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U. S. ATOMIC ENERGY COMMISSION
ALVIN W. VOGTLE NUCLEAR PLANT, UNITS 1-4

DOCKET NOS. 50-424, 425, 426, 427

SUPPLEMENTAL TESTIMONY OF AEC REGULATORY STAFF ON
SITE SUITABILITY

BY

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The site proposed for the Vogtle facility has been reviewed by the Regulatory staff to establish whether the site is suitable for light water reactors of the general type proposed. The facility will be located on the southwest side of the Savannah River in Burke County, Georgia, approximately 26 miles south-southeast of Augusta, Georgia. The facility consists of four pressurized water reactors of a design similar to that reviewed and approved for other nuclear power plants now in operation or under construction.

Each unit is designed for a rated thermal output of 3411 MW and a net electrical output of about 1100 MW. The site evaluation has been conducted for a stretch thermal power of 3565 MW.

The Nuclear Steam Supply Systems, including the initial cores, will be supplied by the Westinghouse Electric Corporation and the turbine generators will be purchased from the General Electric Company.

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distance, low population zone and population center distance, there is reasonable assurance that adequate engineered safety features can be provided to meet the dose guideline values indicated in 10 CFR Part 100.

B. NEARBY INDUSTRIAL, TRANSPORTATION & MILITARY FACILITIES

No nearby industrial or military facilities have been identified for which the Vogtle plant could not be designed against, as necessary, to protect the health and safety of the public. There are no airports, military facilities, gas pipelines or major highways within 5 miles of the plant. The nearest railroad line is about 4 miles from the plant. The only significant transportation route in the vicinity is the Savannah River which is about 3600 feet from the nearest reactor.

The AEC's Savannah River Plant (SRP), which lies directly across the river from the proposed Vogtle nuclear station produces nuclear materials, including plutonium and tritium, and uses significant quantities of the hazardous chemical hydrogen sulfide. The nearest operating SRP reactor is located about 8 miles from the proposed Vogtle plant and the nearest fuel processing and tritium processing facilities about 11 miles away. Hydrogen sulfide is stored and used at a distance of about 4 miles. We have evaluated accidental releases of radioactive materials and of hazardous chemicals from SRP. Based on our review, we have concluded that adequate design provisions can be incorporated to assure that the Vogtle plant meets General Design

Criterion No. 19, and that such releases would not adversely affect control room operations, nor prevent a safe and orderly shutdown of the nuclear reactors.

On the basis of the above considerations, we conclude that there are no nearby activities that would preclude site acceptability.

C. SEISMOLOGY AND GEOLOGY

There are no geologic hazards such as surface faulting, landsliding potential, liquefaction potential, or ground failure attributable to subsidence or collapse brought about by cavities or caverns within the clay-bearing stratum at the site.

The site is located on the Coastal Plain Province about 25 miles southeast of the Fall Zone, the physiographic boundary between the Coastal Plain and Piedmont Provinces.

The Safe Shutdown Earthquake (SSE) for the Vogtle site will be based on the seismicity of both provinces. The Atlantic Coastal Plain Province has experienced a maximum historical intensity of X on the Modified Mercalli (MM) scale as a consequence of the 1886 Charleston, South Carolina earthquake. During that event, the site, which is about 100 miles from Charleston, experienced an intensity no higher than VII on the MM scale. Because of the spatial clustering characteristics of Coastal Plain earthquakes, particularly a cluster of more than 400 historic shocks in the immediate vicinity of Charleston, and because the site itself is located in a

nearly aseismic area, we do not consider that intensity X events could occur near the site. We conclude that an intensity of VII is the maximum likely to be experienced at the site in consequence of a Coastal Plain earthquake. The Piedmont has experienced a maximum intensity of VII. The nearest point to the site of the Piedmont province is 25 miles distant. Thus, the SSE at the site will be no greater than VII. Plants licensed by the Atomic Energy Commission elsewhere in the eastern United States have been designed for this intensity.

The crystalline basement, which is near the surface northwest of the Fall Zone, slopes southeasterly and lies at a depth of about 950 feet beneath the site. The basement is overlain by Coastal Plain sediments consisting of sands, silts, clays, and limestones ranging in age from Cretaceous to Recent. The applicant demonstrated that the Coastal Plain strata beneath the site are not faulted. Within the basement beneath the site is a downfaulted block, filled with Triassic sediments. It is believed that the northwest side of this Triassic Basin is founded by a fault, about one mile northwest of the site. Any faulting associated with such Triassic basins does not appear to have been tectonically active since pre-Upper Cretaceous time, or more than 60 million years ago, and faults associated with the basins are not considered "capable" faults as defined in Appendix A to 10 CFR Part 100. There are no other identifiable faults or other younger geologic structures that might be expected to localize earthquakes in the immediate vicinity of the site.

From our analysis and evaluation of available geologic and seismicity data, including the results of the investigations performed by the applicant, we conclude that there are no geologic or seismic considerations which would preclude the acceptability of the site.

D. METEOROLOGY

The Vogtle site is on the eastern side of an area, centered over the southern Appalachian Mountains, in which atmospheric dispersion conditions are generally not as favorable as over other portions of the United States east of the Rocky Mountains. Within the geographical region in which the site is located, however, the dispersion conditions at Vogtle are better than at other nuclear plant sites in this region, and better than the average for all sites in the contiguous United States.

A description of meteorological conditions at the site, including the climatology of the region, local meteorological conditions and expected severe weather, is presented in Section 2.6 of the Final Environmental Statement for the plant issued in March 1974.

The applicant has provided meteorological data (in joint frequency form as recommended in Regulatory Guide 1.23), collected onsite during the period 12/4/72 - 12/4/73, as a basis for the staff's evaluation of atmospheric diffusion conditions. For the evaluation of short-term accidental releases from the buildings and vents, the staff used the joint frequency distribution of wind direction and speed measured at the 33-foot level and vertical temperature difference between the

150- and 33-foot levels, and assumed a ground-level release with a building wake factor (cA) of 1350 square meters.

The relative concentration (X/Q) for the 0-2 hour time period which is exceeded 5% of the time is calculated, using the diffusion model described in Regulatory Guide 1.4, to be $2.8 \times 10^{-4} \text{ sec/m}^3$ at the minimum site boundary distance of 1098 meters. This relative concentration is equivalent to dispersion conditions produced by Pasquill type F stability with a wind speed of 1.1 meters/second. The relative concentration which is exceeded 5% of the time at the outer boundary of the low population zone (3220 m) is calculated to be $1.0 \times 10^{-4} \text{ sec/m}^3$ for the 0-8 hour time period.

A comparison of the short-term atmospheric dispersion values at the exclusion radius with similar values at other sites that have been evaluated by the staff indicates that the dispersion conditions at Vogtle are better than those at about 80% of the other sites.

Based on the above, we conclude that there are no meteorological characteristics that would preclude site acceptability.

E. HYDROLOGY

The proposed site for the Vogtle plant is about 26 miles SSE of Augusta, Georgia, on the west bank of the Savannah River. Plant grade is to be about 220 feet above mean sea level (MSL).

The site is not subject to flooding from the Savannah River. The estimated Savannah River Probable Maximum Flood (PMF), about one million cubic feet per second at the site, is a modified Corps of Engineers estimate for the Savannah River above Augusta. Preliminary estimates indicate a maximum water level of about 149 feet MSL

will be attained. The design-basis water level on the Savannah River will be produced by a Standard Project Flood, generally assumed equal to about one-half of the PMF, coincident with an arbitrarily assumed seismic failure of the upstream Jocassee Dam and the subsequent failure of all intermediate dams. The estimated water level at the site under these assumed conditions would be about 168 feet MSL. The conservative methods of analyses and the substantial margin between the calculated flood levels and plant grade provide assurance that the design-basis flood elevation will be well below plant grade.

The Savannah River will provide an adequate supply of normal cooling water. Because it is regulated by upstream reservoirs, the estimated low flow of the Savannah River is significantly greater than the estimated makeup requirements for the proposed natural draft cooling towers. Mechanical draft cooling towers, which are to provide emergency cooling, are to be located at plant grade and are not to be dependent on the river intake for emergency operation.

The groundwater gradient beneath the site is toward the Savannah River. Only plant wells are located down gradient between the site and the River. Thus, the potential for groundwater contamination from accidental spills will not differ from that at sites previously approved by the Commission.

Based on the above considerations, we conclude that there are no hydrological factors that would preclude acceptability of the site.

CONCLUSION

On the basis of our analysis and evaluation, we conclude that there is reasonable assurance that the proposed site is a suitable location for nuclear power reactors of the general size and type proposed from the standpoint of radiological health and safety considerations under the Atomic Energy Act and rules and regulations promulgated by the Commission pursuant thereto.