

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
UNITED STATES ATOMIC ENERGY COMMISSION
Washington 25, D. C.
November 1, 1961

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

Subject: REPORT ON THE PEACH BOTTOM ATOMIC POWER STATION,
PHILADELPHIA ELECTRIC COMPANY

Dear Dr. Seaborg:

At its thirty-seventh meeting, October 26-28, 1961, the Advisory Committee on Reactor Safeguards reviewed the 115 MW (thermal) helium cooled, graphite moderated, high temperature reactor to be constructed at the Philadelphia Electric Company Peach Bottom site in southeastern Pennsylvania. This reactor was considered previously at the Committee's twenty-fourth and thirtieth meetings. In addition, a subcommittee has met with the applicant, contractor, and the staff on February 17, 1960, March 15-16, 1961 (at La Jolla, California) June 2, 1961 and October 3, 1961.

At the discussion on October 27, 1961, representatives of General Atomic Division of General Dynamics Corporation, Bechtel Company, and members of the AEC staff were present. The committee has also had the benefit of reports from its subcommittee and the documents referenced below.

In its reports dated March 14, 1960 and December 10, 1960, the Committee expressed the opinion that the site is suitable for a reactor of this general design and power level. In those reports several questions were raised relative to problems requiring investigation because of novel design features.

The extensive research and development program which is being carried on by General Atomic Division has resulted in the development of pertinent information. Design modifications have been made which appear to resolve the safety questions that have been raised.

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While the hydraulic control rod system remains basically the same, the added rod separation detection system, electrically driven emergency shutdown-rods, fusible-link poison rods, and installation of a finger-type holding lock on control rods provide a satisfactory control and backup scheme. A testing program which is underway on a prototype hydraulic control rod system involving starts and stops, a large number of scrams, and a series of malfunction tests appears to indicate its reliability.

The questions raised concerning the inherent shutdown characteristics appear to have been resolved by changes in thorium concentration and addition of rhodium to the core, and recalculation and measurements on the Doppler contribution. It has been stated by the applicant that, as a result of these changes, the temperature coefficient is negative throughout core life and at all temperatures up to 4000°F.

In order to prevent reaction between core graphite and moisture, provision has been made for rapid moisture detection, loop isolation, and scrambling the reactor if excessive moisture is detected in the primary system. Further protection of the graphite is provided by maintaining the oxygen content of the containment vessel at a level below 5%. An emergency cooling system has been provided around the reactor cavity to remove decay heat after shutdown in the event of loss of coolant circulation. Design specifications, including inspection procedures provide a basis for assuring the integrity of the containment shell. In addition, the research and development program gives reasonable assurance as to the long term integrity of the graphite.

Considerable information has been developed on barriers against fission product release. Pyrolytic coating of fuel particles, the use of an impervious graphite sleeve around the fuel compacts, internal fission product traps on fuel elements, and external fission product traps are proposed as the means of controlling fission product concentration in the coolant. The current results of the fission product research program appear to be favorable. However, should later results indicate that a reliable system can not be obtained by the present approach, alternate methods appear to be available to insure that the fission product concentration in the helium coolant will be kept low.

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Since the continuing research program gives reasonable assurance that all health and safety problems can be satisfactorily resolved, the ACRS believes that the proposed reactor can be constructed at the Peach Bottom site with reasonable assurance that it can be operated without undue risk to the health and safety of the public.

Dr. John C. Geyer did not participate in these reviews or discussions.

Sincerely yours,

/s/ T. J. THOMPSON

T. J. Thompson
Chairman

References:

1. Amendment #2 to Application of Philadelphia Electric Company, Part B, dated August 4, 1961.
2. Amendment #3 to Application of Philadelphia Electric Company, dated October 17, 1961.