ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

November 15, 1972

Honorable James R. Schlesinger
Chairman
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: PLATFORM MOUNTED NUCLEAR PLANT

Dear Dr. Schlesinger:

At its 151st meeting, November 9-11, 1972, the Advisory Committee on Reactor Safeguards completed its review of a concept for a floating nuclear power plant, known as the Platform Mounted Nuclear Plant (PMNP), proposed by Offshore Power Systems (OPS), a newly organized joint venture formed by the Westinghouse Electric Corporation and Tenneco, Inc. This project had been considered previously at the Committee's 148th meeting, August 10-12, 1972, and at Subcommittee meetings held on August 3, October 5, and October 25, 1972 in Washington, D.C. During its review, the Committee had the benefit of discussions with representatives of OPS, the Westinghouse Electric Corporation, Public Service Electric and Gas Company, the AEC Regulatory Staff, and their consultants. The Committee also had the benefit of the documents listed below.

The PMNP is to employ a pressurized water nuclear steam supply system, designed by the Westinghouse Electric Corporation for a rating of 3425 MW(t). Except for its mounting on a floating platform, the nuclear steam supply system and the turbine generator system will consist primarily of conventional equipment which will be standardized to permit use of assembly-line type of production. The PMNP will be fabricated and assembled in a specially constructed shipyard facility where it will be floated, outfitted, and tested without fuel. It will then be towed to its site and moored within a breakwater where fuel loading and final preoperational tests will be completed. Selection and preparation of the site, including the design and construction of the breakwater, the mooring system, the plant seawater discharge structure, and the electrical power lines from the platform to the breakwater and to the shore, will be the responsibility of the utility.

A design envelope specifying the site characteristics which are to be met for assurance of the compatibility of the site and the plant will be provided by OPS. By thus separating site and plant design, OPS

believes that the construction permit for the plant can be separated from the construction permit for the site. OPS proposes submitting a single application for a permit to construct from four to ten standardized plants. Each utility would submit a separate application for a construction permit for a particular site.

Although the OPS proposes separating site design from plant design by use of a design envelope specifying the site characteristics which must be met, the Committee believes that the appropriateness of this approach will have to be confirmed by review of specific cases. It will be necessary to demonstrate for each case that the site and plant characteristics are compatible.

The review by the Committee was limited to design considerations associated with the unique features of the concept, within the limits of information available. A number of the design features for the concept remain to be developed in detail. As with any new system, these features should be thoroughly explored by the applicant and appropriate steps taken by him to assure adequate margin for all components and systems prior to a formal construction permit application. The construction permit submittals should fully document the suitability of the plant for the intended service. Specific attention must be given to ensuring the integrity of the platform, its moorings, the breakwater, and emergency power supply systems. The safety of the public under both site-related and plant-related potential accidents should be assured.

The acceptability of a plant based on this concept will be dependent in large part on the capability of the plant for coping with fires and explosions which might arise from potential collisions of ships carrying flammable or other hazardous cargo. The Committee believes that such capability has not yet been demonstrated; substantial further effort in this area is required. In determining the nature and size of the fire-fighting systems installed in the plant, consideration must be given to all site characteristics which could affect the intensity and course of such events.

Depending on the site characteristics, consideration may need to be given to the probability of unacceptable consequences resulting from aircraft crashes.

The Committee believes that OPS should give further consideration to possible means for assuring maintenance of containment integrity in the highly unlikely event of core melt-through, taking into account the possible advantages of the availability of the large source of cold water surrounding the platform.

The Committee believes the PMNP should be designed so that sinking within its breakwater would not cause undue risk to the health and safety of the public.

The Committee recommends that the design of the PMNP take into account decommissioning of the station.

The turbine-generator for this plant is so arranged that in the unlikely event of a turbine failure, missiles could be generated which might damage the reactor building or other key structures related to plant safety. The Committee recommends that a study be made of the probability of unacceptable consequences arising from potential turbine missiles and of the possible need for protective measures if this probability should be unacceptably high. In addition, the Committee believes that analytical and experimental work on the penetration of structures by missiles of the type of interest is needed to provide a suitable basis for establishing the probability of penetration of structures and damage to safety-related components.

Emergency core cooling systems of improved designs should be incorporated in the design of the nuclear steam supply system in accordance with the Committee's letter of January 7, 1972, entitled, "Report on Interim Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Power Reactors." In addition, the Committee believes that since these plants are to be standardized, procedures must be developed to incorporate approved resolutions of generic items.

The Committee believes that, with due attention to the foregoing items and subject to confirmation by additional design studies, analyses and test work as found necessary, this floating Platform Mounted Nuclear Plant concept can be successfully engineered to operate without undue hazard to the health and safety of the public.

Sincerely yours,

C. P. Siess
Chairman

References:

1. Westinghouse Electric Corporation letter dated April 26, 1972; Preliminary Design Report, Vols. I and II
2. Amendment No. 1 to Preliminary Design Report
3. Atlantic Generating Station, Plant and Site Descriptions dated August 1972
4. AEC letter to Offshore Power Systems dated October 20, 1972