability. All proposed methods for protection of the shutdown capability from fire-induced failures will be evaluated by the staff for acceptability.

A. Our concern is that circuits within the fire area will receive fire damage which can affect shutdown capability and thereby prevent post-fire safe shutdown. Associated Circuits* of Concern are defined as those cables (safety related, non-safety related, Class 1E, and non-Class 1E) that:

*The definition for associated circuits is not exactly the same as the definition presented in IEEE-384-1977.

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

2. Have one of the following:

   a. a common power source with the 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 (see diagram 2a), or

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

   c. a common enclosure (e.g., raceway, panel, junction) with the shutdown cables (redundant and alternative) and,

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

      (2) will allow propagation of the fire into the common enclosure, (see diagram 2c).

EXAMPLES OF ASSOCIATED CIRCUITS OF CONCERN

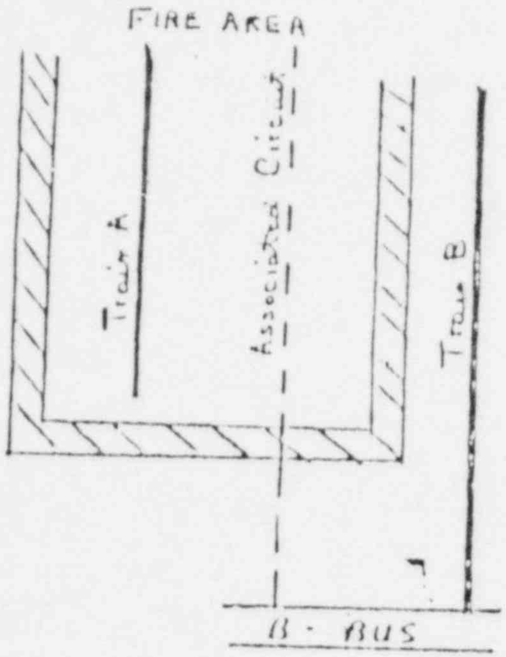


Diagram 2A

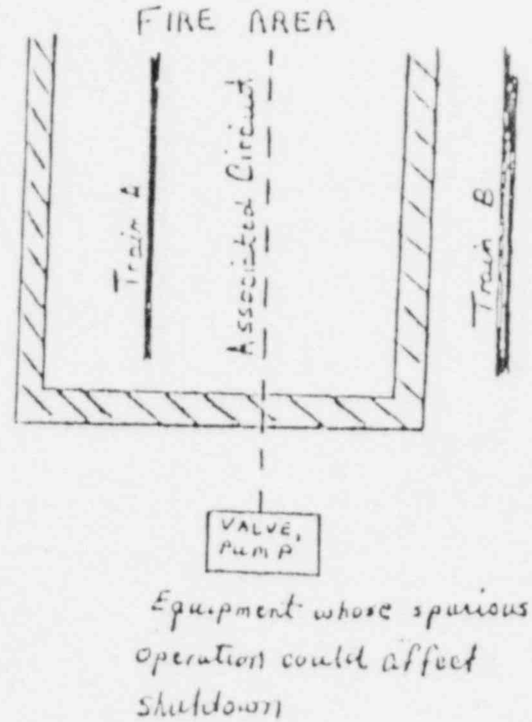
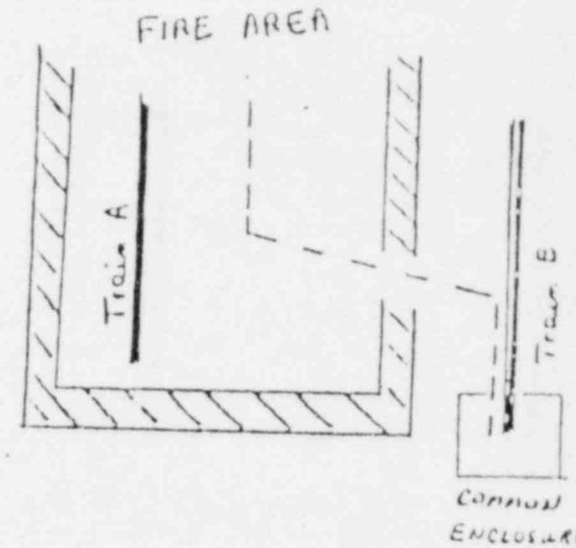


Diagram 2B



The area barriers shown above meet the appropriate sub-paragraphs (a-f) of section III.G-2 of Appendix R.

Diagram 2C

B. The following guidelines are for protecting the shutdown capability from fire-induced failures of circuits (cables) in the fire area. The shutdown capability may be protected from the adverse effect of damage to associated circuits of concern by the following methods:

1. Provide protection between the associated circuits of concern and the shutdown circuits as per Section III.G.2 of Appendix R, or

2. a. For a common power source case of associated circuit:

   Provide load fuse/breaker (interrupting devices) to feeder fuse/breaker coordination to prevent loss of the redundant or alternative shutdown power source. To ensure that the following coordination criteria are met the following should apply:

   (1) The associated circuit of concern interrupting devices (breakers or fuses) time-overcurrent trip characteristic for all circuits faults should cause the interrupting device to interrupt the fault current prior to initiation of a trip of any upstream interrupting device which will cause a loss of the common power source,

   (2) The power source shall supply the necessary fault current for sufficient time to ensure the proper coordination without loss of function of the shutdown loads.

The acceptability of a particular interrupting device is considered demonstrated if the following criteria are met:

(i) The interrupting device design shall be factory tested to verify overcurrent protection as designed in accordance with the applicable UL, ANSI, or NEMA standards.

(ii) For low and medium voltage switchgear (480 V and above) circuit breaker/protective relay periodic testing shall demonstrate that the overall coordination scheme remains within the limits specified in the design criteria. This testing may be performed as a series of overlapping tests.

(iii) Molded case circuit breakers shall periodically be manually exercised and inspected to insure ease of operation. On a rotating refueling outage basis a sample of these breakers shall be tested to determine that breaker drift is within that allowed by the design criteria. Breakers should be tested in accordance with an accepted QC testing methodology such as MIL STD 10 5 D.

(iv) Fuses when used as interrupting devices do not require periodic testing. Administrative controls must insure that replacement fuses with ratings other than those selected for proper coordination are not accidentally used.

b. For circuits of equipment and/or components whose spurious operation would affect the capability to safely shutdown:

(1) provide a means to isolate the equipment and/or components from the fire area prior to the fire (i.e., remove power cables, open circuit breakers); or

(2) provide electrical isolation that prevents spurious operation. Potential isolation devices include breakers, fuses, amplifiers, control switches, current XFRS, fiber optic couplers, relays and transducers; or

(3) provide a means to detect spurious operations and then procedures to defeat the maloperation of equipment (i.e., closure of the block valve if PORV spuriously operates, opening of the breakers to remove spurious operation of safety injection);

c. For common enclosure cases of associated circuits:

(1) provide appropriate measures to prevent propagation of the fire; and

(2) provide electrical protection (i.e., breakers, fuses or similar devices)

C. INFORMATION REQUIRED

The following information is required to demonstrate that associated circuits will not prevent operation or cause maloperation of the shutdown method:

a. Describe the methodology used to assess the potential of associated citcuit adversely affecting the shutdown capability. The description of the methodology should include the methods used to identify the circuits which share a common power supply or a common enclosure with the shutdown system and the circuits whose spurious operation would affect shutdown. Additionally, the description should include the methods used to identify if these circuits are associated circuiys of concern due to their location in the fire area.

b. Show that fire-induced failures (hot shorts, open circuits or shorts to ground) of each of the associated circuits of concern will not prevent operation of cause maloperation of the shutdown method.

2. The residual heat removal system is generally a low pressure system that interfaces with the high pressure primary coolant system. To preclude a LOCA through this interface, we require compliance with the recommendations of Branch Technical Position RSB 5-1. Thus, the interface most likely consists of two redundant and independent motor operated valves. These two motor operated valves and their associated cables may be subject to a single fire hazard. It is our concern that this single fire could cause the two valves to open resulting in a fire initiated LOCA through the high-low pressure system interface. To assure that this interface and other high-low pressure interfaces are adequately protected from the effects of a single fire, we require the following information:

a. Identify each high-low pressure interface that uses redundant electrically controlled devices (such as two series motor operated valves) to isolate or preclude rupture of any primary coola-

b. For each set of redundant valves identified in a., verify the redundant cabling (power and control) have adequate physical separation as required by Section III.G.2 of Appendix R.

c. For each case where adequate separation is not provided, show that fire induced failures (hot short, open circuits or short to ground) of the cables will not cause maloperation and result in a LOCA.

440 REACTOR SYSTEMS BRANCH

440.136 (15.6.3) The recent steam generator tube rupture (SGTR) event at R. E. Ginna Plant and previous SGTR events at other PWRs indicate the need for a more detailed review of the analysis of this accident. Our review of Seabrook FSAR section 15.6.3 (SGTR) and your response to AEB Question 450.4 on this subject resulted in several questions and a need for the following additional information and clarification.

(1) FSAR Section 15.6.3 indicates equalization of primary and secondary pressure 30 minutes after the SGTR event, with consequent termination of steam generator tube leakage. However, Figure 1 of your response to Question 450.4 indicates a minimum primary pressure of 1700 psia at approximately 600 seconds, followed by a rise to 2100 psia at 1800 seconds. Explain this discrepancy and modify your analysis of this event accordingly, including consideration of longer leak times if indicated by these results.

(2) Demonstrate that your assumption of secondary relief actuation at 1236 psia (Reference: Table 2 of your response to question 450.4) is conservative from a radiological standpoint in view of the fact that the set points for the atmospheric dump valve and the lowest safety valve are 1135 psia and 1185 psia, respectively.

(3) Clarify whether you have analyzed a case which considers the radiological effects of a SGTR with the highest worth control rod stuck out of the core, with equilibrium iodine concentration, including the effects of any additional fuel failure caused by this event. (Reference: SRP Section 15.6.3, Subsections II (1) & III.7)

(4) Discuss whether as a result of possible modification of your analysis, including consideration of longer leak times as discussed in item (1), liquid can enter the main steam lines and what the effects would be on the integrity of the steam piping and supports. Consider both the liquid dead weight and the possibility of water hammer.

(5) Table 1 in your response to Question 450.4 (Sequence of Events) does not provide all the information requested. Provide the time of turbine trip and loss of offsite power, the setpoints for system actuations, and operator action times. Clarify the flow termination time for main feedwater, which is indicated at 302 seconds in the table while the text indicates that main feedwater flow is terminated by the safety injection signal which occurs at 555 seconds.

(6) In view of the fact that the emergency feedwater turbine drive steam flow cannot be terminated from the control room, provide the results of activity and dose calculations from the turbine steam exhaust for the duration of the tube leak.

610 OPERATOR LICENSING BRANCH

610.1 Deleted.

610.2 Reference FSAR page 13.2-2, Item 4 (Replacement Training)- Provide details of replacement training program and how this replacement training is applied to operators with different previous experience.

610.3 Reference FSAR page 13.2-7, Item 13.2.1.3-6 (On-the-Job Training)- Provide documentation of conformance with the requirements of H. R. Denton's letter of March 28, 1980 on Qualification of Reactor Operators (see Enclosure 4 of the letter).