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

April 13, 1972

Honorable James R. Schlesinger
Chairman
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: REPORT ON SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

Dear Dr. Schlesinger:

At its 144th meeting, April 6-8, 1972, the Advisory Committee on Reactor Safeguards completed its review of the application from the Pennsylvania Power and Light Company for a permit to construct the Susquehanna Steam Electric Station, Units 1 and 2. The project was previously considered at a Subcommittee meeting at the Station site on March 24, 1972. During the review the Committee had the benefit of discussions with representatives and consultants of the applicant, the General Electric Company, the Bechtel Corporation, and the AEC Regulatory Staff. The Committee also had the benefit of the documents listed below.

The Susquehanna Station will be located in Pennsylvania on a 1522 acre site on the west bank of the Susquehanna River approximately 12 miles northwest of Hazleton and 15 miles southwest of Wilkes-Barre, the nearest cities having populations in excess of 25,000. The low population zone radius is 3.0 miles within which the 1970 population was about 2,400 and the projected 2020 population about 4,000. The exclusion zone has a minimum radius of 1,800 feet and is separated from the river on the east by U. S. Route 11 and a single-track line of the Erie-Lackawanna Railroad. The principal facilities are located approximately 3,000 feet from the bank of the river at a grade elevation of about 170 feet above the bank.

The Susquehanna Station will utilize two General Electric boiling water reactors, each to be operated at a power level of 3293 MWt with waste heat rejected to the atmosphere by two natural-draft cooling towers. The primary containment is of the over-under pressure suppression type similar to those previously reviewed for Zimmer, Limerick, and Shoreham. The reactors are of the 1967 General Electric product line and similar to those of other facilities now under construction, particularly Browns Ferry 1, 2, and 3 and Peach Bottom Units 2 and 3.

The applicant does not currently own all portions of the proposed site south of the reactors and within the exclusion radius. Similarly, mineral rights within the exclusion radius are not yet owned by the applicant. Procedures are being initiated to obtain ownership of the needed properties, and the applicant has stated that no construction will begin until this has been accomplished.

The applicant's criteria for protecting low pressure piping from overpressure include interlocks to prevent residual heat removal (RHR) system valves from opening unless the reactor coolant system pressure is below the RHR system design pressure. Although the applicant will design these interlocks to meet the requirements of IEEE 279-1971, the Committee recommends that diverse pressure sensors also be employed to provide greater assurance of performance of this important function.

The Susquehanna Station is the second plant for which the relief valve augmented bypass (REVAB) system is proposed. This system allows a full-load rejection without a reactor scram even though the turbine bypass capacity is only 25% of full-power steam flow. REVAB utilizes rapid-response pressure relief valves discharging into the suppression pool and rapid reactor power reduction to avoid reaching scram setpoints. As this system provides an additional signal causing opening in the primary system coolant boundary, the Committee believes that attention should be given to the possibility of valves remaining open following REVAB action.

The Committee believes that the main steam lines up to and including the turbine stop valves, and all branch lines 2-1/2 inches and larger up to their first valve, should be dynamically analyzed to ensure structural integrity during a design basis earthquake. A sealing system designed to standards applicable to engineered safety features should be provided to minimize leakage through the main steam line isolation valves. These matters should be resolved in a manner satisfactory to the Regulatory Staff.

The applicant has studied design features to make tolerable the consequences of failure to scram during anticipated transients, and has concluded that automatic tripping of the recirculation pumps and injection of boron could provide a suitable backup to the control rod system for this type of event. The Committee believes that this recirculation pump trip represents a substantial improvement and should be provided for the Susquehanna reactors. However, further evaluation of the sufficiency of the approach and the specific means of implementing the proposed pump trip should be made. This matter should be resolved in a manner satisfactory to the Regulatory Staff and the ACRS during construction of the reactors.

The techniques for analysis of the control rod drop accident are being revised by the General Electric Company. The adequacy of the revised model and the acceptability of the results should be established in a manner satisfactory to the Regulatory Staff. The Committee wishes to be kept informed of the resolution of this matter.

Current analysis indicates acceptably low peak clad temperatures following a postulated loss-of-coolant accident. A research program, which was recently begun under the auspices of the General Electric Company and the USAEC, should provide more detailed knowledge of the flow and heat transfer processes during the first stages of such postulated accidents. More detailed analytical studies, particularly as they relate to the time to critical heat flux and the level swell process, should also be performed during construction of the plant. These studies should be reviewed by the Regulatory Staff. The Committee wishes to be kept informed.

Other problems related to large water reactors have been identified by the Regulatory Staff and the ACRS and cited in previous ACRS reports. The Committee believes that resolution of these items should apply equally to the Susquehanna Station.

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

Sincerely yours,

C. P. Siess
Chairman

References

List Attached

References

1. Pennsylvania Power and Light Company letter dated 4/1/71 transmitting their Application for Licenses for the Susquehanna Steam Electric Station together with an Environmental Report and Vols. 1 through 6, Preliminary Safety Analysis Report

2. Amendments 1 and 3 through 7 to the Application

3. Pennsylvania Power and Light Company letter dated 4/3/72