NRC 2002-0007

January 14, 2002

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Ladies/Gentlemen:

DOCKETS 50-266 AND 50-301
POINT BEACH NUCLEAR PLANT UNITS 1 AND 2
RESPONSE TO NON-CITED VIOLATION CONCERNING
ADEQUACY OF FIRE SUPPRESSION SYSTEM
NRC INSPECTION REPORTS 50-266/01-12 (DRS) AND 50-301/01-12 (DRS)

Reference: 1) Letter from R.N. Gardner (NRC) to M.E. Reddemann (NMC) dated November 13, 2001.
2) Letter from M.E. Reddemann to NRC Document Control Desk dated December 13, 2001

On November 13, 2001, the subject inspection report was transmitted (Reference 1) to the Nuclear Management Company, LLC (NMC). The inspection report documented the results of the Triennial Fire Protection Inspection, conducted at Point Beach Nuclear Plant (PBNP) from September 10 through 28, 2001.

The report identified three non-cited violations (NCVs) and one inspection finding. One of the NCVs stated the automatic fire suppression system for the auxiliary feedwater pump room was not adequate. The report states that the installed fire suppression system for this location was only designed for surface fires and was not designed to provide the necessary soak time for deep-seated fires. The report maintains that the potential for deep-seated fire hazards has been introduced to the room by the addition of IEEE 383 qualified cables as a result of plant modifications. 10 CFR Part 50, Appendix R, Section III.G.2 is cited as the basis for this violation of NRC requirements.

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Your letter dated November 13, 2001, states that if NMC denies a non-cited violation that the basis for our denial should be submitted to the NRC within 30 days of this inspection report. In our letter dated December 13, 2001, (Reference 2) we requested a 30-day extension to complete our response to this item. Attached is our response to that NCV. Based on the information provided therein, we believe that there has been no violation of NRC requirements and we hereby request that this NCV be withdrawn from the inspection report.

Please contact us if you have any questions concerning our evaluation of this condition.

Sincerely,

Mark E. Reddemann
Site Vice President

cc: NRC Resident Inspector
NRC Regional Administrator
PSCW
NRR Project Manager

ATTACHMENT 1

Letter from Mark E. Reddemann (NMC)

To

Document Control Desk (NRC)

Dated

January 14, 2002

DOCKETS 50-266 AND 50-301
RESPONSE TO NON-CITED VIOLATION
ADEQUACY OF HALON 1301 SUPPRESSION SYSTEM
IN AUXILIARY FEEDWATER PUMP ROOM
NRC INSPECTION REPORTS 50-266/01-12 AND 50-301/01-12
POINT BEACH NUCLEAR PLANT UNITS 1 AND 2

FINDING

NRC Inspection Report 50-266/01-12 (DRS); 50-301/01-12 DRS, dated November 13, 2001, documents the findings related to implementation of the NRC approved Fire Protection Program for the Point Beach Nuclear Plant. Section 1R05.10.b of the report identifies that the automatic fire suppression system for the Auxiliary Feedwater Pump Room is not adequate because the system is only designed for surface fires involving non-IEEE-383 qualified cables, and that deep-seated fire hazards consisting of IEEE-383 qualified cables have been introduced into the room.

The inspection report identifies that the system is designed to ensure that a six percent concentration of Halon 1301 can be maintained for a soak time of ten minutes, which is appropriate for surface fires. However, the inspection report also identifies that a fifteen-minute soak time is required to extinguish fully developed cable tray fires containing IEEE-383 qualified cables, and that such a fire represents the 10CFR50 Appendix R design basis fire for the room.

NUREG/CR-3656, Evaluation of Suppression Methods for Electrical Cable Fires, Table 9, is cited as the basis document for determining the minimum required soak time for fully developed IEEE-383 qualified cable tray fires.

BASES FOR CONTESTING THE FINDING

Background

Table 9 in NUREG/CR-3656 identifies that a fifteen-minute soak time is required for a six percent concentration of Halon 1301 to extinguish a fully developed cable tray fire containing IEEE-383 qualified cables. As identified in Section 2.5.2 of NUREG/CR-3656, a fully developed fire was defined as a fire that involved four of the five cable trays. The fully developed fire was established when the temperature of the cables in the fourth tray away from the fire source was approximately 600°C (1112°F). The Halon 1301 suppression system was discharged after the fully developed fire was established in the stack and allowed to burn freely for one minute. Per the report, this represented a fire that had been burning for some time, and that four burning cable trays represented a significant fuel loading.

Table 9 in NUREG/CR-3656 identifies a fifteen-minute minimum soak time as being required based on the results of two separate fire tests conducted in a five-tray stack of cable trays extinguished with a six percent concentration of Halon 1301. In Test Number 87, the trays were in a horizontal configuration, and in Test Number 90, the trays were in a vertical configuration. In both tests, the fifteen-minute soak time was specified prior to conducting the tests. These two tests were the only tests conducted to establish the soak times for fully developed cable tray fires containing IEEE-383 qualified cable where the extinguishing agent is a six percent concentration of Halon 1301. Therefore, the fifteen-minute minimum soak time was established as the required soak time without testing alternative soak times.

Design Basis Fire

NRC Inspection Report 50-266/01-12(DRS); 50-301/01-12 (DRS) identifies that the primary fire hazards in the Auxiliary Feedwater Pump Room are lubricating oil in the auxiliary feedwater pumps and transient materials. The inspection report categorizes both hazards as surface hazards that would be effectively extinguished by the installed Halon system with a ten-minute soak time. The inspection report further states that a fully developed cable tray fire containing IEEE-383 qualified cables represents the 10CFR50 Appendix R design basis fire for the room for purposes of determining the adequacy of the Halon 1301 suppression system. However, this is not consistent with information previously provided by NRC, as described below.

By letter dated November 24, 1980, NRC identified that a revised 10CFR50.48 and a new Appendix R to 10CFR50 had been published. A copy of the Federal Register Notice was included as Enclosure 1 to the letter. NRC also included, as Enclosure 2, a summary listing of the open items remaining from previous fire protection reviews as documented in Fire Protection Safety Evaluation Reports (FPSER). Enclosure 2, Summary of Staff Requirements to Resolve Open Items, presents NRC's position on the specific requirements that must be satisfied to meet the requirements of Appendix R.

Section 3.1.14, Cable Separation, of Enclosure 2 identifies the following:

"In the Fire Protection Safety Evaluation Report, we were concerned about the loss of redundant safety-related equipment and/or cables-conduit due to a fire of a combustible transient fire load (exposure fire) as well as the interaction of this fire on installed combustibles in the area."

Section 3.1.14 identifies the Auxiliary Feedwater Pump Room as one of the specific areas of concern.

Therefore, NRC identified that the Appendix R fire of concern for the Auxiliary Feedwater Pump Room is an exposure fire from a transient fire load and the potential spread of the exposure fire to other combustibles installed in the room. The transient exposure fire is considered to involve transient combustible materials or lubricating oil from pumps in the room, since those are the primary fire hazards in the Auxiliary Feedwater Pump Room.

Adequacy of Halon 1301 System to Extinguish Design Basis Fires

In order to meet the alternative shutdown requirements of Section III.G, a fixed suppression system must be installed in the area, room, or zone under consideration. A single active failure proof Halon 1301 suppression system was installed in the Auxiliary Feedwater Pump Room to satisfy this requirement. As identified in Section 3.1.14 of Enclosure 2 to NRC's letter dated November 24, 1980, the fire of concern is an exposure fire from a transient fire load.

NUREG/CR-3656 Section 2.5.1, Exposure Cable Tray Fires, identifies that initially, the suppression test program was designed to test the suppression systems on smaller initiating-type fires, designated as exposure fires. Section 2.5.1 identifies that these exposure fires were indicative of a fire starting in a single tray either electrically or by some transient fuel. The purpose of the tests, as identified in Section 2.5.1, was to evaluate the ability of the suppression systems to extinguish a relatively small cable fire and prevent damage to an exposed cable tray above the fire.

All exposure fire tests involved two cable trays. The bottom tray was designated as the "donor" tray, while the top tray was designated as the "acceptor" tray. A marinite barrier separated the "donor" and "acceptor" trays until a well-developed fire was established in the "donor" tray. The marinite barrier was used to prevent burning of the "acceptor" tray until the fire in the "donor" tray was well developed in order to evaluate the effectiveness of the suppression system in preventing ignition of the "acceptor" tray. An insulating barrier was also placed above the top tray to simulate the re-radiative effects of a third tray.

The exposure fires were defined as self-sustaining fires in a single cable tray that were allowed to free burn for one minute before actuating the suppression system. The marinite barrier separating the "donor" and "acceptor" trays was removed when a well-developed fire was established in the "donor" tray and prior to the one minute free burn time period. After the one-minute free burn period, the suppression system was actuated.

Table 6 in NUREG/CR-3656 documents the results of testing performed using a six percent concentration of Halon 1301 to extinguish exposure fires, as described above, in cable trays containing IEEE-383 qualified and non-IEEE-383 qualified cables. Based on the results of Test Number 57, Table 6 documents that a ten-minute soak time will extinguish exposure fires in cable trays containing IEEE-383 qualified cable.

It should be noted that Table 6 also documents that, based on the results of Test Number 61, a sixteen-minute soak time will extinguish exposure fires in cable trays containing non-IEEE-383 qualified cable. The report identifies that the soak time for non-IEEE-383 qualified cable was probably less than sixteen minutes because the cable does not produce deep-seated, smoldering fires, but no further testing was performed. Table 9, however, does document the results of subsequent testing on fully developed fires. Based on the results of Test Number 86 and Test Number 92, Table 9 documents that a ten-minute soak time will extinguish a fully developed fire in cable trays containing non-IEEE-383 qualified cable. The one test on the two-tray exposure fire documented that a sixteen-minute soak time will extinguish the fire, and the two tests on the five-tray fully developed fire documented that a ten-minute soak time will extinguish the fire. Since the fully developed fire in a stack of five trays is much more severe than the exposure fire

in a stack of two trays, it is reasonable to assume that a ten-minute soak time will extinguish an exposure fire in cable trays containing non-IEEE-383 qualified cable.

Based on the above, the installed Halon 1301 suppression system in the Auxiliary Feedwater Pump Room is capable of extinguishing the Appendix R design basis exposure fire hazard in cable trays containing IEEE-383 qualified cables and in cable trays containing non-IEEE-383 qualified cables.

Conclusion

A single active failure proof Halon 1301 suppression system is installed in the Auxiliary Feedwater Pump Room. The system is designed to maintain a six percent concentration for a ten-minute soak time.

The design basis fire in the Auxiliary Feedwater Pump Room is not a fully developed cable tray fire as indicated in the inspection report dated November 13, 2001. The design basis fire is a transient combustible exposure fire, as documented by NRC in correspondence dated November 24, 1980 that specifically identifies this issue as applicable to Appendix R compliance.

NUREG/CR-3656 documents that maintaining a six percent concentration of Halon 1301 for a ten-minute soak time will extinguish exposure fires in cable trays containing IEEE-383 qualified cable. NUREG/CR-3656 also documents that a six percent concentration of Halon 1301 will extinguish fully developed fires in cable trays containing non-IEEE-383 qualified cable, which is a more severe fire than an exposure fire initiated by transient materials. Accordingly, we maintain that the Halon system installed in the PBNP AFW room satisfies the design basis fire for that location and that there has been no violation of NRC requirements. Therefore, we believe that the NCV for this issue should be withdrawn from the subject inspection report.