

NORTHEAST UTILITIES

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

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06101
(203) 666-6911

July 30, 1982

Docket Nos. 50-213
50-245
50-336
A02608
A02636

Director of Nuclear Reactor Regulation
Attn: Mr. Robert A. Clark, Chief
Operating Reactors Branch #3
Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

- References:
- (1) W. G. Council letter to Commissioner Hendrie, dated March 19, 1981.
 - (2) D. G. Eisenhut letter to W. G. Council, dated May 10, 1982.
 - (3) W. G. Council letter to D. G. Eisenhut, dated July 16, 1982, Docket No. 50-245.
 - (4) W. G. Council letter to D. G. Eisenhut, dated July 16, 1982, Docket No. 50-336.
 - (5) D. M. Crutchfield letter to W. G. Council, dated June 25, 1982.
 - (6) R. A. Clark letter to W. G. Council, dated July 7, 1982.

Gentlemen:

Haddam Neck Plant
Millstone Nuclear Power Station, Unit Nos. 1 and 2
Clarifications of Appendix R Reviews

By letter dated March 1, 1982, Northeast Nuclear Energy Company (NNECO) provided to the NRC Staff an assessment of the fire protection features at Millstone Unit Nos. 1 and 2 pursuant to the requirements of 10CFR50.48 and Appendix R to 10CFR Part 50. NNECO had previously requested an exemption from the schedular requirements of 10CFR50.48(c)(5), specifically for additional time to complete the assessments discussed above, in Reference (1). The Staff granted the schedular exemption request as documented in Reference (2). In addition, Reference (2) provided NNECO an additional period of 60 days in which to provide any supplemental information to that provided on March 1, 1982.

8208060267 820730
PDR ADOCK 05000213
F PDR

A006

On July 16, 1982, NNECO provided to the Staff supplemental information in support of our March 1, 1982 Appendix R reviews in References (3) and (4) for Millstone Unit Nos. 1 and 2, respectively. This included revised and expanded discussions of each request for exemption from specific requirements of Appendix R.

Subsequent to the Reference (2) transmittal from the NRC Staff, NNECO received additional requests for clarification of the March 1, 1982 Appendix R Review for Millstone Unit Nos. 1 and 2 as noted in References (5) and (6). This submittal is intended to provide individual answers to the questions raised in References (5) and (6).

1. Fire Zones

NRC Position

Section III.G of Appendix R identifies acceptable methods to provide fire protection for shutdown systems, when redundant trains are located "within the same area." A fire area is generally bounded by construction having a fire resistance of at least 3 hours or by equivalent protection such as a justified fire barrier of less fire resistance or a water curtain. Fire hazard analyses conducted prior to Appendix R to satisfy NRC Supplementary guidance for fire protection program evaluation (September 1976), evaluated plant conditions from the perspective of both fire areas and fire zones (locations within a fire area that are not bounded by fire barriers). However, Section III.G of Appendix R only permits the evaluation of fire protection for safe shutdown capability on the basis of fire areas.

The licensee has relied upon a concept of fire zones to assess compliance with Appendix R. The approach may have resulted in incorrect conclusions with regard to the adequacy of separation of redundant trains. To assure compliance with Section III.G, the licensee is required to comprehensively reassess the fire protection in each fire area containing redundant shutdown systems.

Response - Millstone Unit Nos. 1 and 2

NNECO's response to this position takes two forms:

- o Compliance with Appendix R, and
- o Assurance of safe shutdown integrity.

NNECO is in agreement with the Staff position that Appendix R permits the evaluation of fire protection for safe shutdown capability on the basis of fire areas. However, Appendix R provides no explicit definition of the term fire area; hence, a reasonable interpretation should be utilized.

This question suggests that a fire area should generally be bounded by construction having a fire resistance of at least 3 hours, or some other "equivalent protection". It might be inferred that an Appendix R definition of "equivalent protection" is contained in III.G.2.b or c, since the three hour barrier approach is outlined in III.G.2.a. However this definition would render superfluous the following words in III.G.2:

"within the same fire area".

Reading III.G.2 without the phrase above would require implementation of III.G.2.a, b, or c, independent of the location of safe shutdown equipment within the plant (excluding primary containment). Since the phrase quoted above was included in Appendix R, it would be reasonable to assume that it had some intended meaning and that components located in different fire areas were sufficiently protected.

Of course, this position assumes that reasoned fire protection judgement was exercised during the original establishment of the fire areas. NNECO contends that the process by which these areas were established was indeed appropriate. The process included review by NNECO, NRC Staff, and their respective individual consultants, and culminated in documented NRC approval. This leads to the second and more substantive facet of NNECO's response, which focuses on the technical adequacy of the approach.

Applications for construction permits for both Millstone Unit Nos. 1 and 2 were made long before July 1, 1976. As such, the plants were not designed on the basis of fire areas as described in the above quoted NRC position. The NRC Staff recognized this generic configuration of older plants in developing Appendix A to Branch Technical Position APCS9.5-1 which provided guidance on the preferred and acceptable alternatives to the concept of fire areas. When specific compartmentalization of fire areas did not exist, NNECO defined fire zones within fire areas based on guidance provided by the NRC Staff. These zones were established on the basis of existing boundary fire barriers and other logical physical divisions or equipment groupings. NNECO provided the Staff with descriptions of the proposed fire zones in the Fire Protection Program Review submitted in February, 1977 for Millstone Unit Nos. 1 and 2.

In the Spring of 1978, the NRC Staff conducted on-site inspections for the purpose of comparing the information presented in the Fire Protection Program Review to the requirements of Appendix A to BTP APCS9.5-1. The review team consisted of NRC personnel and their fire protection consultants. The results of this review were presented in the Fire Protection Safety Evaluation Reports docketed on September 26, 1978 and September 19, 1978 for Millstone Unit Nos. 1 and 2, respectively. The NRC has concluded, as documented in Section 4.11 of both Safety Evaluation Reports, that the fire barriers upon which the fire zones are defined at Millstone Unit Nos. 1 and 2 are adequate to prevent fire spread.

The stated purpose of Appendix R was to resolve the open issue in individual plant Safety Evaluation Reports (SERs). The fire zone concept at Millstone Unit No. 1 and 2 was not an open issue but approved by the Staff in the SERs.

It is on these bases that NNECO utilized the existing definitions of fire zones at Millstone Unit Nos. 1 and 2 for the reviews conducted in accordance with 10CFR50.48 and Appendix R. NNECO contends that the conclusions regarding compliance with the requirements of Appendix R, presented in the March 1, 1982 submittals, as supplemented by References (3) and (4), are correct. NNECO is prepared to defend the adequacy of the modifications proposed on an individual fire zone basis as the Staff requires.

2. Area Fire Detectors and Fire Suppression System

NRC Position

Information contained in our Safety Evaluation Report, dated September 26, 1978, and in the licensee's submittal, indicates that the licensee's interpretation of the requirements of Section III.G pertaining to the need for area fire detectors and fire suppression systems is not correct. As a result, the licensee's conclusions with regard to compliance Appendix R are in error. Specifically, in select areas of the plant, the extent of fire detection and fire suppression, consists of partial (spot) coverage, intended to provide protection from specific, isolated hazards. This protection, is not sufficient to comply with the requirements of Section III.G which requires that fire detectors and a fixed fire suppression system be installed throughout the fire area. However, this partial coverage may provide adequate fire protection in some instances. Such configurations could be the subject of exemption requests.

Response - Millstone Unit Nos. 1 and 2

NNECO disagrees with the Staff statement that III.G:

"requires that fire detectors and a fixed fire suppression system be installed throughout the fire area".

Appendix R, in fact, requires fire detection and suppression in fire areas, not throughout them. Such language can be found in III.G.2.c, III.G.2.e, and III.G.3. Appendix R is silent with respect to the design details of these suppression and detection systems, as it should be. For many instances it may be appropriate to install such systems throughout fire areas, and this in fact has been implemented in many instances. However, there are many other instances where installing suppression systems throughout a fire area may be either unnecessary or even detrimental to overall facility safety.

Appendix R apparently recognizes this potential by the inclusion of III.G.3.b. This section recognizes that fire suppression systems may render inoperable certain redundant safe shutdown components, even if they are sufficiently protected from the effects of a fire. Hence, it may be necessary to avoid installation of suppression systems in certain sensitive portions of a given fire zone to assure safe shutdown integrity.

The ACRS has also recognized the potential for adverse effects resulting from indiscriminate use of water sprays. The third question of the June 9, 1982 memorandum from R. Fraley to W. Johnston focuses on this point. Hence, NNECO concludes that fire suppression systems must be uniquely designed to reflect an integrated evaluation designed to maximize overall facility safety. Consequently, certain fire areas require spot coverage, not total coverage.

NNECO also notes that, contrary to the last sentence of the NRC position, installation of partial coverage need not be the subject of an exemption request to comply with Appendix R.

To demonstrate plant specific instances where NNECO's interpretation was, in fact, implemented, the following discussion is provided.

The September 26, and 19, 1978 Safety Evaluation Reports (SER's) for Millstone Unit Nos. 1 and 2, respectively were authored by the NRC Staff and represent agreed upon commitments by NNECO which satisfied the fire protection requirements of BTP 9.5-1, Appendix A.

At the request of the NRC Staff, NNECO provided additional design details for selected fire detection and suppression systems for the purpose of assuring the acceptability of the proposed modifications. The following is a listing of the correspondence which included the requested design details for those systems for which the Staff expressed the need for additional design information.

W. G. Council letter to D. L. Ziemann and R. Reid, dated April 11, 1979.

W. G. Council letter to D. L. Ziemann and R. Reid, dated May 18, 1979.

W. G. Council letter to D. L. Ziemann and R. Reid, dated July 19, 1979.

W. G. Council letter to D. L. Ziemann and R. Reid, dated July 31, 1979.

W. G. Council letter to D. L. Ziemann and R. Reid, dated October 9, 1979.

W. G. Council letter to R. Reid, dated November 21, 1979.

W. G. Council letter to R. Reid, dated December 4, 1979.

As no additional Staff inquiries or concerns have been expressed regarding the above correspondence, NNECO had previously concluded that the detection and suppression system designs are acceptable.

3. Requested Exemption

NRC Position

The licensee's submittal is not specific as to what requirement is not being met and what alternative is proposed. It stated, for example, that an individual area "does not comply with Section III G.2 of Appendix R", but does not directly identify the nature of the noncompliance. The information supplied (highlighted drawings and text) regarding divisional separation is insufficient to identify the degree of separation between redundant trains or the consequences of fire on safe shutdown capability.

Response - Millstone Unit Nos. 1 and 2

NNECO provided the Staff with supplemental information in References (3) and (4) for Millstone Unit Nos. 1 and 2, respectively. This information included revised and expanded fire zone analyses specifically delineating from what requirements of Appendix R NNECO requested exemptions. Additional information in the form of photographs, sketches and narratives were provided which NNECO considers sufficient for the Staff to concur with our exemption requests.

4. Proposed Modifications

NRC Position

The licensee has not adequately described alternatives that are proposed to be implemented in conjunction with the exemptions to permit our evaluation. For instance, the licensee has not described the design of:

- a. The one hour fire rated barrier that is to be used to enclose select cables.

Response - Millstone Unit Nos. 1 and 2

Appendix R to 10CFR50 and subsequent Staff clarification documents do not require licensees to submit design details for those modifications which will result in compliance with Appendix R. It is recognized that there are instances where one hour rated barriers are being proposed in fire zones for which exemptions are being requested. Even in these instances, NNECO believes that its stated proposal to install a one hour barrier is adequate to evaluate the merits of the exemption request. Where NNECO proposes fire rated enclosures for cabling and equipment, qualified fire barriers will be utilized. Of course, we remain prepared to provide whatever details are necessary on an individual fire zone basis.

- b. The fire suppression system that is proposed to be installed in the cable vault (T-16).

Response - Millstone Unit No. 1

As in part (a) above, design details are not required to be provided by Appendix R. Proposed fire suppression systems will be installed to provide specific coverage such that the potential hazard identified through the Appendix R reviews will be protected. The design of these systems will be in accordance with applicable NFPA codes. Even for those fire zones where suppression systems are being proposed as part of an exemption request, we believe that sufficient detail has been provided in the combination of the March 1, and July 16, 1982 submittals to evaluate the exemption requests. As noted above, we remain prepared to provide whatever details are necessary on an individual fire zone basis.

5. Open SER Item

NRC Position

The licensee contends that the submittal resolves all outstanding SER open items. However, as of January 28, 1982, SER item 3.1.14, Auxiliary Boiler Blast Wall, has not been adequately addressed.

Response - Millstone Unit No. 1

The recommendation to erect a blast wall between the diesel generator room (Fire Zone T-7) and the auxiliary boiler room (Fire Zone T-9) was first raised by the Staff during their on-site fire protection inspection conducted in June of 1978. The concern centered around a postulated boiler explosion incapacitating the diesel generator in the adjoining fire zone as well as the main supply feeds from the gas turbine routed through Fire Zone T-9.

NNECO evaluated this concern and concluded that, based on the boiler manufacturer's experience, type of failure expected, boiler orientation and the nature of the potential explosion, the existing wall separating Fire Zones T-7 and T-9 provided adequate protection to the diesel generator. Information in this regard was provided in W. G. Council letters to D. L. Ziemann, dated January 24, 1980 and to D. M. Crutchfield, dated September 25, 1980.

Numerous telephone conversations occurred during the months following this correspondence, as the Staff was reluctant to accept the justification provided and continued to postulate the occurrence of a "maximum theoretical boiler explosion". Ultimately, these discussions resulted in a NNECO commitment to modify the ventilation duct work penetrating the wall and the door between the two fire zones.

Recognizing that this issue was identified in the 1978 SER and required to be completed during the 1980 refueling outage, it was necessary to either resolve this item or have a license amendment issued in order to maintain compliance with License No. DPR-21. Contrary to the Staff contention in this regard, the issue was resolved as documented in Reference (1). A pertinent excerpt follows:

"Also for Millstone Unit No. 1, SER item 3.1.14 requires the construction of a blast wall between the auxiliary boiler room and the diesel generator room. Following numerous telephone discussions, NNECO and the NRC Staff have agreed that reinforcement of the door, ventilation duct, and ceiling attachment constitutes compliance with the license condition requirement. These actions will be completed prior to startup from the current outage. Since it cannot be conclusively demonstrated that the above reinforcement installation results in a blast wall capability to survive a theoretical boiler explosion, NNECO agrees to incorporate the evaluation of such boiler rupture into the scope by III.G and III.L of Appendix R."

Although the Staff never responded to Reference (1) in this regard, no response was necessary to fulfill the license condition requirement.

NNECO's interpretation of Appendix R is that theoretical boiler explosions need not be postulated. Hence, since the redundant safe shutdown components are located in different fire zones (T-7 and T-9), Appendix R requirements are already fulfilled. However, NNECO has an obligation to fulfill its commitment as quoted above. Accordingly, the proposed modification, as discussed in the March 1, 1982 Appendix R review, consisted of providing appropriate shielding for the gas turbine cable in Fire Zone T-9 such that it would be protected from the effects of the postulated explosion and resulting shrapnel.

The modifications to the wall separating fire zones T-7 and T-9 together with the protection proposed in the March 1, 1982 Appendix R Review ensure that one redundant emergency power system will be available at Millstone Unit No. 1 in the event of an auxiliary boiler blast.

5. Fire Zone A-14

NRC Position

The following specific information is needed to complete our analysis of the proposed alternate protection:

- a. The gauge of the steel used in the HVAC duct.
- b. The distance from the top of the duct to the floor/ceiling above.

Response - Millstone Unit No. 2

NNECO provided the NRC Staff with revised and expanded fire zone analyses for Millstone Unit No. 2 in Reference (4). As discussed in Reference (4), the proposed alternate protection for Fire Zone A-14 has been re-designed to include only a one inch marine board from the top of the block wall to the ceiling providing a one-hour rated enclosure for the Train B cables. As NNECO is no longer proposing to take credit for the ventilation duct, the information requested above is no longer relevant.

6. Conclusion

NRC Position

Based on our initial review, we conclude that the exemption requests should be denied if further clarification cannot be provided by the licensee within a reasonable time.

Response - Millstone Unit Nos. 1 & 2

As of this writing, it is NNECO's position that all questions and concerns raised by the Staff have been addressed. Given the relatively recent issuance dates of References (5) and (6), NNECO asserts that the clarification has been provided "within a reasonable time".

In addition to the six items raised by the Staff in References (5) and (6), NNECO would like to offer a discussion of two other elements of the exemption process of Appendix R.

We are concerned that our interpretation of the concept of equivalent protection is quite different from that of the Staff. In our view, the critical element of equivalency is that alternatives to the prescriptive requirements of Appendix R should be evaluated on their ability to ensure safe shutdown capability in the event of a fire, not as a direct comparison between protective features. For example, an evaluation which states,

"A two hour barrier is not equivalent to a three hour barrier, therefore the exemption is denied,"

is not a valid interpretation of the concept of equivalent protection.

In fact, for the above example, the two hour barrier could be just as effective if the maximum duration of a fire in a give zone is thirty minutes. Generally our interactions with the Staff to date, either as a member of the Nuclear Utility Fire Protection Group or as an individual utility, have not given us assurance that our views are compatible in this regard.

One exception to this general perception is contained in References (5) and (6), item 1, Fire Zones. In the statement of the concern, the Staff explicitly recognizes that a barrier rated for less than three hours or a water curtain may provide equivalent protection to a three hour barrier for specific configurations. This type of approach is essential if cost-effective solutions to potential fire hazards are to be implemented.

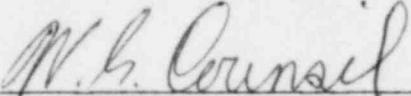
Second, NNECO and CYAPCO have collectively invested substantial (greater than 12,000 in-house manhours) resources to develop their proposed resolutions to Appendix R concerns. Because of the complexity of certain fire zones and the numerous factors which must be considered during the evaluation of an exemption request, we are concerned that the volume of documentation docketed may make it difficult for the Staff to conduct an accurate review. Despite our use of drawings, color-coding, sketches, photographs, narratives, and adherence to Staff guidance documents, we offer the possibility that a physical inspection of certain fire zones may be more useful than any amount of documentation. With this backdrop, we wish to explicitly offer the Staff an invitation to inspect our facilities should it be determined that a site visit(s) would facilitate the evaluation process. Please contact my staff if you wish to pursue this alternative.

Lastly, it is noted that a letter similar to References (5) and (6) was not issued for the Haddam Neck Plant. Please be advised that the generic aspects of the above information are also applicable to the Haddam Neck Plant. Consequently, this letter is also being placed on Docket No. 50-210.

We trust this information adequately clarifies the concerns expressed by the Staff in References (5) and (6).

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY
NORTHEAST UTILITIES NUCLEAR ENERGY COMPANY



W. G. Council
Senior Vice President