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DESCRIPTION:
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United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

50-261

ER-73/582

JUL 6 1973

Dear Mr. Muller:

This is in response to your letter of April 23, 1973, requesting our comments on the Atomic Energy Commission's draft statement, dated April 1973, on environmental considerations for H. B. Robinson Steam Electric Plant, Unit 2, Wake County, North Carolina.

General

The subject statement concerns a nuclear facility that has been in operation since 1971, having received an operating license in 1970. Since the plant is already in operation, we believe that the statement should place primary emphasis on the environmental effects of plant operation. We are concerned that the Atomic Energy Commission has not required the applicant to perform adequate preoperational and postoperational ecological studies. If such studies had been undertaken, the environmental impacts of plant operations could now be assessed and the effectiveness of project modifications to reduce environmental impacts could be determined. We recommend that the final impact statement and the conditions to the continuation of Facility Operating License be modified to require a monitoring system that would insure that the impacts of the plant on the aquatic life of Lake Robinson and Black Creek are sufficiently quantified.

Our detailed comments are presented according to the format of the statement or according to specific subjects.

Historical and Archeological Sites and Natural Landmarks

The proposed action will not directly affect any existing or proposed unit of the National Park System or any registered National Historic, Natural, or Environmental Education Landmark or any site now in process of registration as a landmark.

We are pleased that attention was given to the requirements of the National Historic Preservation Act of 1966 and to Executive Order 11593, Protection and Enhancement of the Cultural Environment. However, the statement does not reflect that an interdisciplinary investigation of the development area by professionals was done. If such an investigation was done, the final environmental statement should so reflect. If it was not done, the extent to which cultural resources have been lost or damaged due to the construction of the plant and associated transmission facilities will remain undetermined since the plant is essentially constructed, except for cleanup operations.

Geology and Seismology

The brief description of the geology and seismology is inadequate to determine whether these factors have been properly considered in the design, construction, and operation of the plant. However, the statement does reference the applicant's Final Safety Analysis Report and Environmental Report which do contain this information.

Under previous arrangements, the Geological Survey has reviewed the geologic conditions related to the construction of the plant as presented in the applicant's license application. The Geological Survey's comments on the license application was transmitted to the AEC Director of Regulation on February 10, 1967. Nevertheless, we believe that the environmental statement should include a more comprehensive summary of the geologic and seismologic environments for the benefit of other independent reviewers. Such a summary should reference appropriate parts of the applicant's Safety Analysis Reports and should include cross-references within the environmental statement to show how knowledge of the geologic and seismologic environments has been taken into account in design, construction, and operation of the plant.

Surface Water

The temperature measurements of Black Creek at the inlet and outlet as given in table 2.6 are claimed by the applicant to show that solar radiation accounts for a 6-degree Fahrenheit increase, and the cooling water use of both the fossil and nuclear fueled units for an additional 4-degree Fahrenheit temperature increase. We agree with the AEC staff (p. 5-5) that the data shown are not sufficient to establish this claim. For example, the monthly and yearly average temperature

increases between inlet and outlet are apparently based on spot measurements made several times per month. The temperatures of Black Creek at the Lake inlet are subject to diurnal and day-to-day fluctuations of a wider range than at the outlet and thus spot measurements would have to be numerous and randomly distributed during the day to result in reliable averages. In addition, the variability of the powerplant load has to be known in order to evaluate the temperature differences shown, but such data are not given. Figure 5.1, for example, shows outlet less inlet temperatures ranging from 5 to 17 degrees Fahrenheit while Unit No. 2 was in operation. It is likely that short-period fluctuations at the inlet, variable load factors antecedent to the measurements as well as variable meteorologic and hydrologic conditions, played a part in this range; and without additional information, it is not possible to determine the increase due to the operation of Unit No. 2. In table 2.6, average October outlet minus inlet temperatures are shown for 1 year when neither unit was operating, 4 years when Unit No. 1 was operating, and 1 year when both units were operating. In addition to the problems mentioned above, it should be noted that in October, outlet temperatures of lakes in the northern hemisphere might be expected to be highest in relation to inlet temperatures due to the more rapid adjustment of the inlet waters to the fall cooling trend; however, differing meteorologic conditions could vary the observed difference greatly from year-to-year. Thus, the October differences in table 2.6 are not in themselves meaningful for determining the increases due to plant operation.

The AEC staff has attempted to separate the average temperature difference into that due to solar radiation and that due to plant operation by directly relating temperature effects to solar energy absorbed per unit area of lake surface and heat energy discharged per unit area (p. 5-4). This is not appropriate for several reasons. First, the use of average difference is questionable, as discussed above. Secondly, the calculations assume a 100 percent load factor, although Unit No. 2 is believed to have operated at less than 100 percent load during the period that the temperature differences in figure 5.1 were observed. The major objection to the staff's calculation is that it assumes that the effects of solar radiation and heat discharge are directly proportional, which is by no means the case. The temperature differences between lake inlet and lake outlet (when there is no artificial heat lead) depend on the different rate of response to several meteorologic parameters by the water in the creekbed upstream of the lake as compared to that in the lake. Thus, at different times the inlet temperature could be either higher or

lower than the outlet temperature. In terms of monthly averages, a shift in the seasonal temperature cycle is likely with the peak and low temperatures at the outlet occurring somewhat later than at the inlet. With respect to average annual temperature differences, the lake outlet temperature may be somewhat elevated, but the degree of elevation does not depend on the magnitude of solar radiation. It would be related to distance of the inflow from the source, the relative proportions of groundwater and storm runoff, etc., and could not be estimated on the basis of the magnitude of solar radiation.

It should be emphasized that the draft statement does not contain sufficient information from which to determine: (1) the temperature differences of Black Creek at the point of inlet and outlet of Lake Robinson prior to the lake's construction; (2) the average temperature difference between lake inlet and outlet while neither unit is operating; and (3) the incremental temperature difference due to the operation of Unit No. 2. These quantities could be determined by analytical models based on an adequate body of field data, including water discharge and temperature as well as meteorologic data.

Data and figures presented in the section titled "Thermal Discharge to Lake Robinson," which begins on page 3-17, evidently represents four arbitrarily selected days in 1971 and 1972. These data have limited value without knowledge of the meteorological conditions that existed prior to and on the sampling dates. This section should also include lake isotherms and temperature profiles for maximum summer and winter critical conditions. Also, the thermal conditions when the reservoir is full and when it is at maximum drawdown should be analyzed along with a discussion of the probability of such occurrences and the time of the year that they are expected to occur. This is important since, in most cases, significant adverse impacts on aquatic life occur during abnormal conditions.

Ground Water Use

It is indicated on page 3-8 that five wells are required for various purposes related to operation of the fossil-fueled Unit 1 and the nuclear-fueled Unit 2. Well water is required for engineered safety features, such as the safety injection system, the containment air recirculation cooling systems, and the containment spray system for Unit 2. About 10,000 gallons per day are taken from these wells for the operation of Unit 2. In view of the use of this water for engineered safety features, it would appear that the wells might be "Class I" structures; that is, structures whose function is necessary for

safe shutdown of the plant. The use of wells and the well field should be clarified as to whether they are Class 1 structures, whether the well construction and operation have been analyzed to validate the ability of the wells to produce water supplies in the event of earthquakes or other emergencies, and whether the well field system has been analyzed in terms of the effects on plant structures of potential ground subsidence from long-term groundwater withdrawal.

Heat Dissipation System

The draft statement discusses the effects of the heated discharge on Lake Robinson and presents detailed temperature measurements of the lake made on a number of days in 1971 and 1972 (table 2.3; figures 3.10 through 3.12). The data shown would have more meaning if it were accompanied by antecedent Black Creek flow and powerplant heat load discharge. For example, figure 3.12a shows a temperature rise of only 11 degrees Fahrenheit between intake and discharge, indicating that the powerplants were operating at a fraction of capacity. The same figure does not support the claim (p.3-7) that the heated discharge affects only the upper 10 to 15 feet of water, beneath which water temperatures would remain near those expected in the absence of heated effluent. Actually, figure 3.12b shows that stratification, which would be expected in July, does occur at the upstream end of the reservoir where surface temperatures are above 84 degrees Fahrenheit and bottom temperatures of 77 degrees Fahrenheit. Downstream, in the deepest part of the reservoir, where stratification should be most pronounced in an unaffected lake in July, figure 3.12b shows uniform temperatures at all depths of 81 to 82 degrees Fahrenheit. This is a clear indication that except for the extreme upper end of the reservoir the heated discharge affects the lake at all depths. This should be expected as the intake structure is designed to draw water from relatively deeper lake layers.

We suggest that the scale be added to figure 3.5 to better define the depths from which water is drawn.

The estimated maximum extensions of the 85 degree Fahrenheit and 90 degree Fahrenheit isotherms, shown in figure 5.3, appear to be similar to those shown in figure 3.12a, measured on July 14, 1972, which show a condition when the heat discharge apparently was much less than the maximum. There is no indication that antecedent Black Creek flow and meteorologic conditions were such as to produce maximum temperature effects on the lake at that time. Thus, we believe that the estimates

of maximum extension of the 85 degree and 90 degree Fahrenheit isotherms shown must be questioned and appear to substantially underestimate the maximum probable extent of heating.

Solid Waste Processing System

Solid radioactive waste is discussed on pages 3-26, 3-35, and 5-21. These wastes will consist of evaporator concentrates, spent exchange resins, air filters, and other solids. The statement does not provide information on the total anticipated volumes of these wastes, except for indicating that three-to-six 55-gallon drums are expected to be filled per week and that about 1,000 drums of solid waste will be generated in an unspecified period of time. There is no data on the radionuclides that will be present, or on their physical and chemical states, and concentrations in the various kinds of wastes. We believe that this data should be included in the final environmental statement.

The offsite disposal of solid radioactive wastes constitutes an important long-term environmental impact stemming from the operation of the H. B. Robinson plant and should be evaluated in the environmental statement. The seriousness of the disposal problem is indicated on page 8-12 which states that "Solid radioactive wastes are a product of operation of Unit 2 and add to the as yet unresolved problem of long-term disposal of these materials." This statement supports previous comments by this Department concerning operational radioactive wastes associated with other nuclear powerplants. We believe that the Atomic Energy Commission must satisfactorily solve the problems of disposal of these operational radioactive wastes from all nuclear plants to avoid a possible, much more serious long-term environmental problem due to lack of action. Consequently, we strongly recommend that the environmental statement for the H. B. Robinson Plant, as well as the statements for other nuclear powerplants, provide more specific information on the wastes to be generated, including discussions of the radionuclides that will be present, their physical and chemical states, estimated concentrations, and should specify the proposed waste-disposal site. If an impact statement has not been prepared for the disposal site, or if such a statement does not fully consider radioactive wastes of the nature and quantity of those generated at the Robinson Plant, then we believe it incumbent on AEC to include an evaluation of the disposal site in the final statement. This evaluation should discuss the Federal and State licensing provisions, criteria, and responsibilities for the site in regard to (1) determination of the hydrogeologic suitability of the site to isolate the wastes from the

biosphere for specific periods of time; (2) current and continuing surveillance and monitoring of the site; and (3) any remedial or regulatory actions that may be required throughout a specific period of time in which the wastes will be hazardous.

Aquatic Impacts

This section, beginning on page 5-13, does not adequately discuss the effects of plant operations on reservoir biota. This lack of an adequate discussion is apparently due to a lack of preoperational and postoperational data. However, we believe that it could be substantially improved by presenting an analysis of thermal patterns to include the probability of occurrence and duration of lake temperatures above 90 degrees Fahrenheit and the areas of the lake subjected to such temperatures and the biological significance of these areas to overall reservoir productivity. The final statement should also discuss the effects of elevated temperatures and decreases in dissolved oxygen to the development, growth, and survival of phytoplankton, aquatic invertebrates, fish eggs, larval, and adult fish.

The importance of macroinvertebrate organisms to reservoir productivity should also be discussed in this section. The draft statement indicates that there may be a major reduction in macroinvertebrate populations at water temperatures near 90 degrees Fahrenheit. We suggest that the final statement discuss the possible effects of this reduction in invertebrate populations on higher trophic-level organisms. The statement should also evaluate more quantitatively the losses of plankton, fish eggs, and larval fish by entrainment. As indicated in the draft, the total condenser cooling water flow rate is about three times the average flow through the reservoir. Recycling of reservoir waters and the resulting destruction of entrained larval fish, fish eggs, and other organisms could result in a severe reduction in reservoir productivity.

General Assessment and Recommendations for Monitoring

The fifth paragraph on page 5-19 infers that since only a modest reduction in game fish productivity is expected due to the operation of the plant, a monitoring program to quantify this reduction does not appear justified. We take strong exception to this approach based on impacts on the aquatic life affected by heated water discharges from other powerplants. Furthermore, the statement does not contain sufficient information for such a conclusion. We suggest

that the conditions to the operating license and the monitoring program described on page 5-19 be modified to require that pre-operational and operational monitoring be required to the extent necessary to accurately quantify the impacts of the plant on the aquatic life.

We do not agree with the statement on page 5-19 that "the extensive heat loading of the lake in the summer is simply an adverse impact on a cooling lake which cannot be avoided." It would appear to us that if the heat loading is extensive it is the result of inadequate protection for the affected aquatic life. Such impacts also result from inadequate coordination during the planning stages with appropriate Federal agencies such as this Department.

Postulated Plant Accidents Involving Radioactive Materials

This section contains an adequate evaluation of impacts resulting from plant accidents through Class 8 for airbourne emissions. However, the environmental effects of releases to water is lacking. Many of these postulated accidents listed in tables 7.1 and 7.2 could result in releases to Lake Robinson and Black Creek and should be evaluated.

We also think that Class 9 accidents resulting in both air and water releases should be described and the impacts on human life and the remaining environment discussed as long as there is any possibility of occurrence. The consequences of an accident of this severity could have far-reaching effects on land and in the Pee Dee River Basin which could persist for centuries.

Unavoidable Adverse Environmental Effects

The consumptive loss due to forced evaporation is estimated at 19.5 cfs. However, the adverse effects of this loss on downstream uses including aquatic and bottom land ecosystems are not evaluated.

Irreversible and Irretrievable Commitments of Resources

According to page 8-15, the monitoring programs are designed to detect unanticipated, significant, detrimental effects to any of the biotic communities so that corrective measures can be taken by the applicant.

The monitoring programs referred to are those included as conditions to the continuation of the operating license and include only impingement assessment according to page 6-1.

As discussed earlier, we believe that AEC should require that the monitoring program be designed to detect unanticipated, significant, detrimental effects.

Alternative Energy Sources

Estimates for SO_2, NO_x, and particulate emissions for an alternative fossil-fueled powerplant are presented in table 9.1. We suggest that the assumptions made in calculating these values be identified in the final environmental statement.

Alternative Cooling Systems

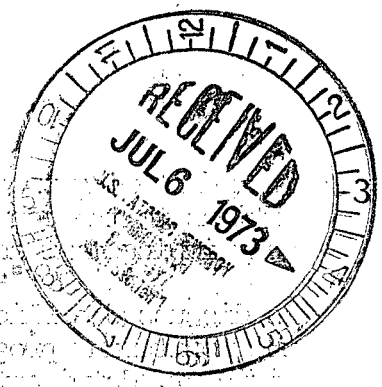
We think that this section, beginning on page 9-4, should be expanded to include the environmental impacts of project operation to reservoir and downstream biota in addition to the economic and aesthetic considerations.

We hope these comments will be helpful to you in the preparation of the final environmental statement.

Sincerely yours,

Assistant Secretary of the Interior

Mr. Daniel R. Muller
Assistant Director for
Environmental Projects
Directorate of Licensing
U.S. Atomic Energy Commission
Washington, D. C. 20545



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