NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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April 22, 1988

Docket No. 50-336
B12890
Re: 10CFR50, Appendix R

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Millstone Nuclear Power Station, Unit No. 2
Fire Protection
Response to NRC Staff Questions

On March 23, 1988, a telephone conference was held between the NRC Staff and Northeast Nuclear Energy Company (NNECO) concerning various questions the NRC Staff had associated with the Fire Protection Safe Shutdown Analysis for Millstone Unit No. 2. During this telephone conference, NNECO responded to approximately twenty-three (23) questions from the NRC Staff, of which the NRC Staff requested that NNECO provide additional clarification to four (4) of these questions in a formal submittal. The purpose of this letter is to provide the NRC Staff with the requested information. The responses to these questions are included as Attachment 1.

We trust you will find this information satisfactory and we remain available to answer any additional questions you may have.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

E J Mroczka

E. J. Mroczka
Senior Vice President

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By: W. D. Romberg
Vice President

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cc: W. T. Russell, Region I Administrator
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2 and 3
D. H. Jaffe, NRC Project Manager, Millstone Unit No. 2

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Attachment 1

Fire Protection
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Question 1: Provide a discussion concerning the verification of boron concentration following the worst case scenario Appendix R fire. Please explain why the shutdown procedures did not require that boron samples be taken during or following a worst case fire scenario.

Response 1: Sampling is normally done during the cooldown process to establish or verify the boron concentration in the primary plant. The Appendix R shutdown procedures are based on existing procedures which provide specific guidelines concerning the obtaining of primary plant samples during the cooldown process. Thus, Reactor Coolant System (RCS) samples will be drawn. However, should the fire prevent drawing a sample, the following method will be employed:

> Immediately following an Appendix R fire and for several hours thereafter, plant personnel could calculate the approximate RCS boron concentration by knowing the amount of borated water added from specific tanks and the amount and duration of letdown. As a result, the obtaining of a primary plant sample to establish primary plant boron concentration would not be needed in a timely manner. It should be noted, in the worst case Appendix R fire scenario, the cooldown process will be a very long process and therefore the obtaining of primary plant samples for the purpose of evaluating boron concentration could be accomplished as deemed necessary.

Question 2: During the worst case Appendix R fire scenario, water level indication for Steam Generator No. 1 is assumed lost. Without level indication, auxiliary feedwater flow for Steam Generator No. 1 is isolated to prevent the possibility of overfilling the generator. Later in the cooldown procedure, auxiliary feedwater flow is reinitiated to Steam Generator No 1. Provide additional information which will support or define how the plant will fill or partially fill Steam Generator No. 1 while providing assurance that the steam generator will not be overfilled.

Response 2: The auxiliary feedwater flow to Steam Generator No. 1 would need to be reestablished at about 50 hours to cool the isolated loop prior to entering shutdown cooling (SDC). The total free volume of an empty steam generator secondary side is approximately 8340 cubic feet. If steam generator level were to be restored to the feed ring, which is the normal operating level, this would represent a free steam generator volume of 3150 cu ft., or approximately 45% of the total free volume. The addition of feedwater to Steam Generator No. 1 will be stopped when the normal water level is reached, or when the loop and the steam generator have cooled sufficiently to allow SDC to be placed into service. The calculation concluded that given the volume of a reactor coolant loop at 500°F, the filling of a "dry" steam generator with feedwater at a temperature of approximately 75°F would be sufficient to cool the loop to satisfy the requirement for continuing the cooldown with the SDC system.

The Appendix R shutdown procedure lists the time to fill the steam generator to the normal level for various flow rates. The auxiliary feedwater flow would be estimated from the valve stem position and the pressure drop from the pump discharge to the steam generator. Plant data has been obtained which provides flow rates for differential pressure and local valve position indication. For instance, with a differential pressure of 250 psi, between feedpump discharge pressure and steam generator pressure, and the auxiliary feed control valve approximately 20% open, as determined by local observation, the expected flowrate is 100 gpm. Given the available defined maximum volume in the steam generator, this flowrate could be maintained for a period of approximately 230 minutes before water level would reach the feed ring or fill 45% of the available free volume. Clearly, this would be a very slow process and therefore, the operator would be able to control the level.

<u>Question 3</u>: The Appendix R worst case fire scenario assumes that a charging pump(s) will not be needed for the first four (4) hours after the reactor is shutdown. Why?

<u>Response 3</u>: This Appendix R fire scenario assumes a total loss of offsite power, and that all primary plant letdown flow is isolated. It also assumes that the steam generator main steam isolation valves and the blowdown isolation valve will be shut in order to isolate any uncontrolled loss of steam generator inventory. During this period, the plant will remove decay heat generated from the core by using the auxiliary feedwater system, the steam generator relief valves and the atmospheric steam dump valves. Decay heat will be transferred from the core to the steam generators by natural circulation flow within the primary plant, and the steam generator level will be maintained by using a turbine driven auxiliary feedwater pump. During the first four hours following a fire and a subsequent reactor trip, the plant operating personnel will be concerned with stabilizing plant conditions and removing decay heat. With letdown isolated, pressurizer level will remain fairly constant and as a result charging will not be required for the first four hours after the fire and a reactor trip.

<u>Question 4</u>: Describe the repair/replacement of a Reactor Building Closed Cooling Water (RBCCW) pump damaged by fire. Are all required replacement parts on site and how long will replacement take?

<u>Response 4</u>: Both the RBCCW and service water system are only required to achieve and maintain cold shutdown in the worst case Millstone Unit No. 2 Appendix R fire scenarios. Per 10CFR50 Appendix R, Section III.G.1.b, cold shutdown systems must be capable of being repaired within 72 hours. NNECO has developed procedures and maintains a controlled inventory of spare equipment and dedicated material to perform the motor replacements. In addition to the spare Class 1E qualified motors, tools, test equipment, and portable emergency generators are available in the dedicated Appendix R warehouse area. NNECO Engineering, Electrical Test, and Maintenance personnel have walked through the procedures to verify the capability of performing the repairs within the 72 hour time limit.