ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 17, 1975

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

Subject: REPORT ON THE CALLAWAY PLANT UNITS 1 and 2

Dear Mr. Anders:

During its 185th meeting, September 11-13, 1975, the Advisory Committee on Reactor Safeguards reviewed the application of the Union Electric Company for a permit to construct the Callaway Plant Units 1 and 2. The site of the proposed plant was visited on August 20, 1975, and Subcommittee meetings were held on August 19, 1975, in Washington, D. C., and on August 20, 1975, in St. Louis, Missouri. During its review, the Committee had the benefit of discussions with the Nuclear Regulatory Commission (NRC) Staff and representatives and consultants of the applicant, the Westinghouse Electric Corporation and the Bechtel Corporation. The Committee also had the benefit of the documents listed below.

The Callaway Plant application is one of four submitted in response to the Commission's standardization policy as described in Appendix N of Part 50 of Title 10 of the Code of Federal Regulations. This option allows for simultaneous review of the safety-related parameters of a limited number of duplicate plants which are to be constructed within a limited time span at a multiplicity of sites. The other sites are located in Kansas, Wisconsin, and New York. The five utilities that have joined together have designated their common design the "Standardized Nuclear Unit Power Plant System" (SNUPPS). The Committee believes that its report on the Callaway application, as discussed below, also is a report on the SNUPPS design to the extent practical.

The Callaway Plant will be located in a rural section of Callaway County about 80 miles west of St. Louis, Missouri on a tract of land five miles north of and about 300 feet above the Missouri River. The exclusion area radius of 1,200 meters is within the site property limits. The nearest center of population is Jefferson City (population 32,400) 25 miles west-southwest.

The Callaway Plant will utilize two four-loop pressurized water reactor nuclear steam supply systems, each having a power level of 3411 MW(t) and a design similar to that of the Comanche Peak Steam Electric Station Units 1 & 2 previously reported on by the Committee in its letter of October 18, 1974. The turbine generator is supplied by the General Electric Company and will be oriented so as to minimize damage from turbine failure.

The ultimate heat sink for the plant will consist of two four-cell mechanical draft cooling towers with a source of makeup water from an onsite retention pond. These cooling towers and the cut slopes of the retention pond will be seismic category I. The pond will be sized to provide sufficient makeup water for 30 days with the reactors shut down.

The analyses of the response of the plant to the postulated loss-of-coolant accidents as required by the Final Acceptance Criteria are underway but not yet fully completed. The applicant is committed to the evaluation of a full spectrum of postulated break sizes prior to the issuance of a construction permit. He discussed what was stated to be a worst case in which he found that the criteria were satisfied. The Committee wishes to be kept informed concerning the resolution of this matter.

The Committee recommended in its report of September 10, 1973, on acceptance criteria for ECCS, that significantly improved ECCS capability should be provided for reactors for which construction permit requests are filed after January 7, 1972. The SNUPPS design is in this category. These units will use the 17x17 fuel assemblies similar to those to be used in Comanche Peak Steam Electric Station Units 1 & 2. Although calculated peak clad temperatures in the event of a postulated LOCA are less for 17x17 assemblies than for a 15x15 array, the Committee believes that the applicant should continue studies that are responsive to the Committtee's September 10, 1973 report. If studies establish that significant further ECCS improvements can be achieved, consideration should be given to incorporating them into these units.

In conjunction with his presentation of results of analyses of events subsequent to a postulated loss-of-coolant accident, the applicant discussed the development of best-estimate calculations for the same class of accidents. His preliminary results indicated that a considerable margin of safety may exist; however, the methodology used has not been subjected to critical evaluation. The Committee recognizes the potential importance of studies of this type in the improvement and optimization of design of safety devices and encourages the applicant and the NRC Staff to accelerate their efforts to this end. The Committee wishes to be kept informed.

Each of the SNUPPS units employs a cylindrical, steel-lined, reinforced, post tensioned concrete containment structure with a free volume of about 2.5×10^6 ft ^{3}. The design pressure is 60 PSIG at a temperature of 320 degrees Fahrenheit. The design will conform to the proposed ACI-ASME Concrete Containment Code (Section III, Division 2 of the ASME Boiler and Unfired Pressure Vessel Code) with appropriate modifications required by the NRC Staff. The Committee believes that this containment design with the auxiliary systems (sprays, heat removal, air cleaning, and combustible gas control) is satisfactory for the SNUPPS design at the Callaway site.

The Callaway Plant will be the first commercial nuclear power plant in the State of Missouri. For this reason, the Committee recommends that the applicant and the Regulatory Staff give particular attention to assuring proper coordination with appropriate state agencies in the development of effective emergency plans for this facility.

The Committee believes that the applicant and the NRC Staff should continue to review the Callaway Plant design for features that could reduce the possibility and consequences of sabotage.

The Committee recommends that the NRC Staff and the Applicant review the design features that are intended to prevent the occurrence of damaging fires and to minimize the consequences to safety-related equipment should a fire occur. This matter should be resolved to the satisfaction of the NRC Staff. The Committee wishes to be kept informed.

Generic problems relating to large water reactors are discussed in the Committee's report dated March 12, 1975. These problems should be dealt with appropriately by the NRC Staff and the applicant.

The Advisory Committee on Reactor Safeguards believes that the items mentioned above can be resolved during construction and that, if due consideration is given to the foregoing, the Callaway plant 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.

Additional remarks by Dr. H. S. Isbin are attached.

Sincerely yours,

W Kerr

W. Kerr
Chairman

Additional Remarks by H. S. Isbin

In my opinion, a significant omission in the SNUPPS Preliminary Safety Analysis Report is Section 1.5, Requirements for Further Technical Information. An important contribution that the SNUPPS project can make is to note the many experimental and analytical studies underway that serve to better define the margins of safety, that serve to confirm design methods, that contribute to the resolution of generic items, that relate to improved reliability of components and systems, and that seek to advance surveillance and monitoring systems. A thorough compilation of such activities would be a reflection of industry's overall commitments to a better understanding of safety issues and advancing of safety measures. The material provided in Section 1.5 of the PSAR should not be construed to be licensing requirements. A more appropriate accounting of licensing requirements should be through the NRC Staff's Safety Evaluation Report where the Staff should compile into a single section all items identified in their review which require the submission of future information.

The SNUPPS project represents a very substantial and unique concentration of industry effort in the development of nuclear reactor power stations. I believe that it is appropriate for SNUPPS to develop a meaningful Section 1.5 which could serve as a reference for other applications.

References

1. SNUPPS Preliminary Safety Analysis Report with Revisions 1 through 9 and the Callaway Site Addendum Report with Revisions 1 through 5.

2. RESAR-3 Consolidated Version, Westinghouse Reference Safety Analysis Report with Amendments 1 through 6.

3. Safety Evaluation Report, NUREG-75/076 related to the construction of Callaway Plant, Units 1 & 2, Docket Nos. STN 50-483 & STN 50-486, August, 1975.

4. Report on Field & Laboratory Investigation of Crushed Stone Fill, Callaway Plant, Units 1 & 2, for Union Electric Company, Dames & Moore Job No. 7677-074-07 August 8, 1975.

5. Report on the Second Year of On-Site Meteorological Monitoring Program and the Comparison of the First and Second Year of Meteorological Data Union Electric Company, Callaway Plant, Units 1 & 2, Dames & Moore, Job No. 7677-056-07, July 15, 1975.

6. Union Electric Company letter dated September 5, 1975, from John K. Bryan to Bernard C. Rusche, Director, Office of Nuclear Reactor Regulation, USNRC, Ser ULNRC-121, Subject: Submittal of preliminary analysis of the Ultimate Heat Sink.