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

October 14, 1971

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

Subject: REPORT ON BAILLY GENERATING STATION NUCLEAR 1

Dear Dr. Schlesinger:

At its 138th meeting, October 7-9, 1971, the Advisory Committee on Reactor Safeguards reviewed the application from the Northern Indiana Public Service Company for a permit to construct Bailly Generating Station Nuclear 1. The project was considered at a Subcommittee meeting at the plant site on September 24, 1971. During its review, the Committee had the benefit of discussions with representatives and consultants of the applicant, Sargent and Lundy, the General Electric Company, and the AEC Regulatory Staff. The Committee also had the benefit of the documents listed.

The Bailly Station is located in Porter County, Indiana, about 10 miles east of Gary. The site consists of approximately 350 acres, is bounded on the north by Lake Michigan, on the south and west by a plant of the Bethlehem Steel Corporation, and on the east by the village of Dune Acres and the Indiana Dunes State Park. The minimum exclusion distance is 188m (617 ft.). Two fossil-fired power plants, Bailly Units 7 and 8, and one gas turbine peaking plant, Bailly Unit 10, currently are located on the site. The nearest community is Dune Acres which is about two miles east-northeast of the site with a 1970 population of 300, and the nearest population center is Gary with a 1970 population of 175,000.

The applicant has proposed a low population zone radius of 2400m (7874 ft.), which includes substantially all of the nearby Bethlehem Steel Corporation plant, with potentially more than 2500 employees in the area during the day shift. The applicant is working closely with the plant management to develop emergency plans for the timely evacuation of these employees in the unlikely event of a major accident.

Since the plant is located about two miles from Indiana Harbor, which is being developed as a major Great Lakes port, the Committee believes the applicant should conduct studies to establish that an explosion in or near the harbor would not damage the plant in a manner affecting the health and safety of the public.

A Nike-Hercules missile site is located about 2.5 miles southeast of the plant. The relationship between the missile site and the proposed reactor is very similar to that of the Shoreham plant. The Regulatory Staff has reviewed the possible hazards related to this situation and has concluded, as in the case of Shoreham, that the probability of a missile or portion of a missile causing damage to the plant is sufficiently low so that no special design features are required. The Committee concurs in this assessment.

The Bailly Station will utilize a General Electric boiling water reactor of the 1969 product line, to be operated at a power level of 1931 MWt. The reactor and the emergency core cooling system are similar to those provided for the Zimmer Station and described in our report of September 17, 1971. The primary containment is of the over-under pressure suppression type, constructed of prestressed concrete, and is similar to that provided for the Zimmer Station. Waste heat will be rejected to the atmosphere by a natural-draft cooling tower.

The main steam lines, up to and including the turbine stop valves, will be designed as seismic Class I components. In addition, a sealing system, designed to standards applicable to engineered safety features, will be provided to minimize leakage through the main steam line isolation valves. The design of this sealing system should be reviewed by the Regulatory Staff before its installation.

The Bailly plant will incorporate a Relief Valve Augmented Bypass (REVAB) system to avoid the need to scram the reactor following a loss of electrical load on the generator. The system combines a turbine bypass capacity of 25 percent with the use of pressure relief valves and partial reduction of reactor power to prevent reactor pressure or neutron flux from reaching scram setpoint values following the loss of load. The pressure relief valves discharge steam to the suppression chamber for several seconds, after which they close sequentially. The design of this system should be followed carefully by the Regulatory Staff.

Since the Bailly plant will be the first of its size to use the GE 1969 emergency core cooling system (ECCS) and constant-speed recirculation pumps with flow control valves, the Committee believes that a suitable preoperational vibration testing program should be planned and undertaken.

Analyses are being made to determine whether the effectiveness of the ECCS will be decreased if the recirculation control valves or the pump discharge block valves should close following a break in a recirculation line. If significant adverse effects on the ECCS effectiveness are revealed by the analyses, circuits and interlocks, designed to meet the IEEE-279 requirements, should be provided to assure that these valves will remain in the "as-is" condition.

The applicant has proposed that bypasses of engineered safety features can be identified and controlled adequately by administrative procedures. The Committee believes that certain of these bypasses should be annunciated in the control room in such a manner that it is immediately obvious to the reactor operator that a bypass has been effected. This matter should be resolved to the satisfaction of 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 Bailly reactor. However, further evaluation of the sufficiency of this 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 reactor.

Other problems related to large water-cooled and moderated 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 Bailly 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 Bailly Generating Station Nuclear 1 can be constructed with reasonable assurance that it can be operated without undue risk to the health and safety of the public.

Sincerely yours,

Spencer H Bush

Spencer H. Bush
Chairman

References

1. Northern Indiana Public Service Company Letter dated August 27, 1970; License Application; Preliminary Safety Analysis Report (PSAR), Volumes 1, 2, 3, 4 and 5

2. Amendments 1, 2, 3, and 5 through 14 to the PSAR