



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

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DOCKET NO: 70-3027

APPLICANTS: Public Service Company of New Hampshire
The United Illuminating Company
Massachusetts Municipal Wholesale Electric Company
New England Power Company
Central Maine Power Company
The Connecticut Light and Power Company
Canal Electric Company
Montaup Electric Company
Bangor Hydro-Electric Company
New Hampshire Electric Cooperative, Inc.
Central Vermont Public Service Corporation
Maine Public Service Company
Fitchburg Gas and Electric Light Company
Vermont Electric Generation and Transmission Cooperative
Taunton Municipal Lighting Plant
Hudson Light and Power Department

FACILITY: Seabrook Station, Unit 1
Rockingham County, New Hampshire

SUBJECT: ENVIRONMENTAL ASSESSMENT - LICENSE APPLICATION TO
RECEIVE NEW FUEL

Background

By application dated August 1, 1985, and its supplement dated October 24, 1985, Public Service Company of New Hampshire (PSNH) acting on its own behalf and as agent for the above utilities applied for an NRC license to permit the receipt, possession, and storage of special nuclear materials in the form of unirradiated nuclear fuel assemblies. In addition, PSNH, as part of the license application, seeks authorization to receive, possess, inspect, and use other radioactive materials in the form of irradiation test capsules containing U-238 and Np-237, incore fission chambers and excore detectors containing uranium enriched in U-235, and sources containing Pu-238, Pu-239, U-235 and U-238. All materials are for eventual use in Seabrook, Unit 1. In accordance with 10 CFR 51.21, the NRC has prepared this assessment of the environmental impacts that may be caused by issuance of the requested license.

Because of the form and small amount (gram quantities) of nuclear materials contained in the startup sources, fission chambers, and counters, storage of these materials will pose no threat to the environment. Therefore, the discussion below will be limited to assessing the potential for environmental impacts resulting from the storage of new fuel assemblies at Seabrook, Unit 1.

The Proposed Action

The proposed action is issuance of a special nuclear materials license pursuant to 10 CFR 70 that will authorize PSNH to receive, possess, inspect, and store 199 fresh fuel assemblies at Seabrook, Unit 1. The license would be effective until it can be superseded by PSNH's operating license under 10 CFR 50. The fuel assemblies contain uranium dioxide (UO_2) pellets that have a maximum uranium-235 enrichment of 3.55 percent by weight and are encapsulated in zircaloy tubing. Issuance of the license would result in the receipt, possession, inspection, and storage of the unirradiated fuel assemblies at Seabrook, Unit 1. The transport of new fuel to Seabrook, Unit 1, will be the responsibility of the fuel fabricator. However, the proposed license would authorize the packaging of fuel assemblies for delivery to a carrier for transport. This would allow PSNH to return damaged fuel assemblies to another location, e.g., return to the manufacturer.

Need for the Proposed Action

PSNH proposes to receive and store fresh fuel prior to issuance of the Part 50 operating license in order to inspect the assemblies and to finalize fuel preparation (e.g., add necessary hardware) needed to load the fuel into the reactor core vessel. Actual core loading, however, will not be authorized by the proposed license. Early completion of this fuel handling will help avoid delays in the Seabrook, Unit 1, startup once its operating license is issued.

Alternatives to the Proposed Action

Alternatives to the proposed action include complete denial of PSNH's application. Assuming the operating license for the facility will eventually be issued, denial of the storage only license now would merely postpone new fuel receipt at Seabrook, Unit 1. Such action, as well as any other alternative that can be imagined, would not present an environmental advantage because, as discussed below, no environmental impacts are expected from the proposed action.

Environmental Impacts of the Proposed Action

A Final Environmental Statement (NUREG-0895) associated with the full-scale operation of Seabrook, Units 1 and 2, has already been issued by the NRC. Based on the evaluation in this statement, the environmental impacts of plant operation subject to proposed conditions for environmental protection are expected to be small. New fuel receipt and storage is only a small part of Seabrook, Unit 1's, overall operation that will eventually include the handling and storage of irradiated fuel which is significantly more hazardous. Accordingly, the environmental impacts resulting from the handling and storage of new fuel are expected to be very minor.

Once at Seabrook, Unit 1, the new fuel may be temporarily stored in their shipping containers in the rail bay and the new fuel shipping container area prior to placement in their designated storage locations: new fuel storage area and the spent fuel pool located in the Fuel Building. The shipping container array to be utilized at Seabrook, Unit 1, has been analyzed under all degrees of water moderation and/or reflection and found to be critically safe.

In the unlikely event that more containers are received than can be stored in the rail bay and new fuel shipping container area, a temporary holding area outside and adjacent to the Fuel Storage Building will be set up. To avoid the establishment of a long-term storage area outside for the fuel-bearing shipping containers, PSNH has committed to a maximum storage period of 72 hours (from receipt onsite of any loaded shipping container) outside.

Assemblies are then removed from their shipping containers, inspected, and surveyed for external contamination. Assuming no contamination is detected and the fuel meets PSNH's technical specifications, the fuel is transferred to their designated storage locations.

Criticality safety of the storage locations is maintained by limiting the interaction between adjacent fuel assemblies. This condition is maintained in the new fuel racks such that a maximum of 12 fuel assemblies are stored in the new fuel racks in a checkerboard pattern; the four adjacent storage locations to each fuel assembly are vacant. The staff has determined that such a storage arrangement is critically safe under all degrees of water moderation and/or reflection.

Interaction between fuel assemblies stored in the spent fuel racks is limited by the presence of sheets of neutron poison securely fastened to all four sides of each storage location.

The design of the storage locations, combined with plant procedures, will ensure acceptable protection of the general public and plant personnel either under normal or abnormal conditions.

Since the fresh fuel assemblies are sealed sources, the principal exposure pathway to an individual is via external radiation. For a low-enriched uranium fuel bundle (<4 percent U-235 enrichment), the exposure rate at a foot from the surface is normally less than 1 mr/hr; therefore, it is estimated that the exposure level to an individual from unirradiated fuel would be less than 25 percent of the maximum permissible exposure specified in 10 CFR 20. Because of the low-radiation exposure levels associated with the requested materials and activities and PSNH's radiation protection procedures, the staff concludes that fuel handling and storage activities can be carried out without any significant radiological impact to the environment.

Only a small amount, if any, of radioactive waste (e.g., smear papers and/or contaminated packaging material) is expected to be generated during fuel handling and storage operations. Any waste that is produced will be properly stored onsite until it can be shipped to a licensed disposal facility.

In the event the applicant must return assemblies to the fuel fabricator, all packaging and transport of fuel will be in accordance with 10 CFR 71. The package will meet NRC approval requirements for normal conditions of transport and hypothetical accident conditions. No significant external radiation hazards are associated with the unirradiated assemblies because the radiation level from the clad fuel pellets is low and because the shipping packages must meet the external radiation standards in 10 CFR 71. Therefore, any shipment of unirradiated fuel by the applicant is expected to have an insignificant environmental impact.

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PSNH has installed redundant engineered-safety features on equipment intended for use in fuel handling and storage operations. These safety features combined with administrative controls minimize the likelihood of an accident situation occurring during fuel handling activities. In the unlikely event that an assembly (either within or outside its shipping container) is dropped during transfer, the fuel cladding is not expected to rupture. Even if the cladding were breached and the pellets were released, an insignificant environmental impact would result. The fuel pellets are composed of a ceramic UO_2 that has been pelletized and sintered to a very high density. In this form, release of UO_2 aerosol is highly unlikely except under conditions of deliberate grinding. Additionally, UO_2 is soluble only in acid solution so dissolution and release to the environment are extremely unlikely.

Conclusion

Based upon the information presented above, the environmental impacts associated with new fuel storage at Seabrook, Unit 1, are expected to be insignificant. Essentially no effluents, liquid or airborne, will be released and acceptable controls will be implemented to prevent a radiological accident. Therefore, in accordance with 10 CFR 51.31, a Finding of No Significant Impact is considered appropriate for this action.

Original signed by:

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