

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

May 12, 1966

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

Subject: REPORT ON ZERO POWER PLUTONIUM REACTOR

Dear Dr. Seaborg:

At its seventy-third meeting on May 5-7, 1966, the Advisory Committee on Reactor Safeguards considered the proposal by Argonne National Laboratory (ANL) to construct the Zero Power Plutonium Reactor (ZPPR) at the National Reactor Testing Station in Idaho. The Committee had the benefit of Subcommittee meetings on July 7, 1965 and April 23, 1966; of discussion with representatives of ANL and the AEC Staff; and of the documents listed below.

The proposed ZPPR utilizes a split-table critical machine for constructing large fast critical assemblies. It is capable of handling critical assemblies of about 6000 liters containing about 3000 kg of plutonium. The design and proposed method of operation of ZPPR are similar to the ZPR-III and ZPR-VI critical facilities which have been designed and operated by ANL. The distinguishing features of ZPPR are the larger size, the addition of forced-air cooling of the assembly, provisions for safe handling of large quantities of plutonium, and the uniqueness of the containment.

The reactor is housed in a concrete-walled cell covered with a gravel-sand roof 15 to 20 feet thick to serve as a plutonium filter in the unlikely event of an accident. Further protection from possible venting is afforded by an absolute filter housing over the gravel-sand roof.

ANL has agreed to develop a calculational procedure to estimate the cell overpressure resulting from a design-basis nuclear excursion and to operate only assemblies for which the predicted cell overpressure is less than 12.5 psi, the levitation pressure of the gravel-sand filter. The details of the calculational procedures should be resolved with the Regulatory Staff before operation of the facility is begun.

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The ACRS believes that the ZPPR facility can be constructed at the site proposed with reasonable assurance that it can be operated without undue hazard to the health and safety of the public.

Dr. David Okrent and Dr. Harry O. Monson did not participate in the review of this project.

Sincerely yours,

/s/

Nunzio J. Palladino
Acting Chairman

References:

1. ZPPR, Argonne National Laboratory, Zero Power Plutonium Reactor, Preliminary Safety Analysis Report, approval copy, revised January, 1965.
2. "Information for Safety Evaluation of ZPPR", Argonne National Laboratory, dated June 4, 1965.
3. ZPPR, Argonne National Laboratory, Zero Power Plutonium Reactor, Supplement to Preliminary Safety Analysis Report, February 1966.
4. "Logging, Coring & Analysis of the Gravel in the Gravel Gertie Test Cell", Eberline & Associates, Inc., December 1965.
5. "Answers to Questions in the Letter from K. A. Dunbar to A. V. Crewe, March 21, 1966", undated, received April 7, 1966.
6. "More Detailed Discussion of the Excursion Calculations", undated, received April 21, 1966.