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Docket No. 50-237

SEP 18 1969

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Commonwealth Edison Company
72 West Adams Street
Chicago, Illinois 60690

Attention: Mr. W. B. Behnke
Assistant to the President

Gentlemen:

The Advisory Committee on Reactor Safeguards has completed its review of your application for a license to operate the Dresden Nuclear Power Station Unit 2 at power levels up to 2527 megawatts (thermal).

A copy of the ACRS report to the Commission is enclosed for your information.

Sincerely yours,

Original Signed by
Peter A. Morris

Peter A. Morris, Director
Division of Reactor Licensing

Enclosure:
ACRS Report dtd 9/10/69

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

September 10, 1969

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

Subject: REPORT ON DRESDEN NUCLEAR POWER STATION UNIT 2

Dear Dr. Seaborg:

During its 113th meeting, September 4-6, 1969, the Advisory Committee on Reactor Safeguards completed its review of the application by the Commonwealth Edison Company for a license to operate Unit 2 of the Dresden Nuclear Power Station at power levels up to 2527 MW(t); the Committee's review for construction was based on a design power of 2255 MW(t). The Committee had previously met with the applicant for a partial review of the application during its 110th meeting, June 5-7, 1969, and its 111th meeting, July 10-12, 1969. Subcommittee meetings with the applicant were held on May 27 and 28, 1969, at the site, and on August 21, 1969, in Washington, D. C. In the course of the review, the Committee had the benefit of discussions with the applicant, the General Electric Company, Sargent and Lundy, Incorporated, and their consultants; of discussions with the AEC Regulatory Staff; and of the documents listed. Other nuclear facilities at the site are Dresden Unit 1, which has been in operation since October 1959, and Dresden Unit 3, which is similar to Unit 2 and is in an advanced stage of construction. The General Electric Company's Midwest Fuel Recovery Plant is under construction at a separate adjacent site.

The application covers Units 2 and 3, but this report applies to Unit 2 only. The application as it applies to Unit 3 will be reviewed when its construction is nearing completion. The two units are in most respects identical, but some facilities and services are shared by Units 2 and 3, and some also by Units 1, 2, and 3. The Committee has reviewed possible interaction among units, and also the temporary arrangements necessitated by operation of Unit 2 while Unit 3 is still under construction. It is believed that the physical measures and administrative procedures to isolate the operating units from construction activities, and to provide all safety associated services to the operating units, are adequate.

Dresden Unit 2 incorporates important developments since the design of previously licensed boiling water reactors. The developments include use of jet pumps inside the vessel with an external primary recirculation system of reduced size, improvements in engineered safety features, and increased power density.

The Committee reported to you on the construction permit application for this Unit on November 24, 1965. In its report, the Committee referred to the extensive development program being conducted by the General Electric Company to substantiate the design basis of several features, including jet pump monitoring and system stability, metal-water reactions, instrumentation, and blow-down and emergency cooling. The Committee also recommended that special attention be given to other features of the design. Further recommendations applicable to Unit 2 were contained in the Committee's report of August 16, 1966, on the application for a construction permit for Dresden Unit 3. The Committee is satisfied that proper attention has been given to these matters -- additional verification of some items will be obtained during pre-operational testing and the initial operation at power.

Many improvements in safety features and procedures have evolved since the Dresden Unit 2 provisional construction permit was granted, as a result of the work of reactor suppliers, the AEC, and others. Some of these improvements have been discussed in recent ACRS construction permit and operating license reports. The applicant has agreed to incorporate several of these improvements in Dresden Unit 2. These include an improved emergency cooling system, flooding protection for the emergency cooling pumps, provision of an interlock to prevent depressurization by the automatic pressure relief subsystem if low-pressure emergency core cooling pumping capability is lost, and installation of a strong-motion seismograph.

The applicant is reviewing the seismic design of Class I structural and mechanical components of the plant and will complete his analysis before the reactor goes into operation. In the event that changes to the plant should be found necessary, such changes will be made on a time scale to be agreed upon between the applicant and the Regulatory Staff.

The Committee believes that, with the present state of knowledge of the performance of the ECCS and the course of a postulated loss-of-coolant accident, the containment should be inerted during operation of the reactor. However, it is recognized that inerting increases problems of inspecting for and repairing leaks in the primary system. It is recommended that the requirement for inerting be periodically reviewed as operating experience and further knowledge from development work currently underway are obtained, and as other means of eliminating the hazards from accident generated hydrogen are found.

Based on Dresden Unit 1 experience, the applicant stated that it will be difficult to maintain during service the very low rate of leakage through the steam line isolation valves used for accident analysis at the time of the construction permit review, and has proposed substantially larger leak rate limits than those recommended by the Regulatory Staff. The Committee believes that the leak rate limit recommended by the Staff should be met when the plant is put into operation. The Committee recommends that the applicant propose a program to ameliorate this situation and to assure the protection of the public from excessive releases of radioactivity through the closed valves in the unlikely event of an accident. This study should be completed as soon as possible, followed by necessary corrective action.

The automatic pressure relief subsystem should be modified so that at least the manual actuation of the subsystem would not be prevented by any single failure in the subsystem.

The Committee believes that, for transients having a high probability of occurrence, and for which action of a protective system or other engineered safety feature is vital to the public health and safety, an exceedingly high probability of successful action is needed. Common failure modes must be considered in ascertaining an acceptable level of protection. In the event of a turbine trip, reliance is placed on prompt control-rod scram to prevent large rises in primary system pressure. The applicant and his contractors have devoted considerable effort to provide a reliable protective system. However, systematic failures due to improper design, operation, or maintenance could obviate the scram reliability. A study is in progress on 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. The applicant plans to consider the results of this study and incorporate appropriate provisions in Dresden Unit 2.

Several matters are still under discussion between the applicant and the Regulatory Staff. These include review of the need for separation of redundant components of the standby gas treatment system, and final revisions to the technical specifications. The ACRS believes these matters can be resolved by the applicant and the Regulatory Staff.

Dresden Unit 2, like other reactors recently licensed for operation, has not been designed to permit the currently required high degree of accessibility for in-service inspection of the primary system boundary, including the pressure vessel and the main steam lines. The Committee believes that the proposed procedures for in-service inspection are adequate for initial operation, but believes these procedures should be reviewed at the end of a five year period to take advantage of experience in the industry and improved inspection techniques.

Continuing research is expected to enhance safety of water-cooled reactors in other areas than those mentioned, for example, by the determination of the extent of radiolytic decomposition of cooling water in the unlikely event of a loss-of-coolant accident, development of instrumentation for in-service monitoring of the pressure vessel and other parts of the primary system for vibration and detection of loose parts in the system, 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, Dresden Nuclear Power Station Unit 2 can be operated at power levels up to 2527 MW(t) without undue risk to the health and safety of the public.

Additional remarks by Dr. William R. Stratton are attached.

Sincerely yours,

Stephen H. Hanauer
Chairman

Additional Remarks by Member Dr. William R. Stratton

I agree with the Committee that the applicant should be granted a license to operate the Dresden Unit 2 power plant; however, I disagree strongly with the Committee recommendation for inert atmosphere within the containment during operation of this reactor.

I take this position for the following reasons:

(1) The several accident prevention and accident limiting safeguards are sufficiently diverse and redundant to more than adequately protect the health and safety of the public in the improbable event of a very severe accident. For example, the performance of the emergency core cooling complex (sprays and flooding systems) could be severely degraded with the result that fuel pin temperatures and fission product releases would still remain within acceptable bounds. I estimate that for this reactor and site the set of safety devices is sufficient, and thus, the necessity for inerting the containment no longer exists, as may have been the case several years ago.

(2) An inert atmosphere will discourage the operating crew from entering the containment at the first opportunity in order to positively identify leaks or other abnormal phenomena detected by remote means. In the same sense, inerting would inhibit the motivation to perform routine inspections within the containment when the plant is shutdown for reasons not connected with the reactor. Thus, it is possible that the safe operation of the plant may be impeded and some degradation of equipment may occur in a manner and amount not known to the operating crew and, consequently, to management.

(3) The inerting gas is a real and present danger to anyone entering the containment even after purging is thought to have been accomplished.

For these reasons I respectfully suggest and urge the Commission not to require an inert atmosphere within the containment of the Dresden Unit 2 reactor.

References - Dresden Unit 2

1) Letter from Commonwealth Edison Company dated November 17, 1967; Volumes I and II to Safety Analysis Report.

2) Letter from Commonwealth Edison Company dated August 30, 1968; Amendments 7 and 8, Answers to AEC Questions; Volume III Proposed Technical Specifications for Dresden Unit 2.

3) Letter from Commonwealth Edison Company dated November 21, 1968; Amendments 8 and 9, Answers to AEC Questions of June 27, 1968; Volume IV to Safety Analysis Report.

4) Letter from Commonwealth Edison Company dated February 28, 1969; Amendments 9 and 10, Answers to AEC Questions of October 16, 1968.

5) Letter from Commonwealth Edison Company dated March 18, 1969; Amendments 11 and 12, Answers to AEC Questions IA and IB of January 14, 1969.

6) Letter from Commonwealth Edison Company dated April 16, 1969; Answers to Remaining AEC Questions of January 14, 1969; Answers to AEC Questions of January 22, 1969.

7) Letter from Commonwealth Edison Company dated May 20, 1969; Amendments 12 and 13 to the Application.

8) Letter from Commonwealth Edison Company dated July 2, 1969; Amendments 13 and 14, Answers to AEC Questions of May 19, 1969.

9) Letter from Commonwealth Edison Company dated July 22, 1969; Amendments 14 and 15, Answers to AEC Questions of May 19, 1969.

10) Letter from Commonwealth Edison Company dated August 5, 1969; Amendments 15 and 16 to the Application.

11) Commonwealth Edison Company's Proposed Technical Specifications and Bases for Unit 2.

12) Letter from Commonwealth Edison Company dated August 8, 1969; Amendments 16 and 17 to the Application.

13) Letter from Commonwealth Edison Company dated August 18, 1969; Amendments 17 and 18 to the Application.

14) Letter from Commonwealth Edison Company dated August 18, 1969; Amendments 18 and 19 to the Application.

References - Dresden Unit 2, Cont'd

15) Letter from Commonwealth Edison Company dated September 2, 1969; Amendments 19 and 20 to the Application.

16) Commonwealth Edison Company's Proposed Technical Specifications and Bases for Dresden Unit 2.

17) Letter from Commonwealth Edison Company dated September 4, 1969; Additional information relative to the Application.