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

October 11, 1962

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

Subject: REPORT ON ENRICO FERMI ATOMIC POWER PLANT (PRDC)

Dear Dr. Seaborg:

During its forty-fourth meeting October 4-6, 1962, the Advisory Committee on Reactor Safeguards reviewed the application of the Power Reactor Development Corporation for a license to operate the Enrico Fermi Fast Reactor Plant at power levels up to 1 MW(th). Representatives of PRDC, APDA and the AEC staff participated in the discussion. At a previous meeting, June 28-30, 1962, the Committee had considered the reactor design, following subcommittee meetings with the applicant. The documents referenced below were used by the Committee in these reviews.

Because of the novel character of this installation, the Committee in its letter to the General Manager, dated July 29, 1955, felt obliged to point out that while the site had desirable features, and was considered suitable for a contained power reactor, certain safeguards should be provided and specific technology would have to be developed in order to give assurance of safe operation. These reservations were further amplified by the Committee in its letter of June 6, 1956, following a review conducted at its June 3, 1956 meeting.

In the years following the 1956 review, the applicant, the AEC and fast reactor groups abroad have conducted vigorous programs of developmental research which have greatly increased the knowledge of the behavior of fast reactors having high power densities. In particular, fast reactors such as the Dounreay Fast Reactor in the U.K., BR-5 in the USSR, and two additional core loadings of EBR-I have been operated for some time. This information has resulted in improved understanding and confidence in analytical techniques.

Specific information has been developed which allows a more accurate and reassuring evaluation of such important features of the reactor design as temperature and power coefficients, core distortions, Doppler effects, and the containment system. The Committee has followed these programs closely.

The reservations expressed by the Committee in its two earlier letters have been removed by the considerable body of data that has been amassed in the intervening years.

Several components, such as a protective dome over the central plug, instrumentation for detecting fission products in the sodium, and automatic controls, which are desirable or required for high power operation, are not needed for safe operation at 1 MW(th). The program as described by the applicant offers reasonable assurance that adequate information will be developed in preparation for full power operation at 200 MW(th).

The Advisory Committee on Reactor Safeguards concludes that the Enrico Fermi Fast Reactor Plant can be operated at powers up to the proposed 1 MW(th) without undue hazard to the health and safety of the public.

Dr. Henry W. Newson did not participate in the review or discussions of this project.

Sincerely yours,

/s/
F. A. Gifford, Jr.
Chairman

References Attached (3 pages)

REPORT ON ENRICO FERMI ATOMIC POWER PLANT (PRDC)

References:

1. PRDC Revised License Application, Part A - General Information and Request for License with Exhibits A-1 through A-6, dated July 1961.
2. PRDC Revised License Application, Part B- Technical Information and Hazards Summary Report; undated, received July 19, 1961:

   Vols. 1, 2, and 3 - Section I: Reactor and Plant Design
   Vol. 4 - Section II: Plant Operation
   Vol. 5 - Section III: System Verification Programs
   Vol. 6 - Section IV: Reactor Commissioning Program
   Section V: Site and Environment
   Vol. 7 - Section VI: Evaluation of Hazards, undated, received September 14, 1961.
3. Amendment No. 1 to revised license application submitting:

   Part A - General Information and Request for License, dated September 1962
   Part B - Technical Information and Hazards Summary Report, Vols. 1 through 7, dated September 1962
   Part B - Vols. 8, Part I - Operation at Levels not in Excess of One Megawatt; Part II - Operation at Levels not in Excess of 200 Megawatts (Preliminary Draft), undated, received October 1, 1962
4. PRDC Quarterly Technical Progress Reports Nos. 1 through 15 and Exhibits T-1 through T-62 attached.
5. Exhibits B-2 through 54, 56 and 58 through 64 to PRDC Revised License Application.
6. Argonne National Laboratory Documents:

ANL-5719	ANL-6334	ANL-6485
5731	6354	6501
5742	6387	6509
5782	6399	6512
5809	6409	6525
5836	6433	6544
5843	6454	6565
5855	6462	6573
6266	6473	6580
6299	6484	6597

7. ANL Fast Reactor Progress Reports Nos. 1 through 7.

PRDC References (Cont'd)

8. 1958 Geneva Conference Papers

A/Conf. 15/P/458	15/P/1782
15/P/541	15/P/1848
15/P/598	15/P/2156
15/P/1777	

9. Technical Information Documents

TID-7016	TID-7548
7532	7549
7546	

10. NAVORD Report 4470 - Calculation of the Energy Absorption Potential for the Blast Shield of the Argonne National Laboratory Nuclear Reactor EBR-II, February 1957.
NAVORD Report 4542 - NOL Reactor Vessel Containment Program, June 1957.
NAVORD Report 5747 - Containment Study of the Enrico Fermi Fast Breeder Plant, October 1957.

11. NOL-285 - Progress Reports Nos. 4, 6, 11, 15 through 18, 19 through 21, 23 through 26, 27 through 34, 35, 36 through 40.
NOL-285 Letter Report - Possible Jump of Rotating Shield Plug, May 15, 1962.
12. ORNL-2616 - Experiments in the Release of Fission Products from Molten Reactor Fuels.
13. Technical Report #1 - Containment of Fragments from Runaway Reactor.
14. Technical Report #63 - Fission Products Release During a Simulated Meltdown of a PWR Type Core.
15. NDA-14-127 - Interpretation of an Experiment to Measure Doppler Effect, June 1956.
16. K-1019 - Basic Critical Mass Information and its Application to Oak Ridge Gaseous Diffusion Plant Design and Operation, May 1958.
17. K-1380 - Studies in Nuclear Safety, August 1958.
18. Reports by AEC Staff on Fast Breeder Reactor Safety Data, dated:

September 10, 1959	March 10, 1960
December 10, 1959	June 10, 1960

PRDC References:

19. Progress Report by Division of Reactor Development on EBR-1 Stability Experiments, dated September 1959.

20. Summary Status Reports of the ANL Fast Breeder Reactor Program Pertinent to the PRDC Case:

November 1959	December 1960
March 1960	March 1961
June 1960	June 1961
September 1960	

21. NAA-SR-4488 - SRE Fuel Damage, dated November 30, 1959.