ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

April 8, 1975

Honorable William A. Anders
Chairman
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: REPORT ON CLINTON NUCLEAR POWER PLANT, UNITS 1 AND 2

Dear Mr. Anders:

At its 180th meeting on April 3-5, 1975, the Advisory Committee on Reactor Safeguards completed its review of the application of the Illinois Power Company for a permit to construct the Clinton Nuclear Power Station, Units 1 and 2. The application was also reviewed at a Subcommittee meeting held at Urbana, Illinois on March 19, 1975. The site for the proposed station was visited by Committee members on March 19, 1975. During its review, the Committee had the benefit of discussions with representatives of the Applicant, his consultants and contractors, and representatives of the NRC Staff and of the documents listed.

The Clinton Station will be located on an irregular U-shaped site of about 15,000 acres at the confluence of North Fork Salt Creek and Salt Creek. The site is located between the cities of Bloomington, Illinois and Decatur, Illinois to the north and south, respectively, and Lincoln and Champaign-Urbana to the west and east, respectively. The city of Clinton (population 7570) is approximately six miles west of the site. The nearest population center is Decatur (1970 population 90,397), located between 20 and 30 miles from the site. The low population zone and exclusion area radii are 2.5 miles and 3200 feet, respectively.

The Clinton Station consists of two nuclear units, each using a General Electric BWR/6 nuclear steam supply system, having a rated power level of 2894 MW(t) and containing 592 fuel assemblies. The Committee reported on the BWR/6 system on September 21, 1972. Each unit will be provided with a Mark III containment systm utilizing a steel-lined reinforced concrete primary containment structure.

For the Clinton site, a safe-shutdown earthquake acceleration of 0.25g has been found acceptable as the high-frequency input to the response spectrum of Regulatory Guide 1.60. In addition, the NRC Staff has proposed that the low-frequency response of foundations and structures should be determined for ground motions with a peak acceleration of 0.15g, a period of one to three seconds, and a duration of one to two minutes.

The Staff requires that soil liquefaction effects attributable to this type of seismic event be considered for the ultimate heat sink, an earth-fill dam impounded body of water submerged within the main cooling water reservoir. The Applicant has established that soil liquefaction for the specified SSE is unlikely to jeopardize the ultimate heat sink as the result of SSE initiated flow slides. Structural fill for the Category I foundations must also be shown not to be subject to liquefaction at SSE conditions. The Committee wishes to be kept informed.

The external design pressure differential to be specified for the Clinton pressure suppression dry well is determined from an analysis of the pressure transient arising from a postulated small-break, loss-of-coolant accident leading to vacuum conditions in the dry well due to steam condensation and a positive pressure in the wet-well annulus. The computation of the appropriate design pressure differential is still being evaluated. This matter should be resolved in a manner satisfactory to the NRC Staff and the ACRS.

The Committee believes that the ability of the drywell structure to resist internal and external pressures, and the potential contribution of cracking of the concrete structure to by-pass leakage, can be predicted by suitable analyses but should be verified by tests on at least one prototypical structure. If such a test provides suitable verification of the analyses, the Committee believes it should be possible to evaluate the integrity and the leakage at high pressures of subsequent structures by less extensive procedures. This matter should be resolved in a manner satisfactory to the NRC Staff. The Committee wishes to be kept informed.

The standardization of the BWR/Mark III design concept provides opportunity for thorough study of maintenance access and related control of radiation exposure for maintenance personnel. The NRC Staff should take appropriate steps to be certain that this consideration is treated generically in an adequate manner for Clinton and other BWR-6/Mark III installations during the design and construction of the plants.

The Clinton Station proposes to use the GESSAR design basis for a number of safety related features. The matters identified in the Committee's March 14, 1975 report on GESSAR relevant to the Clinton Station should be resolved in an appropriate manner by the NRC Staff. The Committee wishes to be kept informed about the four items specifically identified in its March 14th letter as they pertain to this plant.

Other matters pertaining to the Mark III containment discussed in the Committee's letters of January 14, 1975, on the River Bend Nuclear Power Station and of December 12, 1974, on the Allens Creek Nuclear Power Station that are generic in nature, and therefore, applicable to the Clinton Nuclear Power Plant should be resolved in a manner satisfactory to the NRC Staff.

Additional generic problems related to large water reactors have been identified by the Regulatory Staff and the ACRS and have been discussed in the Committee's report dated March 15, 1975.* These problems should be dealt with appropriately by the NRC Staff and the Applicant.

The ACRS believes that the above items can be resolved during construction and that, if due consideration is given to these items, the Clinton Station, Units 1 and 2 can be constructed with reasonable assurance that they can be operated without undue risk to the health and safety of the public.

Sincerely yours,

Original Signed by:
W. Kerr

W. Kerr
Chairman

References:

1. Clinton Power Station, Units 1 and 2, Preliminary Safety Analysis Report (PSAR), Volumes 1-10.

2. Amendments 1-28 to PSAR.

3. Safety Evaluation of Clinton Power Station, Units 1 and 2, Office of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission, March, 1975.

*Should have been March 12, 1975