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

November 17, 1966

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

Subject: REPORT ON LA CROSSE BOILING-WATER REACTOR (LACBWR)

Dear Dr. Seaborg:

At its seventy-ninth meeting, on November 10-12, 1966, the Advisory Committee on Reactor Safeguards reviewed proposed operation of the La Crosse Boiling-Water Reactor (LACBWR) by the Allis-Chalmers Manufacturing Company under a provisional operating authorization. The Committee had the benefit of discussion with representatives of the Allis-Chalmers Manufacturing Company, the Dairyland Power Cooperative, and the AEC Staff, and of the documents listed. A Subcommittee of the ACRS met to review this project at Genoa and La Crosse, Wisconsin on December 7 and 8, 1963, and in Washington, D. C. on August 19, 1966 and October 22, 1966. The Committee previously commented on this project in letters to you dated December 15, 1962 and January 17, 1964.

The LACBWR plant is located in Vernon County, Wisconsin, along the east bank of the Mississippi River approximately one mile south of the village of Genoa, Wisconsin and nineteen miles south of the City of La Crosse, Wisconsin.

The reactor plant consists of a direct-cycle, variable-flow forced-circulation boiling-water system which is to be operated at power levels up to 165 MWt. The plant, except for the turbine and connecting piping, is housed in a 60-foot diameter steel cylindrical containment shell having a hemispherical dome. The containment is designed to withstand an internal pressure of approximately 52 psig at 280°F with a design leak rate of 0.1% per day. Double isolation valves are provided in the steam line to prevent leakage from the containment in the unlikely event of a pipe rupture. A manually operated containment spray system is provided to help control containment pressure in the unlikely event of a loss-of-coolant accident.

The core consists of 72 fuel assemblies made up of stainless steel clad fuel elements containing 3.63% enriched uranium dioxide fuel pellets. Each of the fuel assemblies is contained in a shroud can of Zircaloy or stainless steel. Reactivity control is provided by 29 cruciform control rods that operate between the fuel shroud cans. The control rods consist of Inconel-600 tubes filled with B_4C and sheathed in stainless steel.

A high pressure core spray system is provided as an engineered safeguard to cool the core in the unlikely event of a major loss-of-coolant accident. In addition, a low pressure, high flow, alternate core spray system will be installed before operation at power to provide redundancy in emergency core cooling; this sytem also provides means for flooding the containment building up to the height of the top of the core.

A diesel generator has been installed to assure the availability of electrical power for operation of engineered safeguards and for shutdown heat removal; the pumps for the alternate core spray system are to have their own independent diesel drives.

During construction, a number of modifications were proposed to improve the safety of the plant. These have been identified in a series of amendments to the final safeguards report and are currently being added to the plant. The Committee believes that the modifications should be followed closely by the AEC Staff.

This plant is designed for automatic load-following. The Committee believes, however, that the plant should not be operated with automatic load-following until appropriate experience has been obtained with manual operation and the results of such experience reviewed with the AEC Regulatory Staff.

Prior to operation at power, the following items should be resolved with the AEC Regulatory Staff.

1. Appropriate limits on reactivity and flux anomalies during operation.
2. Methods and procedures for detection of leaks in the primary system and for operator action if leaks are detected.
3. Procedures for use in the event of tornado warnings including identification of circumstances under which limitations are to be placed on the operation of the plant or the plant is to be shut down.

4. A program for periodic inspection of the integrity of the plant stack which is adjacent to the containment. Similar attention should also be given to the tall stack planned for construction nearby.

The Committee believes that, by the end of the first year of operation, a program for periodic inspection of primaty system components should be developed and implemented. The Committee also believes that appropriate records regarding design, fabrication and operation should be preserved so as to be available to the operator for reference purposes during the life of the plant. Action on these items should be followed and reviewed by the AEC Staff. The Committee may wish to examine aspects of the periodic inspection program, particularly the frequency and extent of inspections, at the time of review for a full-term operating authorization.

It is the opinion of the ACRS that, if due attention is given to the foregoing items, LACBWR can be operated by Allis-Chalmers under provisional authorization at power levels up to 165 MWt without undue hazard to the health and safety of the public.

Mr. Harold Etherington did not participate in the Committee's review of this project.

Sincerely yours,

/s/

David Okrent
Chairman

References Attached

REFERENCES

1. ACNP-62614, Amendment 1, dated December 20, 1962.
2. ACNP-63582, Quarterly Technical Report No. 1 (Amendment No. 2), dated July 1963.
3. ACNP-63624, Quarterly Technical Report No. 2 (Amendment No. 4), dated November 1963.
4. ACNP-64529, Quarterly Technical Report No. 3 (Amendment No. 5), dated March 1964.
5. ACNP-64572, Quarterly Technical Report No. 4 (Amendment No. 6), dated June 1964.
6. ACNP-65542, Quarterly Technical Report No. 6 (Amendment No. 10), dated June 1965.
7. ACNP-65543, Amendment 11, Volumes I and II, dated June 1965.
8. ACNP-65544, La Crosse Boiling-Water Reactor, Safeguards Report for Operating Authorization, Volumes I and II, dated July 1965.
9. ACNP-64604, Quarterly Technical Report No. 5 (Amendment No. 7), dated August 1964.
10. ACNP-64628, Quarterly Technical Report No. 6 (Amendment No. 8), dated November 1964.
11. ACNP-65517, Quarterly Technical Report No. 7 (Amendment No. 9), dated February 1965.
12. ACNP-65611, Amendment 12, dated December 1965.
13. ACNP-66501, "Answers to Questions (Group I) about LACBWR Received from the Division of Reactor Licensing on September 8, 1965," dated January 1966.
14. ACNP-66505, Amendment No. 14, dated January 1966.
15. ACNP-66509, Amendment No. 15, dated January 1966.
16. ACNP-66510, Amendment No. 16, dated February 1966.
17. ACNP-66512, Amendment No. 17, dated February 1966.
18. ACNP-66518, Amendment No. 18, dated February 1966.
19. ACNP-66517, Amendment No. 19, dated March 1966.
20. Allis-Chalmers letter dated March 17, 1966 to AEC Division of Reactor Licensing with attachment, ACNP-66523, Amendment No. 20, dated March 1966.
21. Allis-Chalmers letter dated March 18, 1966 to the AEC Division of Reactor Licensing, with enclosures.
22. ACNP-66525, Amendment No. 21, dated March 1966.
23. ACNP-66530, Amendment No. 22, dated April 1966.
24. ACNP-66531, Amendment No. 23, dated April 1966.
25. ACNP-66541, Amendment No. 24, dated June 1966.
26. ACNP-66546, Amendment No. 25, dated June 1966.
27. Allis-Chalmers letter dated June 30, 1966 to AEC Division of Reactor Licensing with attachment, ACNP-66548, Amendment No. 26, dated June 1966.

28. Allis-Chalmers letter dated July 12, 1966 to AEC Division of Reactor Licensing with attachment, ACNP-66549, Amendment No. 27, dated July 1966.
29. Allis-Chalmers letter dated August 8, 1966 to AEC Division of Reactor Licensing with attachment, ACNP-66556, Amendment No. 28, dated August 1966.
30. Allis-Chalmers letter dated September 30, 1966 to AEC Division of Reactor Licensing with attachment, ACNP-66564, Amendment No. 29, dated September 1966.
31. Allis-Chalmers letter dated October 14, 1966 to AEC Division of Reactor Licensing with attachment, ACNP-66564.1, Supplement to Amendment No. 29, dated October 1966.
32. Allis-Chalmers letter dated October 28, 1966 to AEC Division of Reactor Licensing with attachment, ACNP-66572, Amendment No. 39, dated October 1966.