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Final

environmental statement

related to the proposed

ALVIN W. VOGTLE NUCLEAR PLANT UNITS 1, 2, 3 AND 4

GEORGIA POWER COMPANY

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

MARCH 1974

UNITED STATES ATOMIC ENERGY COMMISSION

DIRECTORATE OF LICENSING

MASTER

FINAL ENVIRONMENTAL STATEMENT RELATED TO THE PROPOSED ALVIN W. VOGTLE NUCLEAR PLANT, UNITS 1, 2, 3 AND 4

GEORGIA POWER COMPANY

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

MARCH 1974

U. S. ATOMIC ENERGY COMMISSION

DIRECTORATE OF LICENSING

MASTER

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SUMMARY AND CONCLUSIONS

This Final Environmental Statement was prepared by the U.S. Atomic Energy Commission, Directorate of Licensing.

1. This action is administrative.

2. The proposed action is the issuance of a construction permit to the Georgia Power Company for the construction of the Alvin W. Vogtle Nuclear Plant, located on the Savannah River (Docket Nos. 50-424, 50-425, 50-426, and 50-427). Each unit of the Vogtle Nuclear Plant will employ a pressurized water reactor to produce up to 3,425 megawatts thermal (MWt). A steam turbine-generator will use this heat to provide 1,100 MWe (net) of electrical power capacity. A design power level of 3,579 MWt (1,159 MWe) is anticipated at a future date and is considered in the assessment contained in this statement. The exhaust steam will be cooled by a closed-cycle cooling system employing natural-draft cooling towers and using makeup water from the Savannah River.

3. Summary of environmental impact and adverse effects:

   a. The construction impact will affect 1,011 acres of the site, 245 acres for a railroad spur, and 12,660 acres for transmission lines. About 0.03% of the State's timber acreage will be removed by transmission-line construction. The potential exists for severe erosion during plant construction; however, erosion can be mitigated by strict adherence to preventive and corrective techniques. (Sections 4.1 and 4.3.1)

   b. In June 1973, an archaeological field survey of the Vogtle plant site was conducted under supervision of the Georgia State Archaeologist. The survey concluded that the artifacts found were not archaeologically significant and did not warrant salvage. The field survey was reviewed for the AEC by the Department of Anthropology, National Museum of Natural Hi tory, Smithsonian Institution who concurred in the approach and conclusions. (Sections 2.3.3, 4.1.1, 11.5.1 and 11.9.1)

   c. The use of hyperbolic natural-draft cooling towers for dissipating waste heat will result in consumptive water use at an average rate of 14, 930 gpm per unit (14,860-gpm evaporation and 70-gpm drift) from the Savannah River. For four units, this will total about 1.3% of the river's average flow. This loss will not measurably affect present uses of the Savannah River. (Section 5.2).

d. The plume from the cooling towers is not expected to add
d. The plume from the cooling towers is not expected to add
significantly to fogging or icing conditions in the area. (Section 3.4.4)

e. Entrained organisms that enter the circulating-water systems will be killed. Under average river-flow conditions, entrainment losses represent about 1.7% of the river's planktonic populations. This removal is not expected to have an adverse effect on these populations or on the organisms that feed on them. (Section 5.5.2.2)

f. Liquid effluent from the plant will be discharged to the river at an average rate of about 17,140 gpm; it will consist primarily of main-cooling-tower blowdown at a rate of 4,000 gpm/unit. This discharge will enter the river through a 60-ft-long section of diffuser pipe located on the river bottom. The thermal effects of this discharge will cause no significant impact. (Sections 3.3, 3.4 and 5.5.2.4)

g. The chlorination procedure proposed by the applicant could adversely affect river organisms. By limiting the total residual-chlorine concentration in the discharge to 0.1 ppm, this potential adverse impact will be avoided. (Sections 5.5.2.3, 6.2.4 and 9.2.5.1)

h. Based on the information available, impingement on the intake-structure screens is not expected to be significant; however, the Applicant must submit for the staff's analysis sufficient aquatic survey data on the population density of anadromous fish in the vicinity of the proposed intake structure to verify the Applicant's evaluation. (Sections 4.5.2, 5.5.2.1 and 11.3.5)

i. The commuting of the labor force and the transport of materials to the site may overload certain local roads during certain hours of the day. The main access road to the site, Hancock Landing Road, has been hard-surfaced as far as River Road. Other roads in the Waynesboro area may need to be improved. (Sections 4.4 and 9.3)

j. Indiscriminate broadcast application of herbicide by spraying from a helicopter could result in excessive impact on the vegetation adjoining the transmission lines rights-of-way. This potential adverse impact will be avoided by using commonly-accepted practices which limit the application of herbicide to the right-of-way in non-sensitive areas and only where this type of control is considered essential. (Sections 4.5.1 and 5.5.1.2)

k. The risk associated with accidental radiation exposure is very low. (Section 7.1)

l. No significant environmental impacts are anticipated from normal operational releases of radioactive materials within 50 miles. The estimated dose to the population within 50 miles from operation of the plant is 29 man-rems/year - less than the normal fluctuations in the 71,000-man-rems/year - background dose this population would receive and well below the limits prescribed by 10 CFR Parts 20 and 50. (Section 5.4)

4. Principal alternatives considered:

- Purchase of power from outside sources.
- Non-nuclear sources of energy.
- Alternative sites.
- Alternative cooling systems.
- Alternative discharge structures.

5. The following Federal, State and local agencies and individuals were asked to comment on this Draft Environmental Statement:

Advisory Council on Historic Preservation
Department of Agriculture
Department of the Army, Corps of Engineers
Department of Commerce
Department of Health, Education and Welfare
Department of Housing and Urban Development
Department of the Interior
Department of Transportation
Environmental Protection Agency
Federal Power Commission
National Museum of Natural History, Smithsonian Institution
Governor, State of Georgia
Governor, State of South Carolina
State Clearinghouse, State of Georgia
State Clearinghouse, State of South Carolina
Department of Natural Resources, State of Georgia
Georgia Public Service Commission
Georgia Water Quality Control Board

Georgia Historical Commission
Central Savannah River Area Regional Planning and Development Commission
Burke County Board of Commissioners
Waynesboro City Council
Aguugusta Archaeology Society
Augusta Citizens Concerned About Nuclear Power
Georgia Power Project
Richard C. Palmer
Victor Shorapa

Comments on the draft environmental statement issued in August 1973, were received from the following Federal, State and local agencies and other parties:

Advisory Council on Historic Preservation
Department of Agriculture
Department of Commerce
Department of Health, Education and Welfare
Department of Housing and Urban Development
Department of Interior
Department of Transportation
Environmental Protection Agency
Federal Power Commission
Smithsonian Institution
Beaufort-Jasper County Water Authority
Central Savannah River Area Regional Planning and Development Commission
Georgia Public Service Commission
Governor's Science Advisory Council (State of Georgia)
Lower Savannah Regional Planning and Development Council
South Carolina Department of Health and Environmental Control
South Carolina Water Resources Commission
Augusta Archaeology Society
Georgia Department of Natural Resources
Georgia Department of Transportation

These comments are appended to this Final Environmental Statement in Appendix L.

6. This Final Environmental Statement was made available to the public, to the Council on Environmental Quality, and to other specified agencies in March 1974.

7. On the basis of the analysis and evaluation set forth in this statement, after weighing the environmental, economic, technical and other benefits of Alvin W. Vogtle Nuclear Plant, Units 1, 2, 3, and 4, against environmental and other costs and considering available alternatives, it is concluded that the action called for under the National Environmental Policy Act of 1969 (NEPA) and Appendix D to 10 CFR Part 50 is the issuance of a construction permit for the facility subject to the following conditions for the protection of the environment:

   a. The plant shall be designed such that:

      (1) the plant discharge stream is continuously monitored for total residual chlorine concentration. (Sect. 6.2.4)

      (2) The total residual chlorine concentration within 5 feet of the diffuser ports will be less than 0.1 ppm when all four units are in operation. (Sects 5.5.2.3, 6.2.4 and 9.2.5.1)

      (3) All the cells in the intake structure will normally be used during operation of the intake pumps. (Sect. 5.5.2.1)

      (4) The volume of water enclosed by the 5°F isotherm will not exceed 2400 ft^3 when all four units are operating and discharging effluent at the maximum expected blowdown rate. (Sects. 3.4.3.2 and 9.2.3)

   b. The construction program and practices shall incorporate the following features:

      (1) Rate of pumpage during dewatering will be low enough to prevent siltation in Beaverdam Creek. (Sect. 4.3.2.1)

      (2) The Environmental Protection Agency's guidelines for the operation of retention basins will be followed in order to minimize the potential adverse effects on Beaverdam Creek as a result of erosion during construction. (Sect. 4.3.2.2)

      (3) The retention basins will be drained between storms when the turbidity of the impounded water has decreased to acceptable levels. (Sect. 4.3.2.4)

c. Prior to construction of the intake structure, the applicant shall submit the results of the aquatic monitoring programs and an evaluation of the environmental impact of the intake canal and intake structure which will satisfy the staff that impingement will not have a significant adverse effect on the adult population of resident and anadromous fish in the Savannah River.

d. The applicant shall take the necessary mitigating actions, including those applicant commitments summarized in Section 4.5 (p. 4-29) of this Environmental Statement, during construction of the station and associated transmission lines to avoid unnecessary adverse environmental impacts from construction activities.

e. A control program shall be established by the applicant to provide for a periodic review of all construction activities to assure that those activities conform to the environmental conditions set forth in the construction permit.

f. Before engaging in a construction activity which may result in a significant adverse environmental impact that was not evaluated or that is significantly greater than that evaluated in this Environmental Statement, the applicant shall provide written notification to the Director of Licensing.

g. If unexpected harmful effects or evidence of irreversible damage are detected during facility construction, the applicant shall provide to the staff an acceptable analysis of the problem and a plan of action to eliminate or significantly reduce the harmful effects or damage.

FOREWORD

This final statement on environmental considerations associated with the proposed issuance of a construction permit for the Alvin W. Vogtle Nuclear Plant was prepared by the U.S. Atomic Energy Commission, Directorate of Licensing (staff) in accordance with the Commission's regulation, 10 CFR Part 50, Appendix D, implementing the requirements of the National Environmental Policy Act of 1969 (NEPA).

The NEPA states, among other things, that it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- Assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
- Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.
- Preserve important historic, cultural, and natural aspects of our natural heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice.
- Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities.
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Further, with respect to major Federal actions significantly affecting the quality of the human environment, Section 102(2)(C) of the NEPA calls for preparation of a detailed statement on:

(i) The environmental impact of the proposed action,

(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,

(iii) alternatives to the proposed action,

(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and

(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Pursuant to Appendix D of 10 CFR Part 50, the AEC Directorate of Licensing prepares a detailed statement on the foregoing considerations with respect to each application for a construction permit or full-power operating license for a nuclear power reactor.

When application is made for a construction permit or a full-power operating license, the applicant submits an environmental report to the AEC. The staff evaluates this report and may seek further information from the applicant, as well as other sources, in making an independent assessment of the considerations specified in Section 102(2)(C) of the NEPA and Appendix D of 10 CFR Part 50. This evaluation leads to the publication of a draft environmental statement, prepared by the Directorate of Licensing, which is then circulated to Federal, State, and local governmental agencies for comment. Interested persons are also invited to comment on the draft statement.

After receipt and consideration of comments on the draft statement, the staff prepares a final environmental statement, which includes a discussion of questions and objections raised by the comments and the disposition thereof; a final cost-benefit analysis which considers and balances the environmental effects of the facility and the alternatives available for reducing or avoiding adverse environmental effects with the environmental, economic, technical, and other benefits of the facility; and a conclusion as to whether, after weighing the environmental, economic, technical, and other benefits against environmental costs and considering available alternatives, the action called for is the issuance or denial of the proposed permit or license or its appropriate conditioning to protect environmental values.

Single copies of this statement may be obtained by writing the Deputy Director for Reactor Projects, Directorate of Licensing, U.S. Atomic Energy Commission, Washington, D.C. 20545. Richard J. Clark is the AEC Environmental Project Manager for this statement. (301-443-6980)

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can be highly destructive of vegetation, especially grasses and annual herbaceous plants. In addition to the loss of vegetation as such, the removal may result in erosion and thus in a general decline in productivity of eroded areas through loss of soils and nutrients. The applicant discourages the use of transmission-line corridors by such vehicles but believes that State-level legislation is required for effective control of this problem.

The applicant has a right-of-way land-management program that will pay as much as $75/acre to the landowner to plant the cleared right-of-way in pasture, crops, or game-food plots. Planting is limited to grasses, crops, and low-growing shrubs and trees that will not reach a height which will hinder the operation of the transmission lines. The program is actively publicized through advertisement and is administered by GPC foresters. Each acre planted can be maintained by the property owner in a manner both suitable to him and acceptable to the applicant. The use of easements enables property owners to continue to use their land for agricultural or other purposes that do not interfere with operation and maintenance of the transmission lines.

Ozone is recognized to be a major component of the photochemical air pollution-oxidant complex. The National Primary Air Quality Standard for photochemical oxidants, as issued by the Environmental Protection Agency, is 80 ppb (by volume) maximum arithmetic mean for a 1-hr concentration not to be exceeded more than once per year. The toxicity of ozone to vegetation is well-documented; susceptible species show symptoms of damage from exposures to ozone in concentrations as low as 30 ppb.[16,17] One source of ozone production is believed to be associated with the coronal discharges of high-voltage transmission lines. However, recent studies[18,19] have shown that no measurable concentrations of ozone (less than 2 ppb) are formed due to the presence and operation of transmission lines that carry up to 765 kV. High-voltage lines for VNP will carry a maximum of 500 kV. Any possible deleterious effects on plants directly beneath these lines and on those adjacent to the corridors which could be affected by chronic exposure to ozone drift have not been identified and are expected by the staff to be undectable.

5.5.2 Effect on aquatic environment

Several sources of potential adverse impacts on aquatic environments are associated with the operation of nuclear-power-generating facilities. The extent of these impacts depends on the availability of water for cooling and on the mode of operation of the plant (once-through vs closed-cycle cooling). These impacts are associated with both the plant intake (entrainment and impingement) and the release