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

January 15, 1969

Honorable Glenn T. Seaborg
Chairman
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: REPORT ON INDIAN POINT NUCLEAR GENERATING UNIT NO. 3

Dear Dr. Seaborg:

At its 105th meeting, January 9-11, 1969, the Advisory Committee on Reactor Safeguards completed its review of the application of Consolidated Edison Company of New York, Inc., for authorization to construct Indian Point Nuclear Generating Unit No. 3. This project had previously been considered at the 103rd meeting of the Committee, and at Subcommittee meetings on October 22, 1968, and December 28, 1968. During its review, the Committee had the benefit of discussions with representatives of the Consolidated Edison Company and their contractors and consultants, and with representatives of the AEC Regulatory Staff and their consultants. The Committee also had the benefit of the documents listed.

Indian Point Unit No. 3 includes a four-loop nuclear steam supply system with a design power rating of 3025 MW(t). The design is very similar to that of Unit No. 2 except for differences in power level and some of the engineered safety features. The peak values of core heat flux and linear heat generation rate are slightly lower than those proposed for the reactors of the Zion Station.

The applicant has considered the possibility of reactor vessel failure as a result of thermal shock caused by emergency core cooling system action in the unlikely event of a loss-of-coolant accident during the later portions of vessel life. He has conducted engineering studies which have established the feasibility of a cavity flooding system that could flood to a level above the top of the core and thereby provide additional protection in the event of such failure. He stated that this system would be installed at a future time if studies now under way indicated that vessel failure as a result of thermal shock could occur.

The vessel cavity walls will be designed to withstand the mechanical forces which would result if a highly unlikely vessel split were to occur with the primary system pressurized. Design of the system will be such as to permit annealing of the reactor pressure vessel, if this should become necessary.

The applicant proposes to install flame recombiners to cope with potential hydrogen concentration buildup from various sources in the unlikely event of a loss-of-coolant accident. He has described a research and development program to ascertain the need for a recombiner, to study other types of recombiners, and to confirm acceptable performance. The applicant also described measures to be taken in the design and operation to prevent inadvertent introduction of hydrogen into the containment.

The on-site emergency power supply for Unit No. 3 employs four 480 V buses energized (upon loss of normal power) by three diesel generators, two of which are required to furnish energy to engineered safety features. The applicant proposes an automatic system of cross-connecting sources and loads. The Committee believes that the on-site power sources should have a greater independence than in the proposed system, at least to the extent that they cannot be connected together with automatically operated devices. An appropriate modification should be developed by the applicant and the matter resolved with the Regulatory Staff.

The main-coolant-pump flywheels represent a potential source of missiles within the containment, and the applicant has described measures taken to assure conservative design and high quality fabrication to minimize the possibility of flywheel failure. Additional steps may be warranted to assure the integrity of the flywheel assembly, and the Committee recommends that details concerning the adequacy of design, the material characteristics, quality assurance, and in-service inspection requirements be resolved between the applicant and the Regulatory Staff.

In the event that an irradiated fuel assembly is dropped or otherwise damaged during transit from the reactor vessel to the spent fuel pit, the cladding on the fuel rods may be ruptured with a consequent release of radioactivity. In view of the relatively high population density close to the Indian Point site, the applicant should review the assumptions made in analysis of a refueling accident to see whether additional conservatism is warranted in assessing its effects and the provisions to cope with the accident. The matter should be resolved with the Regulatory Staff.

Part-length control rods and special full-length rods are provided to control spatial neutron flux oscillations. Provision will be made for installation of permanent in-core detectors, should such detectors be required to assure adequate measurement of the power distribution.

Means will be provided for early detection of abrupt gross failure of a fuel element.

The instrumentation design should be reviewed for common failure modes, taking into account the possibility of systematic, non-random, concurrent failures of redundant devices, not considered in the single-failure criterion. The applicant should show that the proposed interconnection of control and safety instrumentation will not adversely affect plant safety in a significant manner, considering the possibility of systematic component failure. The Committee believes that this matter can be resolved by the applicant and the Regulatory Staff.

The Committee calls attention to matters previously identified as warranting careful consideration with regard to all large, water-cooled power reactors of high power density.

The Committee also emphasizes the importance of independent action by the applicant to assure quality in the construction of the facility.

The ACRS believes that the items mentioned can be resolved during construction, and that, if due consideration is given to the foregoing, nuclear Unit 3 proposed for Indian Point can be constructed with reasonable assurance that it can be operated without undue risk to the health and safety of the public.

Sincerely yours,

/s/
Stephen H. Hanauer
Chairman

References attached.

References - Indian Point Nuclear Generating Unit No. 3

1. LeBoeuf, Lamb & Leiby letter, dated April 26, 1967; Consolidated Edison Company of New York, Inc., Application for Licenses, dated April 25, 1967; Preliminary Safety Analysis Report

2. LeBoeuf, Lamb, Leiby & MacRae letter, dated August 30, 1968, Amendment No. 1 to Application for Licenses

3. LeBoeuf, Lamb, Leiby & MacRae letter, dated September 16, 1968; Amendment No. 2 to Application for Licenses

4. LeBoeuf, Lamb, Leiby & MacRae letter, dated October 18, 1968; Amendment No. 3 to Application for Licenses

5. LeBoeuf, Lamb, Leiby & MacRae letter, dated October 31, 1968; Amendment No. 4 to Application for Licenses

6. LeBoeuf, Lamb, Leiby & MacRae letter, dated November 4, 1968; Amendment No. 5 to Application for Licenses

7. LeBoeuf, Lamb, Leiby & MacRae letter, dated November 25, 1968; Amendment No. 6 to Application for Licenses

8. LeBoeuf, Lamb, Leiby & MacRae letter, dated December 9, 1968; Amendment No. 7 to Application for Licenses

9. Amendment No. 8 to Application for Licenses

10. LeBeouf, Lamb, Leiby & MacRae letter, dated January 3, 1969; Amendment No. 10 to Application for Licenses

11. LeBoeuf, Lamb, Leiby & MacRae letter, dated January 6, 1969; Amendment No. 11 to Application for Licenses