

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

January 15, 1970

Honorable Glenn T. Seaborg
Chairman
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: REPORT ON MILLSTONE NUCLEAR POWER STATION, UNIT 1

Dear Dr. Seaborg:

During its 117th meeting, January 8-10, 1970, the Advisory Committee on Reactor Safeguards completed its review of the application by the Connecticut Light and Power Company, the Hartford Electric Light Company, the Millstone Company, and Western Massachusetts Electric Company for a license to operate Unit 1 of the Millstone Nuclear Power Station, a boiling water reactor power plant, at power levels up to 2011 MW(t). An ACRS Subcommittee meeting with the applicant was held at the site on November 20, 1969, and a second Subcommittee meeting was held in Washington, D. C., on January 7, 1970. During the review, the Committee had the benefit of discussions with the applicant, the General Electric Company, the AEC Regulatory Staff, their contractors and consultants, and of the documents listed.

The Committee reported to you on the Millstone site on July 19, 1965, and on the construction permit application for Unit 1 on March 18, 1966. The Committee's review for the construction permit was based on a proposed power of 1730 MW(t); this report is based on the presently proposed power of 2011 MW(t) which the applicant justifies on the basis of more recent heat transfer correlations and development of the core design. In its March 18, 1966 report the Committee stressed the importance of study of emergency core cooling, metal-water reactions, monitoring of jet pump performance, instrumentation, blowdown problems and system stability. The Committee is satisfied that progress has been made in these areas and that the applicant has been responsive to recommendations made in reports on other applications. Some improvements include substantially improved emergency power supplies, an improved emergency core cooling system, and increased turbine bypass capacity from 50% to 105%.

One design change, however, involved a reduction in the capacity of each of the redundant containment cooling systems. This alteration requires placing greater reliance on the heat capacity of the torus water for temporary storage of heat energy in the unlikely event of the hypothetical loss-of-coolant accident. The increase of the torus water temperature to 203°F under certain degraded conditions is an additional concern because of its potential effects on the performance of the emergency pumps. These include the direct effect of high temperatures on the pumps and the dependence on containment pressure to assure adequate net positive suction head. The applicant stated that this containment cooling system will be designed and qualified for a torus water temperature of 203°F. Confirmatory tests will be performed. The Committee recommends that the Regulatory Staff review the results of these tests and that the applicant resolve with the Regulatory Staff the conditions under which the plant may operate with a portion of the containment cooling system out-of-service.

The General Electric Company has an extensive integrated program for measuring vibration in several reactors. A part of this program involves Millstone Unit 1, but a major fraction of such data important to the Millstone Unit will derive from experiments to be conducted in Dresden Unit 2. In the event that these data are not forthcoming before Millstone Unit 1 is ready to operate or if the data are not clearly favorable, the Committee believes that the matter should be reviewed by the Regulatory Staff before routine full power operation of the Millstone Unit is begun.

The main steam lines are provided with redundant valves that are required to close automatically in the unlikely event of a serious accident. Because experience with these large and special valves is limited, the Committee recommends that their performance be followed closely, and that the applicant make additional provisions to assure the requisite leak-tightness if experience should be unfavorable. The Committee wishes to be kept informed of the resolution of this matter.

The containment is penetrated by a large number of small diameter instrument lines. The Committee recommends that special attention be given to assuring the continued integrity and isolability of these lines and to a program for the periodic examination and testing of the valves in these lines. The adequacy of measures taken with regard to such instrument lines should be confirmed by the Regulatory Staff.

Continuing research and engineering studies are expected to lead to enhancement of the safety of water-cooled reactors in other areas than those mentioned; for example, by the determination of the extent of the generation of hydrogen by radiolysis and by other sources in the unlikely event of a loss-of-coolant accident, development of instrumentation for in-service

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monitoring of the pressure vessel and other parts of the primary system for vibration and detection of loose parts in the system, by the development of further means of preventing common failure modes from negating scram action and of design features to make tolerable the consequences of failure to scram during anticipated transients, and evaluation of the consequences of water contamination by structural materials and coatings in a loss-of-coolant accident. As solutions to the problems develop and are evaluated by the Regulatory Staff, appropriate action should be taken by the applicant on a reasonable time scale.

The Advisory Committee on Reactor Safeguards believes that, if due regard is given to the items mentioned above, and subject to satisfactory completion of construction and pre-operational testing, there is reasonable assurance that the Millstone Nuclear Generating Unit 1 can be operated at a power of 2011 MW(t) without undue risk to the health and safety of the public.

Sincerely yours,

/s/
Joseph M. Hendrie
Chairman

References:

1. Letter from The Millstone Power Company, dated July 25, 1967; re: Proposed Design Changes for ECCS and Emergency Power Facilities
2. Letter from Day, Berry and Howard, dated March 14, 1968; Amendment No. 5 to License Application, Application for POL; Volumes 1, 2 and 3 of Final Safety Analysis Report (FSAR)
3. Letter from Day, Berry and Howard, dated May 2, 1968; Amendment No. 6 to License Application, Appendix B to FSAR, "Pre-Operational and Startup Tests"
4. Letters from Day, Berry and Howard; Amendments 8 through 22 to License Application
5. Letter from The Millstone Point Company, dated December 29, 1969; Confirms and clarifies information re: review of application for OL for Millstone Unit 1