DISCUSSION AND FINDINGS BY THE

DIVISION OF REACTOR LICENSING

U. S. ATOMIC ENERGY COMMISSION

RELATING TO

CONSIDERATION OF SUSPENSION

PENDING NEPA ENVIRONMENTAL REVIEW

OF THE CONSTRUCTION PERMITS

FOR THE OCONEE NUCLEAR STATION

UNITS 2 AND 3

DUKE POWER COMPANY

AEC DOCKET NOS. 50-270 AND 50-287

November 19, 1971

1.0 Introduction

On September 9, 1971, the Atomic Energy Commission (AEC) published in the Federal Register a revised Appendix D to 10 CFR Part 50 setting forth AEC's implementation of the National Environmental Policy Act of 1969 (NEPA).[1/] Paragraph E(3) of revised Appendix D generally requires a holder of a construction permit issued prior to January 1, 1970, for which neither an operating license nor an opportunity for hearing on the operating license had been issued before October 31, 1971, to furnish to the AEC within 40 days after September 9, 1971, a written statement of any reasons, with supporting factual submission, why with reference to the criteria in paragraph E(2) of revised Appendix D the permit should not be suspended, in whole or in part, pending completion of the NEPA environmental review specified in Appendix D.

On November 6, 1967, the AEC issued construction permits to the Duke Power Company for the Oconee Nuclear Station Units 1, 2, and 3. On October 18, 1971, the Duke Power Company filed with the AEC the statement required by Paragraph E(3) of Appendix D for Units 2 and 3. Duke Power Company has also supplied additional supporting information.

1/ Amendments to this revision were published in the Federal Register September 30, 1971 and November 11, 1971.

1.1 Determination

In accordance with the requirements of Section E of Appendix D we have determined that the construction permits for Units 2 and 3 of the Oconee Nuclear Station should not be suspended pending completion of the NEPA environmental review specified in Appendix D. A formal "Determination" to this effect is being forwarded to the Office of the Federal Register for publication. In reaching this determination we have considered and balanced the criteria in Paragraph E(2) of Appendix D.

1.2 Background

On November 29, 1966, Duke Power Company filed an application with the AEC for authority to construct and operate Units 1, 2, and 3 of the Oconee Nuclear Power Station. An extensive review of the application was made by the AEC's regulatory staff and by the Advisory Committee on Reactor Safeguards (ACRS). A public hearing was held before a three man Atomic Safety and Licensing Board at Walhalla, South Carolina, on August 29-30, 1967, and September 12, 1967. On November 6, 1967, on the basis of the authorization from the Board, the Director of Regulation issued Construction Permits CPPR-33, -34, and -35 for Units 1, 2, and 3, respectively. On June 2, 1969, the applicant filed the Final Safety Analysis Report (FSAR) covering all three units. This document was extensively reviewed by the AEC's regulatory staff as it applied to all three units and by the ACRS in connection with Unit 1 only. On July 10, 1970, the applicant submitted an environmental report, availability of which was noted in the Federal Register on July 25, 1970. On November 19, 1970, the South Carolina Pollution Control Agency

issued a permit to construct the cooling water system for the Oconee Nuclear Station citing compliance with the Rules and Regulations of the State Board of Health and the South Carolina Pollution Control Authority. On January 8, 1971, the AEC gave notice in the Federal Register of its intent to issue an operating license for Oconee Nuclear Station Unit 1. Opportunity was provided for public hearings; however, none was requested. The construction of Unit 1 is now essentially complete. On October 18, 1971, the applicant submitted a Supplemental Environmental Report, covering all three units, required by AEC in accordance with the September 9, 1971, revised Appendix D to 10 CFR Part 50.

2.0 Completion of NEPA Review

The time necessary for the completion of the on-going NEPA review for Units 2 and 3 of the Oconee Nuclear Station is estimated at six months and the criteria set forth in Section E of Appendix D to 10 CFR Part 50 have been evaluated with this approximate time period in mind. That is, the environmental impact of continuing construction, the foreclosure of alternatives of the type that might be required as a result of the full NEPA review, and the cost of delay all have been considered with respect to approximately six months of continuing construction activity. Should the actual NEPA review for this case exceed six months, such a longer time period would not significantly add to the environmental impact which construction activities have caused to date, but would substantially increase the cost of delay if the construction

were now suspended. A longer review period would also increase the total actual plant expenditures at completion of the NEPA review if the construction permit were not now suspended. We have taken these considerations into account in balancing the factors specified in Paragraph E of Appendix D to 10 CFR Part 50 and have concluded that if a significantly longer time period were required to complete the NEPA review it would not affect our determination that the construction permit for Units 2 and 3 of Oconee Nuclear Station should not be suspended at this time.

3.0 Environmental Impact During the Prospective Review Period

Units 2 and 3 will not become operational during the forecast NEPA review period. Therefore, there will be no environmental impact from radioactive water, or water vapor effluents which would be released as a result of operation of these units. Construction of Unit 2 is approximately 65% complete; Unit 3 is about 35% complete. Construction to be accomplished during the prospective review period on these two units falls basically into these categories: (1) completion of the exterior of the structures, (2) the continuation of installation work inside the structures, (3) redressing construction damage to the surrounding terrain and (4) continuation of work on transmission lines. The current construction status and anticipated activities during the next six months are described below for each of these areas. All

principal site preparation, excavation and foundation work is complete for Units 1, 2, and 3. This includes relocation of highways, bridge construction, construction of two major dams, filling of Lake Keowee, construction of the Keowee Hydro plant, a visitor's center, the intake canal and intake structure, all cooling water conduits and the discharge structure. The Unit 1 and 2 containment, auxiliary building and turbine building exteriors are complete. All turbine-generator pedestals are in place. The 230 Kv and 115 Kv electrical switchyards are complete and the 500 Kv switchyard is approximately 10% complete. Work is complete or underway on all five of the transmission lines associated with supplying power from the Oconee Nuclear Station. Two lines (to Central and to North Greenville) are complete. The line to Newport is 100% cleared with 50% of the towers erected. For the line to Tiger about 25% of the right-of-way has been cleared and 16 parcels (89 acres) are in the process of being acquired for this line. For the line to McGuire about 50% of the right-of-way has been cleared with some towers erected and 26 parcels (196 acres) are in the process of being acquired.

During the next six months the concrete dome of the Unit 3 reactor building, the Unit 3 auxiliary building and the remainder of the exterior of the turbine building will be completed. Work will continue on the installation of Units 2 and 3 equipment, piping and cabling. Construction will also continue on the 500 Kv switching station. Efforts will

proceed to acquire the remaining portions of the transmission line rights-of-way, land clearing and tower erection on all rights-of-way. On the site, roads and parking areas will be paved and, as construction yard area needs diminish, grass will be planted in this area.

The completion of the containments and other principal onsite buildings will have a small, incremental adverse environmental impact when compared with the impact that already has resulted from the present advanced state of construction. This incremental adverse impact will be largely temporary in nature, of the type which usually accompanies activities at large scale construction projects. Impact factors will include heavy truck traffic as construction materials are brought to and moved on the site, and the noises associated with crane operation, steel erection work and miscellaneous mechanized tools and equipment.

These construction noises are unlikely to disturb the surrounding population since this is a relatively remote site. Further significant physical changes to the site are not anticipated during the prospective review period.

It is expected that the appearance of the site, as viewed both from the completed onsite visitor's center and from beyond the property boundary, will become aesthetically more pleasing during the period of the ongoing NEPA review.[2/]

2/ The final appearance of this Oconee Nuclear Station is depicted on Page 5 of Appendix F of the Oconee Supplemental Environmental Report.

No additional adverse effects are anticipated on ground-water, loss of soil by erosion or pollution of water or air, or disruption of recreation as a result of continuation of construction. The incremental adverse impact shared by the surrounding communities as a result of the presence of the 2100 member construction force, which is expected to remain at this level during the continuing NEPA review, will be temporary in nature and is not considered to be unduly disruptive considering the continuing favorable impact that the $2,800,000 monthly payroll can be expected to have on these communities.

The clearance of rights-of-way for transmission lines required as a result of the installation of this power station and the construction of transmission facilities will continue. In evaluating the potential for an incremental environmental impact from this continuation of work we considered the potential for displacement of residents on the rights-of-way, the further disruption of area ecology, and the aesthetics of clearing the remainder of the right-of-way and of constructing the transmission facilities themselves.

Duke Power Company already owns the land except small portions of the Tiger and McGuire transmission line rights-of-way. No displacement of persons will result from continued activities on the owned or proposed right-of-way. The clearing of the remaining portion of the right-of-way is not likely to have significant additional impact on the overall

ecology of the area since movement of animal life will not be impeded and since flora and fauna in areas adjacent to the rights-of-way should remain substantially unaffected by clearing and construction activities. Trees and other vegetation on the right-of-way would of course be removed and animal life at least temporarily displaced. Damage to nesting sites on the right-of-way would be heavy but these are a very small fraction of the total forest population and there is no reason to believe that the existence of any species would be endangered by further right-of-way clearing. The trees have no particular intrinsic value except as a lumber crop.

Most of the rights-of-way are through timbered land and most clearings will not be visible from the main highways. In addition, to minimize environmental impact, Duke Power Company has stated that this clearing work will be carried out under U. S. Department of Interior guidelines. Redress of the impact of tower construction could be effected by removal of the towers. Redress of the right-of-way clearing could eventually be obtained by allowing regrowth or replanting. A mark on the terrain would remain for many years, but as discussed above most of the right-of-way is not exposed to view from main highways.

4.0 Foreclosure of Alternatives During the Prospective Review Period

The incremental environmental impact of continued construction of the facility, as discussed above, could be largely redressed by removal of

structures and reconstitution of the landscape in the event that the full NEPA review so required.[3/] However, reforestation would take decades and removal of structural features added during the remainder of the NEPA review period would be costly. Except for the impact of operation, the major adverse environmental impact has already been made. The additional expenditures expected to be made by continuing construction activities during the remainder of the NEPA review period would constitute a substantial increase in investment, but the ongoing construction activities themselves will not result in a substantial increase in this existing environmental impact.

Alternatives that potentially could be affected by continued construction are those related to effluent control measures. These include the environmental impact of routine and accidental radiological releases, and the thermal and chemical effects of water releases to Lake Keowee, Keowee River and the Hartwell Reservoir. We have examined each of these areas to determine the alternatives that might be foreclosed as a result of construction during the NEPA review period.

3/ The need for power in the Duke Power Company customer area and alternates to the selected site are discussed in Section 5 and Appendix C of our Detailed Statement on Environmental Considerations issued February 13, 1971. Appendix C of this statement contains the August 20, 1970, Federal Power Commission comments on this matter.

Appendix D to 10 CFR Part 50 requires that a cost-benefit analysis of radiological, thermal and other environmental effects be performed by the AEC during the NEPA review and that a conclusion be reached on whether modification or termination of the license is warranted. The radiological effects involve both anticipated low-level releases associated with operation of the plant and with potential releases of radioactivity at somewhat higher levels that could result from an accident.

Routine gaseous and liquid effluent releases will be governed by the limits set forth in 10 CFR Part 20 and the technical specifications to be included in the operating licenses and Duke will be further required to keep radioactive effluents as far below these limits as practicable. This will include meeting numerical guidelines for routine releases comparable to those contained in Proposed Appendix I to 10 CFR Part 50.

The liquid radwaste treatment system for the plant is designed to be capable of recycling liquid radioactive wastes generated during operation. The stated design objectives of the system for liquid effluents are comparable to those of Proposed Appendix I. In addition, construction during the prospective NEPA review period would not preclude any necessary modifications to piping systems before or after their completion. Modifications requiring additional building space could involve substantial costs but would not be precluded.

The gaseous radwaste treatment system presently includes the capability for a 60-day holdup and filtration with a 90% removal efficiency for iodine prior to release. Modifications of this system, if required, could also involve substantial costs but would not be precluded.

We conclude that modifications to the liquid and gaseous radwaste system would not be precluded by continued construction. There is reasonable assurance that a plant under construction can be modified to incorporate any radwaste treatment systems found necessary to restrict environmental release of radioactive waste to levels on the order of those specified in Proposed Appendix I, including the addition of building space if required.

The probability of occurrence of accidents and the spectrum of their consequences to be considered from an environmental effects standpoint will be analyzed using best estimates of probabilities and realistic fission product release and transport assumptions. For site evaluation in our safety review extremely conservative assumptions were used for the purpose of comparing calculated doses resulting from a hypothetical release of fission products from the fuel, against the 10 CFR Part 100 siting guidelines. The computed doses that would be received by the population and environment from actual accidents would be significantly less than those presented in our Oconee Safety

Evaluation.[4/] Although the environmental effects of radiological accidents are anticipated to be small, if further reduction in postulated accidental releases is required as a result of the full NEPA review, additional engineered safety systems could be added. For example, space is available for the inclusion of supplemental containment air cleanup systems.

In any event, operation of the plant will be required to be such that the environmental impact of postulated accidental releases will be within Commission guidelines. We conclude that alternatives related to mitigation of accident consequences would not be precluded by the continuation of construction during the prospective review period.

It is expected that there may be measurable thermal effects of the Oconee Station cooling water discharge on the ecology of portions of Lake Keowee, Keowee River and the Hartwell Reservoir. However, from the data currently available, there is no indication that the environmental impact of these effects will be unacceptable. The major environmental impact on Lake Keowee has already been incurred by its very creation which was specifically authorized by the FPC as a part of the Keowee-Toxaway Project. With all three Oconee units operating at 90% capacity, the temperature rise in the water released to the

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4/ Safety Evaluation by the Division of Reactor Licensing, U. S. Atomic Energy Commission in the matter of Duke Power Company Oconee Nuclear Station Docket No. 50-269, December 29, 1970, pages 67-70.

Hartwell Reservoir is expected to average 3°F which would be within the water quality criteria set by the State of South Carolina. In the unlikely event that a different cooling method were required as a result of the NEPA review, a major additional dollar cost would be incurred.

The control of effluents other than radwaste and cooling water will be provided by an onsite sewage treatment facility. Effluents from this facility and from a 5 million gallon settling pond will enter the Keowee River below Lake Keowee and are estimated by Duke Power to include 53 pounds of boron per year, 1100 gallons of commercial liquid cleaner per year and 4760 lbs of powdered detergents per year. Water in the settling pond will be sampled and chemically conditioned as required. This sewage treatment system has been approved by the South Carolina Pollution Control Authority. Alternative chemical agents or further treatment of waste effluents would not be precluded by the continuation of construction.

An alternate routing of transmission line rights-of-way if required by the NEPA review would not be precluded by completion or continuation of the present clearing and construction activities.

In summary, no alternatives would be foreclosed by continued construction from the standpoint of technical feasibility but significant extra dollar cost could be incurred as a result of ongoing construction activities if major changes in the plant design, such as a change in the method of cooling, or re-routing of transmission lines were required at the end of the ongoing NEPA review.

5.0 Costs of Delays

We have examined the Duke Power Company estimate of costs that might be incurred through suspension of the Oconee Unit 2 and Unit 3 construction permits in whole or in part.[5/] If the permits were to be suspended in their entirety pending completion of the NEPA review, Duke has estimated that the increase in costs as a result of a 6-month suspension would be about $48,193,000. The AEC's Division of Construction has reviewed these delay costs and has concluded that the estimated overall increase in costs associated with such a delay falls in the general range of what could be expected. These incremental costs include suspension of physical site activities including the layoff and rehiring of the construction workers, field construction standby charges, additional engineering work, contingencies and escalations on future work except hardware procurement. They also include taxes,

5/ Duke letter of November 18,1971, to P. A. Morris regarding Oconee show cause.

insurance, owners staffing, administration, training and overhead, and interest. An increased fuel cost associated with the use of less efficient existing generating equipment to insure 886 megawatts of replacement power at current rates would range from 14 to 50 million dollars for a six month period.

We also examined the costs of delay in construction of the transmission lines pending completion of the NEPA review. These costs, provided by Duke Power Company under oath[6/] and summarized below, do not include any of the above costs, but are based on the assumption that the halted work will be reactivated in such a manner as to permit completion of these parts along with the remainder of the facility with no significant overall delay.

If there were no suspension, approximately 14-1/2 million dollars would be expended in the next six months on the transmission lines for land acquisition, clearing and line construction. If transmission line work were to be suspended for six months an increase in costs of approximately 13-3/4 million dollars would be incurred, of which approximately seven million would be required to accelerate construction to prevent an overall project delay.

6/ Duke letter of November 18,1971, to P. A. Morris regarding Oconee show cause.

6.0 Determination and Balancing of Factors

Pursuant to Section E of Appendix D to 10 CFR Part 50, we have taken into consideration and balanced the following factors in making a determination whether to suspend the construction permits for Oconee Station Unit 2 and Unit 3 pending completion of the NEPA environmental review:

6.1 It is not likely that the construction activities to be conducted during the period that the NEPA review is being completed will give rise to an incremental impact on the environment that is substantial and unduly adverse. As discussed in Section 3.0 above, the environmental effects are those associated with construction rather than operation of these units. Because of the advanced state of completion of the Oconee Station, the environmental costs of construction, those associated with the change of the site from its former undeveloped state, already have been incurred. Redress of such environmental impact as might result from further construction could be achieved by removal of above-grade structures and reconstitution of the landscape.

6.2 Continued construction during the prospective NEPA review period would not foreclose subsequent adoption of alternatives to existing design features from the standpoint of technical feasibility, although substantial additional dollar costs might be incurred as a result of

ongoing construction activities if major structural modifications were required at the end of the NEPA review. As discussed in Section 4.0 above, flexibility in system performance specifications has been preserved in the area of treatment of radioactive wastes and installation of additional accident mitigating features should improvements in these areas prove necessary as a result of the NEPA review. Additional reduction in temperature of the discharge of heated water from the station would not be precluded nor would an additional treatment of liquid wastes be precluded. A change in the type of cooling facilities would be technically feasible if proven necessary; however it would be quite difficult, involving substantial costs, and a major delay, since the existing cooling facilities have already been constructed. We regard the eventuality of a change in cooling facilities as unlikely in view of the apparent minimal environmental impact and are supported in this judgement by the favorable comments from other Federal and State agencies.

6.3 The effects of suspension of the construction permits would be substantial. Increased construction and interest cost would result from stoppage and later resumption of construction. As discussed in Section 5.0 above, the cost of construction stoppage due to six months suspension for completion of the NEPA review has been estimated at about $48,193,000.

It has been estimated that an additional $77,087,000 will be invested (investment as of September 30, 1971, was $313,299,000 not including fuel) in the next 6 months in the normal course of construction. Parts of this expenditure conceivably could influence a later decision whether to require major modification to the plant. However, as discussed previously, major modifications are not likely to be required, based on present information. For example, it appears highly unlikely that the site would have to be abandoned as a result of the NEPA review. We conclude that the large certain cost of delay (at least $48,000,000) outweighs the unlikely possibility that expenditures during the period of continued construction will affect substantially a subsequent decision regarding modification of the facility to reduce environmental impact.

After balancing the factors described above as to environmental impact of continued construction and the potential for foreclosure of alternatives as a result of further construction against the effect of delay costs, we conclude that the construction permits for the Oconee Nuclear Station Units 2 and 3 should not be suspended pending completion of the ongoing NEPA review.

Pending completion of the full NEPA review, Duke Power Company, the holder of Construction Permit Nos. CPPR-34 and CPPR-35, proceeds with

construction at its own risk. The discussion and findings herein do not preclude the AEC as a result of its ongoing NEPA environmental review from continuing, modifying, or terminating the construction permits or their appropriate conditioning to protect environmental values.