Docket

OCT 2 1973

Docket Nos. 50-438
and 50-439

Tennessee Valley Authority
ATTN: Mr. James E. Watson
Manager of Power
818 Power Building
Chattanooga, Tennessee 37401

Gentlemen:

In order that we may continue our review of your application for a license to construct the Bellefonte Nuclear Plant Units 1 and 2, additional information is required. The information requested is described in the enclosure and pertains to specific sections of the Preliminary Safety Analysis Report.

In order to maintain our licensing review schedule, we will need a completely adequate response to all enclosed questions by October 10, 1973 with the exception of Request 2.51, which we will need by November 1, 1973. Please inform us within 7 days after receipt of this letter of your confirmation of the schedule date or the date you will be able to meet. If you cannot meet our specified date or if your reply is not fully responsive to our request, it is highly likely that the overall schedule for completing the licensing review for the project will have to be extended. Since reassignment of the staff's efforts will require completion of the new assignment prior to returning to this project, the extension will most likely be greater than the delay in your response.

Please contact us if you have any questions regarding the information requested.

Sincerely,

Original Signed

A. Schwencer, Chief
Pressurized Water Reactors
Branch No. 4
Directorate of Licensing

LB

Enclosure:
Request for Additional Information

OFFICE ▶						
SURNAME ▶						
DATE ▶						

cc: Mr. R. H. Marquis
General Counsel
629 New Sprakle Building
Knoxville, Tennessee 37902

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UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

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Sincerely,

D. A. Peltier

A. Schwencer, Chief
Pressurized Water Reactors
Branch No. 4
Directorate of Licensing

Enclosure:
Request for Additional Information

cc: Mr. R. H. Marquis
General Counsel
629 New Sprakle Building
Knoxville, Tennessee 37902

OCT 2 1973

REQUEST FOR ADDITIONAL INFORMATION
TENNESSEE VALLEY AUTHORITY
BELLEFONTE NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 50-438 AND 50-439

2.0 SITE CHARACTERISTICS

2.32 Provide quantitative statistics on the occurrence of icing conditions in the site area, with emphasis on conditions that could interfere with proposed evacuation and other emergency plans.

2.33 Provide quantitative statistics on the occurrences of hail in the site area, and indicate the occurrences of hailstones 3/4 inch or greater.

2.34 Provide the monthly distribution of thunderstorm occurrences, and indicate the number of thunderstorms classified as severe by the National Weather Service that occur annually in the site area.

2.35 State the bases for the "intuitive" steps implied in the extrapolation of joint wind speed and direction by atmospheric stability technique described on Page 2.3-11 (Amendment 1).

2.36 Provide one full year (for each month and for the annual period) of joint wind speed and direction by atmospheric stability classification (as defined by vertical temperature gradient) from the 130 ft. sensor of the offsite facility without extrapolation to 33 ft., and with TVA extrapolation. Provide nine months (by month and for the 9 month period) of joint wind speed and direction data from the 33 ft. onsite facility, with the additional 3 months data to be submitted as soon as it is available.

2.37 Regulatory Guide 1.23 recommends that the system for the measurement of vertical temperature gradient have an accuracy for time averaged values of ± 0.1°C, and temperature accuracy for time averaged values of ± 0.5°C. Wind, temperature, and humidity data should be averaged over a period of at least 15 minutes once every hour. Discuss present and proposed meteorological instrumentation and data reduction and compilation techniques at Bellefonte with respect to these recommendations of Regulatory Guide 1.23.

2.38 Since severe meteorological conditions, which can seriously affect the meteorological instrumentation, are frequently encountered at this site (e.g., recent loss of meteorological monitoring capability at the new Sand Mountain Tower due to lightning) and Regulatory Guide 1.23 states that the meteorological program be maintained to minimize extended periods of instrument outage, discuss the amount of time required to restore the data collection capability of the Bellefonte meteorological program in the event it is partially or totally impaired, due to any cause, during the pre-operational and operational phase of the program. Also discuss the methods used to minimize the frequency of periods of down-time of the meteorological facility.

2.39 Since the Bellefonte pre-operational program will consist of a total of 3 meteorological towers at various locations, operating over differing time periods, discuss plans to demonstrate the correlation of data obtained from the temporary offsite, temporary onsite, and proposed permanent onsite meteorological facility.

2.40 Provide the minimum cross sectional area of (1) containment; (2) auxiliary building; (3) turbine building; and (4) service building, used in the calculation of X/Q values is Section 2.3.4 and 2.3.5.

2.41 Provide preliminary plant and elevation views of the intake pumping station and intake channel in relation to the surrounding topography. Discuss the need and design bases for rock protection of the structure and approach channel.

2.42 Describe the design and operation criteria to be used for accesses and penetrations below the elevation of the design basis flood plus wave action and runup for the intake structure.

2.43 Provide any reasons (such as post-construction investigations) to be believe that the condition of the dams and their foundations are less than intended in their design. In this regard, discuss the ability of the embankment sections of upstream and downstream dams to resist sliding or piping, or any other type of more severe dam failure modes, during all potential floods up to and including a Probable Maximum Flood (PMF). In particular, if the stability of the Nickajack Dam embankments (and other dams upstream) would be questionable during a PMF, either substantiate that your failure mode analysis is conservative, or recompute your PMF using more conservative failure modes.

2.44 It is not clear that the estimate of the PMF discharge and elevation at the site reflect the conservative effects of a Nickajack Dam failure, whether local runoff below Nickajack Dam has been included, and whether any credit (a nonconservative assumption) is warranted for the assumption of a Guntersville Dam failure. Provide the following information to clarify these subjects:

a. Your estimate of time and area distribution of runoff for the local areas between Nickajack Dam and the site, and between the site and Guntersville Dam.

b. The effects at the site of the sharp increase in Nickajack Dam outflow as a result of your assumption of failure on March 24 (Figure 2.4-35) does not appear in your site PMF hydrographs (Figures 2.4-19 and 2.4-20). Please explain this discrepancy and annotate Figures 2.4-19 and 2.4-20 with the note at the time of both Nickajack Dam and Guntersville Dam failures.

c. Indicate whether closer spacing of cross sections and smaller time steps would result in an increase in the PMF water level estimate at the plant site. Discuss the sensitivity of your PMF estimates of discharge and water level at the site to each of the following:

(1) the adequacy of the spacing of cross sections between Nickajack Dam and the site as used in your unsteady flow

model, particularly the first several miles below the dam, in view of the refined estimates and made for similar conditions at the Watts Bar Nuclear Plant site.

(2) the time steps used in your unsteady flow model in relation to item (1) above.

(3) the change in PMF discharge and water level at the site if the embankments at the Guntersville Dam cannot be assumed to fail until after the maximum PMF water level occurs at the site. The effects of this assumption should also be shown on Figure 2.4-19 and 2.4-20.

2.45 Describe and justify the bases for your assumptions on when overtopping failure of dams (both upstream and downstream) will begin to occur.

2.46 Section 2.4.11.2 refers to Section 2.4.8 for intake channel design and flow requirements. Section 2.4.8 does not contain the referenced information. Provide the hydrologic and hydraulic design bases for the intake channel.

2.47 Provide the normal operation and shutdown (30 days, and for extended time thereafter) plant flow requirements. Provide the design bases minimum reservoir level for safety-related pumps, refer to request 2.48.

2.48 From the discussions in Sections 2.4 and 9.2, it is not clear that an adequate safety-related water supply can be assured during extended periods of very extreme drought (substantially more severe than has been experienced), or in the event of a potential failure of Guntersville Dam during low flow periods. Provide the following information:

a. Is it your intention to reserve sufficient reservoir storage in Guntersville and upstream reservoirs to maintain a minimum flow of 3,000 cfs in the Tennessee River, and to maintain sufficient submergence levels on safety-related intake pumps, such that long term decay heat removal is possible in such situations? If so, provide the drought bases for your storage allocations such that water supply assurance is indicated for the most severe drought possible in the Tennessee River basin, methods of reservoir operation, and discuss how you would allow for the consumptive use of upstream storage and release by others.

b. Provide the estimates of the reservoir water level conditions, and their bases, which you will use to initiate plant shutdown to assure that a minimum 30 day water supply is available for decay heat removal.

c. Provide the "open river" flow rate hydraulically equivalent to the minimum submergence levels on intake pumps necessary for decay heat removal. Include the bases forthis flow rate.

d. For severe drought conditions, and after a minimum 30-day period, provide your plans for obtaining a long-term water supply for continued decay heat removal.

2.49 Discuss the potential for recirculation and concentration of chemical, thermal, and radiological releases during a range of probable reservoir operating conditions.

2.50 Provide the groundwater design bases for subsurface portions of safety-related structures. Similarly, provide the construction design bases to be used in assuring the integrity of partially completed portions of safety-related structures from groundwater-induced hydrostatic loadings.

2.51 In your response to Request 2.1, TVA indicated that thus far only an order allowing TVA limited possession to do site related studies has been entered by the court. You also indicated TVA's right to take the property has been raised in the proceeding. In this connection, indicate the status of the proceedings, including your estimate of the schedule for determination of the question, at least in the court of original jurisdiction.

2.52 Response 2.3 of the Amendment 1 dealing with the Scottsboro Airport is not acceptable since it does not deal with general aviation type aircraft. Provide an evaluation of the probability of an aircraft collision at the site, the projected growth in traffic and the approach, departure, and landing patterns of the airfield in relation to the site.

6.0 ENGINEERED SAFETY FEATURES

6.35 In Section 6.2.3.1.2, Secondary Containment Air Cleanup Systems, analyze each engineered safety feature on filtration systems (fuel handling building, control room, and ECCS pump rooms) as to each position in Regulatory Guide 1.52, "Design, Testing and Maintenance Criteria for Atmospheric Cleanup Systems Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants."

6.36 Section 6.2.5.1 states that the containment purge system in Section 9.4.7 is being used as a backup to the combustible gas control. However, Section 9.4.7 does not state any provisions for combustible gas control for the primary containment purge system. Clarify this inconsistency and provide (a) the time in days following a LOCA that a controlled purge would be initiated; (b) the purge rate required to maintain H_2 generation below 4%; (c) specify the engineered safety features purge filtration units to be used for this action and discuss these purge filtration units with respect to each position in Regulatory Guide 1.52.

9.0 AUXILIARY SYSTEMS

9.16 Section 9.4.7.2 describes the three air handling units to clean containment atmosphere prior to purging. Section 9.4.7.3 indicates that the primary air cleanup system is not an engineered safety feature. However, this section states that the primary containment purge exhaust system cleanup equipment will be used in the fuel handling accident. Since the primary containment exhaust system cleanup equipment is used in the fuel handling accident, this equipment must be an engineered safety feature and should be discussed in Chapter 6.

9.17 Regarding Section 9.4.1.3.2, Control Room System Description, provide an analysis of the flow rate in CFM of unfiltered air leaking into the room when the control room is isolated. The analysis should include a clear description of the assumptions, including:

1) Identification of leakage paths (e.g., doors, duct, pipe, and cable penetrations, dampers, etc.)

2) Leakage path characteristics (pressure differential and leakage flow rate relationship).

3) For each leakage path, an estimate of pressure differential caused by wind effects, stack effects, barometric pressure variations, ventilation units servicing spaces adjacent to the control room.

4) Leakage contributions from all pathways. Filtered and unfiltered leak rates should be reported separately.

9.18 Staff analyses of other plants indicate that reliance on chlorine odor and irritation characteristics with subsequent manual control room isolation is insufficient for initiating control room personnel protection precedures in the event of an on-site chlorine release.

Enclosure 1, outlines acceptable design provisions for protection against on-site chlorine releases. Where inconsistancies or deviations from these provisions are proposed, justifications should be provided to demonstrate that your provisions are equivalent with respect to personnel protection.

ENCLOSURE 1

PROVISIONS FOR ADEQUATE PROTECTION AGAINST A CHLORINE RELEASE

Adequate protection of the control room against an on-site chlorine release will be achieved if provisions are included in the plant design to isolate the control room automatically. to limit the potential build-up of chlorine within the control room, and if equipment and procedures are provided to assure immediate use of breathing apparatus by the control room operators. Similar precautions would help mitigate consequences of most postulated toxic gas releases.

To accomplish the automatic isolation quick-response chlorine detectors should be located in the fresh air inlets to the control room. These detectors should be able to detect and signal a step increase in chlorine concentration within a time period not to exceed 3 seconds. The detectors should be capable of signaling a step increase from zero to 15 ppm of chlorine by volume or greater. Detectors should be provided at the control room fresh air inlet for all plants that have storage facilities that might accidently release a total of 500 pounds of chlorine. Additional detectors should be provided at chlorine storage locations that are less than 100 meters from the control room or that may release more than 3 tons of chlorine as a result of any postulated accident. These detectors should be placed, and the detector trip point adjusted, so as to assure detection of a leak or a container rupture. Detector trip signals should initiate automatic isolation of the control room and provide an audible alarm to the operators. The means used to initiate automatic isolation should meet single active failure and seismic criteria.

Control room isolation should be accomplished within about seven seconds after detector trip. Adequate isolation requires all openings to the control room to have low leakage characteristics. This would include doors, dampers. and penetrations. Total in-filtration into the isolated control room should be less than 100 cfm assuming a 1/8" water gage pressure differential across all openings and the maximum operating differential across the isolation dampers upstream of recirculating fans. This leakage limit should be reduced to 25 cfm if chlorine storage is within 100 meters of the control room or if more than 3 tons of chlorine can be released as a result of any postulated accident. Normal fresh air make-up should be limited to no more than 1 to 1 1/2 air changes per hour. An administrative procedure should provide all doors leading to the control room be kept closed when not in use.

Control room isolation should be followed immediately by the start-up and operation of the emergency recirculating charcoal filter or equivalent equipment designed to remove or otherwise limit the accumulation of contamination within the control room.

Under certain meteorological conditions control room isolation may not be sufficient by itself to limit chlorine concentrations to levels below those which cause physical discomfort or disability. Therefore, the use of self-contained breathing apparatus should be considered when developing a chlorine release emergency plan. Since calculations indicate that rapid increases in chlorine concentrations are possible, emergency plan provisions and rehearsal of these provisions for immediate donning of breathing apparatus on detection of chlorine release are necessary. Storage provisions for breathing apparatus and procedures for use should be such that operators can begin using the apparatus within two minutes after an alarm. Donning of breathing apparatus should be mandatory prior to the determination of the cause of an alarm.

A toxic environment may be present for several days or longer if a chlorine leak cannot be fixed or the leaking container removed. In any event, adequate bottled air capacity (at least six hours) should be readily available on-site to assure that sufficient time is available to locate and transport bottled air from off-site locations. This off-site supply should be capable of delivering several hundred hours of bottled air to the members of the emergency crew.

Isolation and air supply equipment relied on should accommodate a single failure of an active component and still perform the required function. (In the case of self-contained breathing apparatus this may be accomplished by supplying one extra unit for every three units required.)

Protection requirements for plants located nearby other facilities that store significant quantities of chlorine or plants located nearby major chlorine transportation routes will be determined on a case-by-case basis. Similarly plants having storage facilities that might accidentally release a total of 500 pounds of chlorine or less will be reviewed on a case-by-case basis to determine need for protection against accidental release.