POLICY ISSUE
(Information)

February 3, 1995 SECY-95-025

FOR: The Commissioners

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: TERMINATION OF SHOREHAM NUCLEAR POWER STATION OPERATING LICENSE

PURPOSE:

To inform the Commission that the decommissioning process has been completed at the Shoreham Nuclear Power Station (SNPS), Unit 1, located in Suffolk County, New York, and that the staff plans to issue an Order terminating the Nuclear Regulatory Commission Nuclear Power Facility License No. NPF-82 (NRC Docket File No. 50-322), and authorizing the release of the site for unrestricted use.

SUMMARY:

The SNPS facility was formerly a single-unit boiling-water reactor (BWR) nuclear power facility that was designed to produce a gross electrical output of 849 megawatts (849 MWe). The facility was operated for testing from 1985 through 1987 for the equivalent of approximately 2 effective full-power days, without ever exceeding 5 percent of its rated operating power. The unit was prematurely shut down and the reactor was defueled in 1989, after the original owner and licensee, Long Island Lighting Company (LILCO), reached a settlement agreement with the State of New York to transfer plant ownership and the NRC license to the Long Island Power Authority (LIPA) for decommissioning. LIPA was established to decommission

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the facility and release the site for unrestricted use. The full-power operating license (No. NPF-82) was amended to a possession-only status in July 1991 and was subsequently transferred, as amended, to LIPA in February 1992. NRC approved the decommissioning plan in June 1992; the plan approved decontamination or removal of contaminated portions of the reactor and other plant systems. LIPA is the current owner and licensee of the facility.

The limited period of reactor operation resulted in activation and contamination of various components, systems, and structural areas within the plant. Decommissioning began in June 1992 and was completed in August 1994. The slightly irradiated fuel was shipped to the Limerick Generating Station for reuse.

The licensee conducted termination surveys to assess residual radioactive contamination levels at the facility. Phase 1 was the termination survey of the internal components of the main turbine, turbine building, site grounds, and exterior site structures. Phases 2 and 3 surveyed portions of the reactor building, the suppression pool, and the radwaste building. The fourth and final phase surveyed the portions of the reactor building that had been used to store fuel before it was shipped to Limerick. LIPA completed the final radiological survey in August 1994.

Oak Ridge Institute for Science and Education (ORISE), under contract to NRC, conducted a series of independent confirmatory surveys, during four site visits, from February 1993 through November 1994, to verify the accuracy of LIPA's survey. For its confirmatory survey, ORISE selected 46 licensee-designed survey units. The 46 confirmatory survey units consisted of 23 randomly selected affected survey units, 14 randomly selected unaffected survey units, and 9 specifically selected affected and unaffected survey units. The ORISE confirmatory survey affirmed the licensee's final survey results. On the basis of the licensee's completion of decommissioning activities, the NRC staff's review of the licensee's termination survey report, and the results of NRC confirmatory surveys, the staff concludes that the site is suitable to be released for unrestricted use.

BACKGROUND:

The SNPS facility site is located in the town of Brookhaven, Suffolk County, New York, about 50 miles east of New York City on the north shore of Long Island. The developed portion of the site, which contains the Shoreham plant structures, several blacktop or gravel parking areas, intake canal, discharge tunnel, barge dock, and numerous ancillary structures, comprises approximately 80 acres. Approximately 18 acres of the site's developed area was in use during the decommissioning. The balance of the site remains the property of LILCO.

The SNPS facility was constructed as an 849 MWe nuclear power plant. The plant contained a General Electric (GE) model BWR nuclear steam supply system with a rated core thermal power of 2436 MWt within a GE Mark II (pressure-suppression)-type containment in the reactor building, and

coupled to a GE turbine generator located in the turbine building. The first and only reactor core fuel load consisted of 560 GE-BWR6 fuel assemblies, each of which was made up of 64 individual Zircalloy fuel rods containing uranium dioxide fuel pellets.

SNPS achieved initial criticality in February 1985. A low-power operating license (not to exceed 5-percent power) was granted in July 1985. The plant was tested intermittently at low power levels (not exceeding 5 percent) over the course of approximately 2 years. After operating for the equivalent of approximately 2 effective full-power days, the reactor was shut down in June 1987. A full-power operating license was granted in April 1989. As a result of a settlement agreement reached with the State of New York in February 1989, the licensee (LILCO) agreed not to operate the plant and transferred ownership and the Part 50 license to LIPA.

The fuel, the control rod blades, as well as a number of other in-core components and sealed radioactive sources, were removed from the reactor and placed in the spent fuel storage pool (SFSP) in August 1989. In June 1991, the full-power operating license was amended to a possession-only license, and the license was transferred to LIPA in February 1992.

The operating history of the plant, although very limited, resulted in the irradiation of the nuclear fuel and activation of structures and components in the reactor vessel and contamination of systems, components, and areas within the facility. Portions of the steel reactor pressure vessel (RPV), the steel-lined concrete reactor bioshield wall, and many of the RPV internal components were activated to varying degrees, and all or portions of 13 plant piping systems external to the RPV became contaminated above the limits for unrestricted use, as specified in Table 1 of NRC Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors." There were no spills or unusual events involving radioactive materials outside of radiologically controlled areas, nor have there been any onsite burials or other onsite disposal of radioactive material.

LIPA submitted its initial decommissioning plan to NRC for review in December 1990, and responded to three rounds of NRC requests for additional information in 1991. A decommissioning order was issued on June 11, 1992, which authorized the licensee to begin decommissioning/decontamination of the facility.

The licensee proceeded with decommissioning of the reactor vessel's internal components, the activated portion of the RPV, and contaminated piping and equipment. These items were segmented as necessary, packaged, and shipped off site for volume reduction or burial (or both) at a licensed low-level waste disposal facility. The fuel was stored in the SFSP during this period.

Radioactive portions of the reactor bioshield wall exceeding the gamma dose rate criterion were also removed and disposed of off site; however, to maintain exposure as low as is reasonably achievable (ALARA) during the disposal of other large sections of this wall, the licensee requested and received NRC's permission, in June 1994, to apply increased surface

contamination limits for iron-55 and tritium above those specified in Regulatory Guide 1.86. These revised limits were presented to the Commission in SECY 94-145, and increased the allowable residual average and maximum total residual beta activity levels for iron-55 and tritium from 5000 average total and 15,000 maximum total (fixed plus removable) disintegrations per minute (dpm)/100 square centimeters to 200,000 average total and 600,000 maximum total dpm/100 square centimeters, respectively. This permitted the licensee to retain on site major portions of the wall that did not exceed the gamma dose rate criterion or the surface contamination limits for other isotopes, but which would have required offsite disposal under the original iron-55 and tritium surface contamination limits of Regulatory Guide 1.86. Wall segments cut out from their original locations to enable removal and disposal of the more activated portions of the wall were stored in the radwaste building.

Radiological surveys of the facility have shown that contamination was primarily confined to equipment and structural areas within the reactor and radwaste buildings, with relatively slight contamination found in the turbine building. Radioisotopes in activated components (other than fuel assemblies) were determined to include primarily tritium, carbon-14, iron-55, cobalt-60, nickel-59, nickel-63, manganese-54, europium-152, and trace amounts of other isotopes. Contamination of equipment and structural surfaces was primarily limited to cobalt-60 and iron-55. The plant has had no history of contamination from alpha-emitting nuclides, which was attributed to an absence of leaks from the fuel because of its brief, low-power, operating history.

The residual radioactivity criteria for unrestricted release of the facility were established in the approved decommissioning plan and consistent with the guidelines of Table 1 of NRC Regulatory Guide 1.86 (i.e., 5000 dpm/100 square centimeters average total beta activity; 15,000 dpm/100 square centimeters maximum total beta activity; and 1000 dpm/100 square centimeters removable beta activity). In addition, an average gamma dose rate criterion of 5 μR per hour above background at a distance of 1 meter from accessible surfaces in the facility buildings and outdoor areas was established, with any individual gamma exposure measurement not to exceed 10 μR per hour above background radiation. A concentration limit for cobalt-60 in soil and other bulk materials of 8 pCi (picocuries) per gram was also established.

From September 1993 through May 1994, the licensee shipped (in 33 shipments) all its slightly irradiated nuclear fuel to the Limerick Generating Station for reuse. The disposition of the SNPS fuel enabled the licensee to drain and decontaminate the SFSP and dispose of the fuel racks. This work was completed in August 1994 and marked the completion of the last physical decommissioning activities at the SNPS site.

CONCLUSION:

The staff has completed its review of the Shoreham Decommissioning Project Termination Survey final report. The licensee's final survey report documented the level of residual radioactivity remaining at the facility

and affirmed that the residual radioactivity met unrestricted use criteria established by the NRC, and that the site was suitable for release for unrestricted use.

A NRC contractor, ORISE, conducted a series of independent confirmatory surveys during four site visits from February 1993 through November 1994. The results of the ORISE confirmatory survey affirmed the licensee's final survey results. On the basis of the decommissioning activities conducted by the licensee, the NRC staff's review of the licensee's termination survey final report, and the results of NRC confirmatory surveys, the staff concludes that the decommissioning process is complete and the site is suitable to be released for unrestricted use. Accordingly, the staff plans to issue an Order terminating the license and authorizing the release of the site for unrestricted use.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objections.

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for Operations

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