UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 128TO FACILITY OPERATING LICENSE NO. DPR-65

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

DOCKET NO. 50-336

INTRODUCTION

By application for license amendment dated May 26, 1986, as supplemented by letter dated August 11, 1987, Northeast Nuclear Energy Company, et al. (the licensee), requested a change to the Technical Specifications (TS) for Millstone, Unit 2. The proposed change to the TS would delete the footnote in TS 3.9.20, "Spent Fuel Pool" which limits the storage of consolidated spent fuel to five consolidated spent fuel storage canisters.

DISCUSSION

On June 2, 1987, the NRC staff issued Amendment No. 117 to Facility Operating License No. DPR-65 which permitted storage of consolidated spent fuel at Millstone Unit 2 in partial response to the licensee's application dated May 21, 1986. Amendment No. 117 expanded the number of storage locations from 1112 to 1346 by permitting the storage of consolidated spent fuel canisters in locations required to be blocked with cell blocking devices when surrounding locations are used for the storage of unconsolidated assemblies. Amendment No. 117 allowed the storage of 1965 assemblies in 1346 locations, taking into account the mix of locations needed for intact fuel assemblies and locations used for storage of consolidated fuel canisters (each equivalent to two intact fuel assemblies).

However, Amendment No. 117 contained a footnote in TS 3.2.20, "Spent Fuel Pool," that limited the storage of consolidated spent fuel storage canisters to five.

The NRC staff is now considering a change to the TS to remove the footnote in TS 3.2.20. The change would remove the limitation restricting the storage of consolidated spent fuel canisters to five.

In response to the NRC staff's questions on the licensee's amendment request dated May 21, 1986, the licensee provided answers in a letter of April 30, 1987. Attached to the letter was a document entitled "Fuel Consolidated Demonstration Program." The licensee, with the NRC staff's knowledge, undertook the consolidation of ten assemblies pursuant to the provisions of 10 CFR 50.59. The licensee's letter dated August 11, 1987 contains the licensee's safety evaluation of the spent fuel consolidation process, prepared as required by 10 CFR 50.59.

EVALUATION

The consolidation process consists of the disassembly of fuel assemblies and their repackaging into consolidated spent fuel storage boxes. Each such box contains the fuel rods from two spent fuel assemblies. Each assembly to be consolidated must have achieved at least 85 percent of its design burnup and have been in the spent fuel storage racks for at least five years. The consolidation process takes place in the cask laydown areas of the Unit 2 spent fuel storage pool.

The licensee's August 11, 1987 letter contains a detailed discussion of the consolidation process and the equipment which is used in the process. Each stage of the process was examined by the licensee to determine its vulnerability to accidental criticality or release of radioactivity during normal operations. Credible accidents were evaluated with respect to criticality and release of radioactivity.

The following configurations were analyzed for potential criticality:

1. An isolated intact fuel assembly in pure water.

2. An isolated consolidated fuel storage box in pure water.

3. The 3x3 temporary storage rack containing nine intact fuel assemblies in pure water.

4. The fuel disassembly station containing an initially intact fuel assembly from which fuel rods are extracted.

5. The interim transfer container station containing the fuel rods from two intact assemblies in the fuel disassembly station.

6. The damaged fuel rod station containing a storage box with fixed stainless steel tubes with up to 196 fuel rods.

7. The fuel rod transfer station.

The criticality analyses showed that in all cases the value of k-effective was less than the NRC acceptance criterion of 0.95. The analyses were performed by the same methods that were employed for the consolidated fuel storage in Region 2 of the spent fuel racks and found acceptable in the safety evaluation issued in support of License Amendment No. 117. We thus conclude that the consolidation process will not lead to inadvertent criticality.

Accidents that were analyzed included:

1. The drop of a fuel assembly into an empty cell.

2. Drop of a consolidated fuel storage box into the cavity.

3. Drop of fuel assembly onto the top of the racks.

4. Drop of a consolidated fuel storage box onto the top of the racks.

5. Maximum crane uplift force on stuck assembly.

6. Drop of a consolidated fuel storage box onto an intact fuel assembly in the 3x3 temporary rack.

7. Drop of a consolidated fuel storage box onto cask laydown floor area or on to another box.

8. Flow blockage at both ends of a consolidated fuel storage box.

In each of these cases analysis showed that the resultant distortions were not sufficient to cause the k-effective value of the system to exceed 0.95. In addition, the 5 year cooling time assures that radioactivity release values are bounded by those in the FSAR or by the cask drop event found acceptable at the time of the Millstone Unit 2 spent fuel pool reracking.

Based on the discussion presented above, the staff concludes that the fuel consolidation process at Millstone Unit 2 is acceptable. Further, the value of 5 years for the cooling time for the fuel to be consolidated is acceptable, as incorporated in existing TS 3.9.19.

The licensee asserts that the evaluation applies to both the demonstration program and to the full scale consolidation process. Since the analysis assumed full capacity for the various stages of the process, the staff agrees with the licensee's assertion.

In reviewing the spent fuel consolidation process, the NRC staff notes that temporary spent fuel storage racks are utilized during the consolidation process. The temporary spent fuel storage racks are emptied when a consolidation "run" is completed. Should the licensee desire to use the temporary spent fuel storage racks for long term spent fuel storage, the licensee must identify such a change and request approval from the Commission.

ENVIRONMENTAL CONSIDERATIONS

The NRC staff has considered the environmental impact of the storage of consolidated spent fuel at Millstone Unit 2. An "Environmental Assessment and Finding of No Significant Impact" was published in the Federal Register on March 4, 1988 (53 FR 7065).

CONCLUSION

We have concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: March 31, 1988

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