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

December 18, 1972

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

Subject: REPORT ON THE POWER BURST FACILITY

Dear Dr. Schlesinger:

During its 152nd meeting, December 7-9, 1972, the Advisory Committee on Reactor Safeguards completed its review of the construction of the Power Burst Facility (PBF) and the Commission's plans to operate the reactor. The Committee reported previously on this project on November 24, 1965. The project was also considered at the Committee's 151st meeting, November 9-11, 1972, and at Subcommittee meetings at the site on September 2, 1971, and in Washington, D. C., on October 25, 1972. During its current review, the Committee has had the benefit of discussions with representatives and consultants of the Commission's Division of Reactor Development and Technology, the Aerojet Nuclear Company, and the AEC Regulatory Staff. The Committee also had the benefit of the documents listed below.

The PBF is located about 40 miles from Idaho Falls, Idaho, at the National Reactor Testing Station. The nearest boundary of the Testing Station controlled area is about 7 miles to the south; other boundaries are substantially more distant. About 3500 persons normally work in the test area within a radius of 7 miles.

The facility consists of a water-moderated, water-cooled, ambient pressure reactor designed to operate either in a pulsed mode, in a shaped power run (high constant power for a short time), or in a steady state at lower power. The fuel rods are of a unique design. The fuel pellets are composed of a ternary mixture of UO_2, CaO, and ZrO_2. These pellets are separated from the stainless steel cladding by layers of helium gas and ZrO_2. About 2400 such rods make up the core. Reactivity management is accomplished by motion of control rods or special transient rods, or by injection of liquid poison into the system.

An in-pile tube about 8 inches in diameter, designed to accommodate a variety of experiments, will occupy the center of the reactor. An out-of-pile circulation and cooling system is connected to the tube. The purpose of the experiments to be conducted is to test reactor fuels (primarily light water reactor oxide fuels) under simulated accident conditions. These include power-cooling mismatch, loss of coolant, and reactivity-initiated accident conditions.

While the PSAR specified either a pulsed mode or a power-time limit of 20 MW for one hour, the proposal in the FSAR is for a power-time limit of 40 MW for 48 hours. However, the contractor has stated that for the first year or two he expects that 40 MW runs will last no longer than one hour.

Because the Uniform Building Code seismic zone classification for the site was changed from II to III during construction, the confinement building is being strengthened by the addition of a 3/16-inch carbon steel liner to cover the ceiling and walls above the operating floor. Presence of this liner will also reduce leakage from the building and the calculated accident doses.

The Technical Specifications have not yet been issued by the Idaho Operations Office of the AEC. The Committee recommends that these specifications and a safety envelope for the proposed experimental program be reviewed by the Regulatory Staff.

The PBF has specified evacuation procedures, as do all sites at NRTS, and the contractor states that the control center personnel can be evacuated in less than five minutes.

The Advisory Committee on Reactor Safeguards believes that, subject to satisfactory completion of construction and preoperational testing and start-up programs and if due care is taken in the conduct of the experimental program, there is reasonable assurance that the Power Burst Facility can be operated as proposed without undue risk to the health and safety of the public.

Sincerely yours,

C. P. Siess

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Chairman

References attached

References

1. DRD&T memo dated August 4, 1971, Final Safety Analysis Report (FSAR) Parts I and II, July 1971

2. DRD&T memo dated August 16, 1971, replacement pages for FSAR

3. DRD&T memo dated January 3, 1972, Section XI of FSAR

4. DRD&T memo dated February 2, 1972, Section XV of FSAR

5. DRD&T memo dated April 24, 1972, answers to questions

6. DRD&T memo dated May 25, 1972, Additional Information

7. DRD&T memo dated August 2, 1972, Additional Information

8. DRD&T memo dated August 11, 1972, Additional Information

9. DRD&T memo dated September 12, 1972, Additional and Confirmatory Information

10. DRD&T memo dated November 7, 1972, Information on PBF Accident Analyses