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NUREG - 1087, "Final Environmental Statement Related to the Operation of Vogtle Electric Generating Plant, Units 1 and 2" (March 1985)

Final Environmental Statement

related to the operation of
Vogtle Electric Generating Plant,
Units 1 and 2

Docket Nos. 50-424 and 50-425

Georgia Power Company, et al.

**U.S. Nuclear Regulatory
Commission**

Office of Nuclear Reactor Regulation

March 1985



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NUREG-1087

Final Environmental Statement

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Vogtle Electric Generating Plant,
Units 1 and 2

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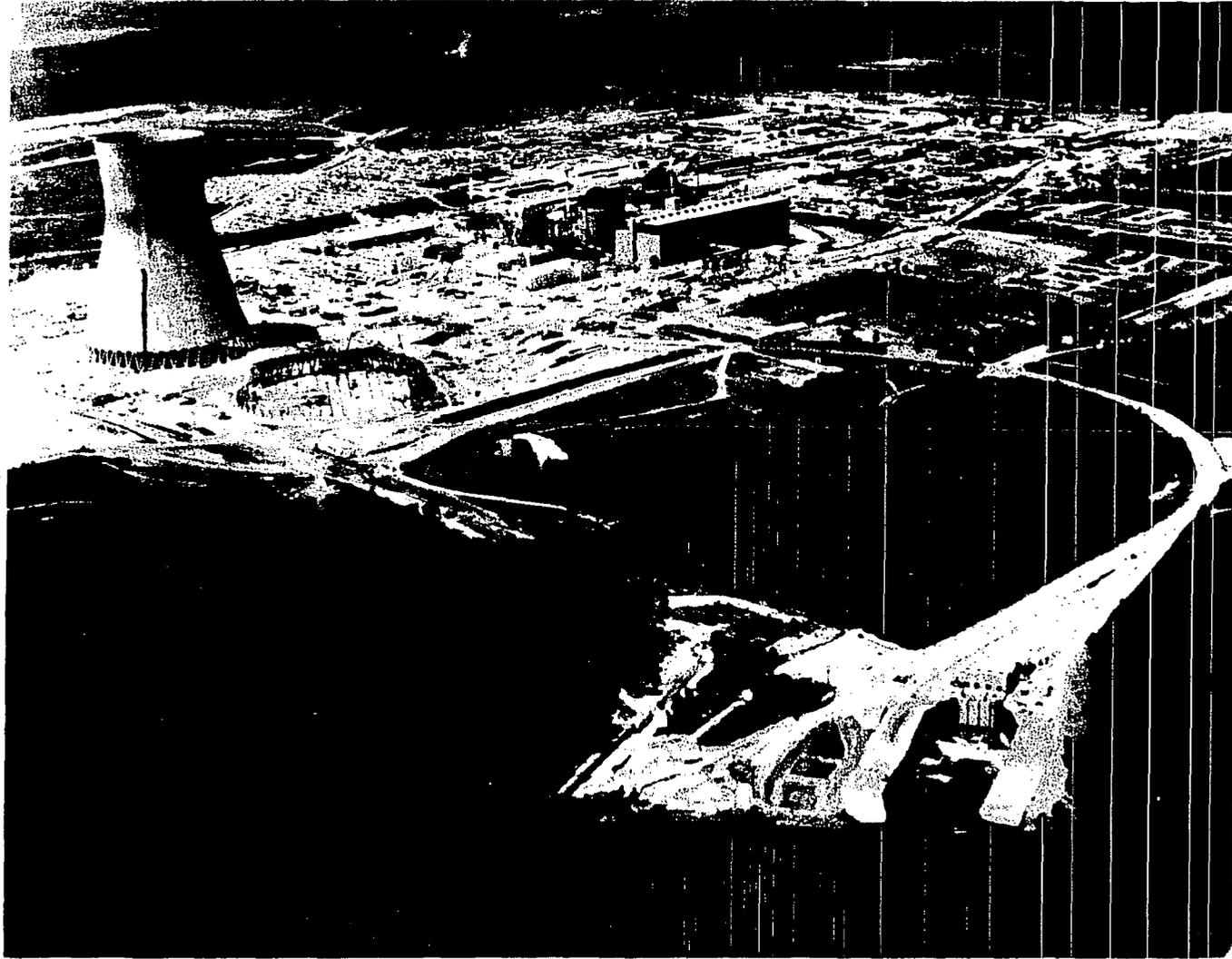


ABSTRACT

This Final Environmental Statement contains an assessment of the environmental impact associated with the operation of the Vogtle Electric Generating Plant, Units 1 and 2, pursuant to the National Environmental Policy Act of 1969 (NEPA) and Title 10 of the Code of Federal Regulations, Part 51 (10 CFR 51), as amended, of the Nuclear Regulatory Commission regulations. This statement examines the environmental impacts, environmental consequences and mitigating actions, and environmental and economic benefits and costs associated with station operation.



Vogtle FES



Vogtle plant site, June 1984



SUMMARY AND CONCLUSIONS

This Final Environmental Statement (FES) was prepared by the U.S. Nuclear Regulatory Commission (NRC), Office of Nuclear Reactor Regulation (staff).

- (1) This action is administrative.
- (2) The proposed action is the issuance of operating licenses to Georgia Power Company (GPC), Oglethorpe Power Corporation (OPC), the Municipal Electric Authority of Georgia (MEAG), and the City of Dalton, Georgia, as owners, for operation of the Vogtle Electric Generating Plant, Units 1 and 2 (the facility) (Docket Numbers 50-424 and 50-425). The facility is located on the southwest side of the Savannah River in the eastern sector of Burke County, Georgia, directly across the Savannah River from the Department of Energy's Savannah River Plant, Barnwell County, South Carolina. Georgia Power Company (referred to herein as the applicant), on behalf of itself and the other owners, acts as agent in the planning, design, licensing, construction, acquisition, completion, maintenance, operation, and decommissioning of the facility.

The two-unit facility uses two four-loop pressurized water reactors (PWRs) manufactured by Westinghouse Electric Corporation. Each reactor has a rated thermal output of 3411 Mwt. The 14-Mwt input from the reactor coolant pumps increases the reactor coolant system gross thermal output to 3425 Mwt. The corresponding turbine-generator gross electrical output is 1157 Mwe. The maximum core design output (excluding pump heat) is 3565 Mwt. This power level is referred to as the stretch level and is the value used in the radiological accident analyses. Excess heat from the condensing of steam is dissipated to the atmosphere through natural draft cooling towers.

- (3) The information in this statement represents an assessment of the environmental impacts of station operation pursuant to the Commission's regulations as set forth in Title 10 of the Code of Federal Regulations, Part 51 (10 CFR 51), which implements the requirements of the National Environmental Policy Act of 1969 (NEPA). After receiving, in August 1972, an application to construct a four-unit facility and subsequent amendments thereto, the staff reviewed the impacts that would occur during construction and operation. That evaluation was issued as the Final Environmental Statement-Construction Permit phase (FES-CP) in March 1974. After that environmental review, a safety review, and an evaluation by the Advisory Committee on Reactor Safeguards, the Nuclear Regulatory Commission issued Construction Permits CPPR-108, 109, 110, and 111 on June 28, 1974 for construction of the facility. On September 12, 1974, the applicant canceled Units 3 and 4.

Amendments to Construction Permits CPPR-108 and CPPR-109 were issued by the NRC on January 24, 1977; July 24, 1981; January 29, 1982; February 13, 1984; and March 6, 1985. Of these five amendments, only the third--regarding a design change to the discharge structure and deletion of three conditions

concerning plant chlorine discharges and related monitoring--is of environmental significance. The applicant submitted an application for operating licenses for Units 1 and 2 by letters dated June 30, 1983 (tendering the Final Safety Analysis Report (FSAR)) and August 31, 1983 (tendering the Environmental Report-Operating License stage (ER-OL)). The NRC conducted a predocketing acceptance review and determined that sufficient information was available to start detailed environmental and safety reviews. The operating license application was docketed on September 16, 1983 (FSAR) and November 30, 1983 (ER-OL).

- (4) The staff has reviewed the activities associated with the proposed operation of the facility and the potential impacts of such operation, both beneficial and adverse. The staff's conclusions are summarized as follows:
- (a) Alteration of about 604 ha (1492 acres)* of land and associated wildlife habitats will be necessary, including up to 338 ha (835 acres) that are devoted to permanent plant facilities. No prime farmland was located on the site. Although construction has had adverse effects on land and wildlife, these effects have not been particularly significant. Vacant areas on the site will be managed for forestry and wildlife (Sections 4.2.2 and 4.3.4).
 - (b) Two 500-kV and two parallel 230-kV transmission lines on 531 km (330 miles) or 2510 ha (6202 acres) of right-of-way will connect Vogtle with the existing power system within the State of Georgia (Section 4.2.7). Another 230-kV line will be routed over 33.5 km (20.8 mi) to a termination point within the Savannah River Plant area in South Carolina.
 - (c) Plant operation should not jeopardize the existence of any terrestrial or aquatic endangered or threatened species (Section 4.3.5).
 - (d) Surface water quality impacts to the Savannah River caused by the blowdown discharge from the Vogtle plant are predicted to be small, based on the staff's assessment of pollutant loading and/or concentration in the blowdown discharge to the river and on the small flow of the blowdown relative to the flow of the river (Sections 5.3.2 and 5.5.2).
 - (e) Since the FES-CP was issued, the discharge design has been changed from a multiport to a single-port configuration. The predicted benefits of the single-port discharge are that the thermal plume will be smaller, that the plume will not impinge on the Georgia shoreline of the river, and that the total width of the river affected by the thermal plume will be less than that predicted in the FES-CP (Section 5.3.2).

*Throughout the text of this document, values are presented in both metric and English units. For the most part, measurements and calculations were originally made in English units and subsequently converted to metric. The number of significant figures given in a metric conversion is not meant to imply greater or lesser accuracy than that implied in the original English value.

- (f) The effect of the intake structure on the canal, the barge unloading facilities, the site runoff flume, and the site discharge pipe on the 100-year floodplain of the site is negligible (Section 5.3.3).
- (g) The impact of the cooling towers on climatic conditions such as fogging and icing will be negligible (Section 5.4.1).
- (h) Operation of the emergency diesel generators and auxiliary boilers will not significantly degrade air quality in the vicinity of the plant. The applicant will operate the auxiliary boilers in accordance with a State of Georgia permit to limit emissions. The State of Georgia has exempted air quality permitting requirements for the diesel generators because of low rates of emissions (Section 5.4.2).
- (i) Plant operation, including the release of drift from cooling towers, will not adversely affect native vegetation or agricultural crops in the vicinity of the plant (Section 5.5.1).
- (j) Operation of the Vogtle transmission lines will have no effect on the health of humans, animals, and plants (Section 5.5.1.2). Wildlife habitat will be modified by right-of-way clearing, and agricultural land directly under the towers will be unavailable for tillage.

One section of transmission line crosses Ebenezer Creek at a point designated as a National Natural Landmark by the U.S. Park Service and as a Scenic River by the State of Georgia. The applicant has proposed mitigative measures to protect the values of the area. These measures are such that the proposed crossing is acceptable to the designating agencies and to the staff (Section 5.2.2).

Following completion of transmission line cultural resource surveys, the staff--in consultation with the State Historic Preservation Officer--will submit determination of eligibility requests to the Keeper of the National Register of Historic Places, where appropriate (Section 5.7).

- (k) The thermal plume from the single-port discharge will reach the river bottom at a distance of 7.6 m to 9 m from the point of discharge. The benthic community in this area will be affected minimally because of the sparse habitat provided by the shifting-sand substrate (Section 5.5.2).
- (l) The single-port discharge is predicted to provide a greater zone of passage for migratory fish in the Savannah River in the plant vicinity than would the multiport discharge (Section 5.5.2).
- (m) A high potential for fouling of the Vogtle plant water systems by Corbicula (Asiatic clam) is suggested by the high population of Corbicula in the site vicinity, the infestations experienced at the Savannah River Plant, and the design of the Vogtle intake system. Intermittent chlorination of plant condenser and service cooling

waters will be supplemented with high level continuous chlorination for control of macrofouling by the Asiatic clam (Corbicula). A dechlorination system may be used to reduce the residual chlorine concentration in the cooling system blowdown during the Corbicula spawning season (April to November). The allowable limits for chlorine in the discharge are in the NPDES Permit (Appendix E). Because the discharge from the plant is less than 1% of the total flow of the Savannah River in the vicinity of the plant, the total residual chlorine in the discharge should be rapidly diluted within the mixing zone and should have no adverse effect on aquatic biota downstream, as long as the total residual chlorine levels in the discharge do not exceed 0.1 mg/L (Section 5.5.2).

- (n) Since the FES-CP was issued, the intake design has been changed. Impacts from intake entrainment and impingement of biota from the Savannah River are expected to be minimal because of design features incorporated into the intake structure (Section 5.5.2).
- (o) The shortnose sturgeon, Acipenser brevirostrum, is the only identified endangered aquatic species in the vicinity of the Vogtle plant. Demersal eggs of the species should not be affected by the plant intake or the thermal plume; however, if larvae are a component of the riverine drift community, they could be drawn into the plant or carried through the thermal plume. The small number of larvae collected in the plant vicinity indicates that the site vicinity is not a unique spawning habitat. Operation of this plant is not expected to jeopardize the continued existence of this endangered species (Section 5.6.2).
- (p) Socioeconomic impacts of the facility are anticipated to be minimal (Section 5.8).
- (q) The risks to the general public from the exposure to radioactive effluents and the transportation of fuel and wastes from annual operation of the facility are very small fractions of the estimated normal incidence of cancer fatalities and genetic abnormalities (Section 5.9.3.2).
- (r) The risk to the public health and safety from exposure to radioactivity associated with the normal operation of the facility will be small (Section 5.9.3.2).
- (s) No measurable radiological impact on the populations of biota is expected as a result of routine operation of the facility (Section 5.9.3.3).
- (t) Impacts of a postulated reactor accident could be severe, but the likelihood of occurrence is small, and the risks are comparable to those at other nuclear power plants. There are no special or unique circumstances about the Vogtle site and environs that would warrant consideration of alternatives for the Vogtle plant (Section 5.9.4.6).
- (u) The dose commitments and health effects of the light-water reactor (LWR)-supporting uranium fuel cycle are very small when compared with dose commitments and potential health effects to the U.S. population

resulting from all natural background sources. The annual occupational dose attributable to all phases of the fuel cycle will have a small environmental impact. The transportation dose to workers and the public with respect to the uranium fuel cycle is small in comparison with the natural background dose. Low-level radioactive waste disposal at land-burial facilities will have no significant radioactive releases to the environment (Section 5.10 and Appendix C).

- (v) Radiation doses to the public as a result of end-of-life decommissioning activities are expected to be small (Section 5.11).
 - (w) Noise levels at residences near the site during operation will be slightly above ambient levels, and no significant impact as a result of plant noise is expected. Noise during wet weather conditions could cause annoyance at one residence located adjacent to one of the Vogtle transmission lines. The applicant will be required to report annually in the Environmental Protection Plan any noise complaints received related to the high voltage line and their resolutions.
- (5) This statement assesses various impacts associated with the operation of the facility in terms of annual impacts and balances these impacts against the anticipated annual energy production benefits. Thus, the overall assessment and conclusion would not be dependent on specific operating life. Where appropriate, a specific operating life of 40 years has been assumed.
 - (6) The personnel who participated in the preparation of this document are identified in Section 7.
 - (7) The DES was made available for comment to the public, to the Environmental Protection Agency, and to other agencies as specified in Section 8.
 - (8) On the basis of the analysis and evaluations set forth in this statement, after weighing the environmental, technical, and other benefits against the environmental costs at the operating license stage, the staff concludes that the action called for under NEPA and 10 CFR 51 is the issuance of operating licenses for Vogtle Electric Generating Plant, Units 1 and 2, subject to the following conditions for protection of the environment:
 - (a) Before engaging in additional construction or operational activities that may result in a significant adverse impact that was not evaluated or that is significantly greater than that evaluated in this statement, the applicant shall provide written notification of such activities to the Director of the Office of Nuclear Reactor Regulation and shall receive written approval from that office before proceeding with such activities.
 - (b) The applicant shall carry out the environmental monitoring programs outlined in Section 5 of this statement, as modified and approved by the staff, and implemented in the Environmental Protection Plan and Technical Specifications that will be incorporated in the operating licenses for Vogtle Electric Generating Plant, Units 1 and 2. Monitoring of the aquatic environment shall be as specified in the National Pollution Discharge Elimination System (NPDES) Permit.