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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 PERMIT
FOR THE ARKANSAS NUCLEAR ONE - UNIT 1 FACILITY

AEC DOCKET NO. 50-313

November 23, 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). Subject to certain exceptions not applicable to this proceeding, paragraph E (3) of revised Appendix D requires a holder of a construction permit issued before January 1, 1970, to furnish 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 December 6, 1968, the AEC issued a construction permit to the Arkansas Power and Light Company (AP&L), Little Rock, Arkansas, for the Arkansas Nuclear One - Unit 1 facility. The facility is currently under construction and is about 65% complete. On October 18, 1971, AP&L filed with the AEC the statement required by paragraph E (3) of Appendix D. An error involving one page of the statement was corrected by an amendment filed on October 26, 1971.

1.1 Determination

In accordance with the requirements of Section E of Appendix D we have determined that the construction permit for the Arkansas Nuclear One -

Unit 1 facility 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 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, 1967, A&L filed an application for permits necessary to construct and operate the Russellville Nuclear Unit (now designated as Arkansas Nuclear One - Unit 1) with the AEC. An extensive review of the application was made by the AEC's regulatory staff and by the Advisory Committee on Reactor Safeguards. A public hearing was held before a three man Atomic Safety and Licensing Board at Russellville, Arkansas on October 30, 1968. This Board issued its initial decision on December 4, 1968, authorizing the Director of Regulation to issue a construction permit. On December 6, 1968, Construction Permit No. CPPR-57 was issued. On April 26, 1971, the applicant submitted the technical portion of its application for an operating license. An Environmental Report for the facility was submitted by the applicant on June 14, 1971.

On October 2, 1967, after a hearing the Arkansas Public Service Commission issued a certificate of convenience and necessity to construct, operate and maintain an 800 megawatt (nameplate) nuclear fueled steam electric generating unit, with step-up transformer and other related facilities,

at its proposed site in Pope County near Russellville, Arkansas. On January 28, 1970, the Corps of Engineers issued a permit to AP&L that authorizes the construction of a circulating water facility to serve a nuclear generating unit on the left bank of the Dardanelle Reservoir. This permit was issued under the provisions of Section 10 of the Rivers and Harbors Act approved March 3, 1899. On June 3, 1971, after two public hearings, the Arkansas Pollution Control Commission issued the water quality certification required by Section 401 (b) of the Federal Water Pollution Control Act.

2.0 Completion of NEPA Review

The time necessary for the completion of the on-going NEPA review for the Arkansas Nuclear One - Unit 1 facility is estimated at 8 months and the criteria set forth in Section E of Appendix D to 16 CFR Part 50 have been evaluated with this approximate time period in mind. That is, the environmental impact of continuing construction at this site, 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 8 months of continuing construction activity. Should the actual NEPA review for this case exceed 8 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 100 CFR Part 50 and have concluded that if a longer time period were required to complete the NEPA review it would not affect our determination that the construction permit for the Arkansas Nuclear One - Unit 1 facility should not be suspended at this time.

3.0 Environmental Impact During the Prospective Review Period

Construction of the plant is 65% complete, but will not be completed during the forecast NEPA review period. There will therefore be no environmental impact from gaseous or liquid effluents which would be released as a result of the operation of the plant. All site preparation, excavation work, foundation work and major structures have been completed or essentially completed. The primary construction activities during the NEPA review period will be (1) installation of equipment within the existing reactor containment and auxiliary buildings, (2) structural closure of the equipment opening in the reactor containment building, (3) construction of several smaller structures, including an enclosure for the emergency diesel oil storage tanks and below ground intake and discharge structures in the already excavated emergency cooling pond, (4) erection of storage tanks, including the bulk oil storage tank and the refueling water storage tank, (5) placement of electrical equipment, e.g., transformers, in the switchyard (supporting structures are already installed), (6) removal of dikes

to fill the intake and discharge canals, (7) flushing of plant systems and cleaning of systems with chemical solutions, and (8) completion of construction of transmission lines. The environmental impact of this continued construction is described in the following paragraphs.

3.1 Impact on Dardanelle Reservoir

Removal of existing dikes across the intake and discharge canals is scheduled for January 1972. It is expected that this operation will cause turbidity in the water, but this condition will last only a few days.

Currently, the only liquid discharges into the Dardanelle Reservoir (Arkansas River) consist of treated sanitary wastes from a temporary construction sewer system and from a permanent sanitary sewer system. The temporary construction sanitary sewage system consists of a 2000 gallon per day package sewage treatment plant with chlorination. The permanent sanitary sewer system consists of sewer lines, a septic tank, a sand filter for clarification, chlorination equipment and piping for discharge of the effluent into the Dardanelle Reservoir. These discharges have been authorized by the Arkansas Pollution Control Commission. The permanent system was designed and installed in accordance with the requirements of the Arkansas State Department of Health. The applicant has stated under oath that even if construction were suspended, discharges from this source would continue at a reduced rate, because permanent plant personnel would remain at the plant.

During the construction period under consideration, dirt and corrosion products will be flushed from certain plant systems using clear water. Then, chemical solutions will be used for cleaning some of these systems. These liquids will be discharged into the Dardanelle Reservoir, but the applicant has stated under oath that these solutions will not exceed present discharge effluent quality standards of Federal and State regulatory agencies. The Arkansas Pollution Control Commission issued a water quality certification on June 3, 1971, applicable to the construction and operation of Arkansas Nuclear One - Units 1 and 2. This Commission, according to Section 10(c) of the Federal Water Pollution Control Act, established water quality criteria for its interstate waters, including the Arkansas River, that are included in the document entitled "Water Quality Criteria and Plan for Implementation, State of Arkansas" approved by the Secretary of the Interior on August 7, 1967.

After the intake and discharge canals are filled, the circulating water system will be operated for testing purposes. During this period it should be possible for the applicant to monitor the operation of the intake screens and temporarily suspend operation if damage to fish or other aquatic life is detected.

3.2 Impact on Air

The amount of dust raised from roadways is being controlled during construction by watering roadways. Vehicular traffic during the re-

maintaining construction activities will be substantially less than during prior construction of the major structures.

3.3 Land Use

Changes in land use have already been effected by site preparation, excavation and construction already completed, and will not be significantly modified by continued construction. None of the continued construction is of such a nature that it will lead to significant additional displacement of wildlife.

Migration of aquatic life into the intake and discharge canals will become possible as a result of continued construction. One of the planned recreational benefits is that of making the banks of the canals available to the public for fishing. Except during brief periods of testing, cooling water flow through the plant will not occur during construction.

3.4 Aesthetics

The relatively small structures and tanks that are still to be completed or installed will effect the overall site appearance in only a minor way. Most of the other remaining construction will consist of making installations within existing buildings. Work on the exterior of existing buildings will be largely decorative in nature.

3.5 Transmission Lines

During the prospective review period work would continue on three 500 kV transmission lines which go north from the site across Interstate Highway

40. One then turns southeast to North Little Rock. The other two turn west for a few miles and then south across Interstate 40 and a narrow neck of the Dardanelle Reservoir. One of these two lines turns west to Fort Smith and the other east to Mabelvale. The applicant has advised us that all rights-of-way have been cleared and that about 40% of the transmission line towers on the north side of the Reservoir (river) have been erected. The foundations for all transmission line towers south of the Reservoir (river) are completed and the towers are assembled at their sites. These towers will be lifted onto the foundations by helicopter. Except for the river crossing, all transmission line construction, including wiring, is scheduled to be completed by December, 1971. Foundations for the towers at the river crossing are 75% complete, and tower erection is scheduled to begin in December 1971, and be completed in 2½ months.

The environmental impact resulting from right-of-way clearing has already occurred. The primary impact of continued construction would be the erection of additional towers and the wires. The impact due to noise from construction helicopters will be of short duration, especially at any one location. The impact of continued transmission line construction could be completely reversed by removal of the towers and wire.

4.0 Foreclosure of Alternatives During the Prospective Review Period

The incremental environmental impact of continued construction, as described above, could be largely redressed by removal of structures and

restoration of the landscape to its existing status by refilling excavations made for structures. Since all clearing has been completed, redress of the incremental environmental impact would not require any reforestation. Except for the impact of operation, the major adverse environmental impact has already been made.

Alternatives that potentially could be affected by continued construction are primarily those related to effluent control measures. Included are measures to control the environmental impact of routine and accidental radiological releases, and to control thermal and chemical effects of water releases. We have examined each of these areas to determine the alternatives that might be foreclosed as a result of continued construction.

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 license. AP&L 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.

Changes and additions in the liquid and gaseous radwaste treatment systems could be required by the NEPA review. In particular, the capacity for holdup of radioactive gases could be increased beyond the 30 day period for the present design. However, 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. Construction during the prospective NEPA review period would not preclude any necessary modifications to these systems before or after their completion. However, modifications requiring additional building space could involve substantial costs.

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 Arkansas Nuclear One - Unit 1 Safety Evaluation^{1/}. 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.

Changes in the thermal effects on the Dardanelle Reservoir could be required as a result of the full NEPA review. Alternatives to the proposed once through circulating water system include (1) incorporation of a condenser bypass system to dilute the heated discharge, (2) construction of a weir across the discharge embayment to increase the velocity of the discharge entering the main reservoir, (3) relocation of the intake and discharge canals to reduce recirculation of heated effluent within the reservoir, and (4) installation of a closed cycle cooling tower. None of

^{1/} Safety Evaluation by the Division of Reactor Licensing, U. S. Atomic Energy Commission in the matter of Arkansas Power & Light Company, Russellville Nuclear Unit (Arkansas Nuclear One - Unit 1), Docket No. 50-313, October 1, 1968, pages 29 and 30.

these alternatives would be foreclosed by continued construction. The necessity for extra costs that would result from continuing construction has essentially been established by construction that is already completed.

Alternate routings of the transmission rights-of-way would not be precluded by completion of the erection of transmission lines on the already cleared rights-of-way. Additional costs of alternate routings that would result from continued construction would be costs of dismantling and removal of wire and towers, and the removal of the special towers and foundations for the reservoir crossing.

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, were required at the end of the ongoing NEPA review.

5.0 Costs of Delays

Direct incremental construction costs that would result from an 8-month suspension of the construction permit would be greater than the total costs of \$16,500,000 estimated by the applicant for an assumed 6-month suspension. The AEC's Division of Construction has independently reviewed these delay costs and has concluded that the estimate by the applicant of the overall increase in costs associated with such a delay in the Arkansas Nuclear One - Unit 1 facility falls within the general

range of what could be expected. Included are the costs of demobilization, remobilization, engineering, continuing home office expenses of the engineer-architect-constructor, continuing field non-construction expense, maintenance and protection of constructed work and equipment, penalties on subcontracts, out of sequence construction problems, escalation and contingencies.

If construction and therefore operation of the Arkansas-1 facility is delayed, other generating facilities will have to be utilized in the interim to provide the required electric power. These will almost certainly be fossil fueled electric generating plants. The AP&L statement filed on October 18, 1971, includes a discussion on availability of fuel for existing generating facilities. All of these facilities were designed for operation with natural gas. As a result of gas curtailments in 1971, the applicant was forced to modify and burn fuel oil in some of these facilities. The availability of gas in the immediate future is so uncertain that the applicant is concerned about being able to supply present AP&L loads. The Arkansas Public Service Commission has required AP&L to file plans for curtailing the supply of electric power to its customers and to other electric utilities. Thus, even if Arkansas-1 becomes operational on schedule, the applicant is faced with the possibility of curtailing service to customers and the need for adding oil storage facilities. The availability of alternate sources and the costs of obtaining electric power from alternate sources in the event that operation of Unit 1 is

delayed are therefore uncertain at this time. The applicant has estimated that fuel costs would be increased by \$4,269,000 if instead of operation of Unit 1, fossil fuels had to be used to generate electricity for six months (September 1, 1973 to March 1, 1974).

The applicant has estimated that suspension of construction would result in payroll loss of \$132,000 per week for 600 construction workers. Estimated loss of income to construction support organizations would be \$168,000 per month. Tax benefits to local taxing authorities would be delayed if construction were suspended. Therefore, aside from the increased costs to AP&L and its customers, there would be a significant and immediate economic impact on the local area due to suspending construction.

6.0 Balancing of Factors and Determination

Pursuant to Section E of Appendix D to 10 CFR Part 50, we have taken into consideration and balanced the following factors in determining whether the construction permit for the Arkansas Nuclear One - Unit 1 facility should be suspended until the NEPA environmental review is completed.

- 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 the plant. 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. There is a possibility that test operation of the circulating water system could result in some damage to fish. Practical control measures by the applicant could essentially eliminate this possibility.

- 6.2 As discussed in Section 4.0 above, continued construction during the NEPA review period would not foreclose the technical feasibility of incorporating alternatives or modifications to the currently proposed design. The cost of implementing some alternatives could be substantial, but this would not be strongly affected by the continued construction.
- 6.3 The economic effects of suspending construction would be substantial. Increased costs to the applicant that would result from a delay of 6 months have been estimated to be about \$16,500,000. In addition, there would be a major economic loss to construction workers and the area in which the plant is located.

The impact of delay in operation would result in a substantial increase in production costs for the utility. Most of this increase would be passed on to electrical consumers. The applicant has estimated that

incremental costs of replacement fuel could be over \$4,000,000 for a 6 month delay. Present problems due to shortages of natural gas would be further complicated by a delay in the operation of Arkansas-1.

It has been estimated that an additional cash outlay of \$21,110,000 will be made during the review period in the normal course of construction. Additional funds will also be committed (present commitments are for \$102,000,000). Parts of this expenditure conceivably could influence a later decision whether to require major modification of the plant. However, as discussed previously, major modifications are not likely to be required based on present information. For example, it appears unlikely that the site would be abandoned as a result of the NEPA review. We conclude that the large certain cost of delay (at least \$20,500,000) 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 permit for the Arkansas Nuclear One - Unit 1 facility should not be suspended pending completion of the ongoing NEPA review.

Pending completion of the full NEPA review, the holders of Construction Permit No. CPPR-57 proceed with construction at their own risk. The discussion and findings herein do not preclude the AEC from continuing, modifying, or terminating the construction permit or its appropriate conditioning to protect environmental values if this is indicated by the NEPA environmental review.

The Director of Regulation has considered the licensee's submission in light of the criteria set out in section E.2 of Appendix D, and has determined, after considering and balancing the criteria in section E.2 of Appendix D, that construction activities at Arkansas Nuclear One, Unit 1 authorized pursuant to CPPR-57 should not be suspended pending completion of the NEPA environmental review.

Further details of this determination are set forth in a document entitled "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 Permit for Arkansas Nuclear One, Unit 1, Docket No. 50-313."

Pending completion of the full NEPA review, the holder of Construction Permit No. CPPR-57 proceeds with construction at its own risk. The determination herein and the discussion and findings hereinabove referred to do not preclude the Commission, as a result of its ongoing environmental review, from continuing, modifying or terminating the construction permit or from appropriately conditioning the permit to protect environmental values.

Any person whose interest may be affected by this proceeding, other than the licensee, may file a request for a hearing within thirty (30) days after publication of this determination in the FEDERAL REGISTER. Such a request shall set forth the matters, with reference to the factors set out in section E.2 of Appendix D, alleged to warrant a determination other than

that made by the Director of Regulation and shall set forth the factual basis for the request. If the Commission determines that the matters stated in such request warrant a hearing, a notice of hearing will be published in the FEDERAL REGISTER.

The licensee's statement of reasons, furnished pursuant to section E.3 of Appendix D, as to why the construction permit should not be suspended pending completion of the NEPA environmental review, and the document entitled "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 Permit for Arkansas Nuclear One, Unit 1, Docket No. 50-313," are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D. C., and at the Arkansas River Valley Regional Library, Dardanelle, Arkansas 72834. Copies of the "Discussion and Findings" document may be obtained upon request addressed to the Atomic Energy Commission, Washington, D. C. 20545, Attention: Director, Division of Reactor Licensing.

FOR THE ATOMIC ENERGY COMMISSION

(signed) L. Manning Muntzing

L. Manning Muntzing
Director of Regulation

Dated at Bethesda, Maryland,
this 26 day of Nov. 1971.