

UNITED STATES OF AMERICA  
ATOMIC ENERGY COMMISSION

3-23-71

In the matter of )  
 )  
THE TOLEDO EDISON COMPANY, ET AL ) DOCKET NO. 50-346  
 )  
(Davis-Besse Nuclear Power )  
Station, Unit 1) )

INITIAL DECISION

A. Preliminary Statement

1. Procedural Action Taken Prior to Hearing

1. By memorandum and order and notice of hearing, dated April 12, 1972, the Atomic Energy Commission (Commission) directed that a hearing be held before an Atomic Safety and Licensing Board (Board) on the question of whether the activities under the construction permit No. CPPR-80 for the Davis-Besse facility should be suspended pending completion of the final National Environmental Policy Act (NEPA) review. The Commission specifically limited the issues to those set forth in 10 CFR Part 50, Appendix D, Section E-2, together with the considerations specified in the remand of the United States Court of Appeals for the District of Columbia in Coalition for Safe Nuclear Power, et al v. United States Atomic Energy Commission, No. 71-1396, slip opinion dated April 7, 1972.

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The Commission specified that the instant Board preside over the hearing and that the latter render its Initial Decision on or before May 19, 1972.<sup>1/</sup>

The Commission also ruled in its memorandum and notice of hearing that the parties to this proceeding shall be the licensees, the Regulatory Staff, the Coalition for Safe Nuclear Power, and Living In A Finer Environment.

2. On April 20, 1972, an informal meeting of counsel was held in the law offices of Jerome S. Kalur, Esq., counsel for the intervenors, Coalition for Safe Nuclear Power, and Living in a Finer Environment. Also present in this meeting were counsel for the licensees, counsel for the Regulatory Staff, and the Chairman of the instant Board. Discussion centered on the adoption of the most appropriate procedure for this unusually short hearing as commanded by the Commission. At this informal meeting, it was agreed that the NEPA review period will encompass June 1, 1972, through December 31, 1972.

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<sup>1/</sup> See 37 FR 7644.

3. On April 21, 1972, this Board directed that the hearing for the taking of evidence in the above-captioned proceeding commence on May 2, 1972, at 10:00 a.m., local time, in Toledo, Ohio.<sup>2/</sup>

4. On April 21, 1972, the licensees filed a motion to amend the Commission's memorandum and order and notice of hearing (April 12, 1972), to require the intervenors to provide, among other things, facts that they are in existence and they have suffered an injury as a result of the licensees actions in connection with their construction of the Davis-Besse Nuclear facility. With respect to the injury question, the motion of licensees relies on the very recent Supreme Court case of Sierra Club v. Morton, No. 70-34, Slip Opinion dated April 19, 1972.

By memorandum and order dated May 2, 1972, the Commission ruled that the Court of Appeals in the Coalition for Safe Nuclear Power case, supra, authorized the participation of the intervenors in the instant hearing. Accordingly, the licensees motion was denied.

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<sup>2/</sup> See Notice and Order for Evidentiary Hearing, dated April 21, 1972.

The hearing commenced on May 2, 1972, in Toledo, Ohio, and was terminated on May 4, 1972.

2. Legal Issues In This Proceeding

5. The Commission, in its April 12, 1972, memorandum and order, directed that we consider the question of suspension of construction in relation to 10 CFR Part 50, Appendix 50, Section E-2, together with the considerations outlined in the remand in the Coalition for Safe Nuclear Power case. Section E-2 provides:

"2. In making the determination called for in paragraph 1, the Commission will consider and balance the following factors:

"(a) Whether it is likely that continued construction or operation during the prospective review period will give rise to a significant adverse impact on the environment; the nature and extent of such impact, if any; and whether redress of any such adverse environmental impact can reasonably be effected should modification, suspension or termination of the permit or license result from the ongoing NEPA environmental review.

"(b) Whether continued construction or operation during the prospective review period would foreclose subsequent adoption of alternatives in facility design or operation of the type that could result from the ongoing NEPA environmental review.

"(c) The effect of delay in facility construction or operation upon the public interest. Of primary importance under this criterion are the power needs to be served by the facility; the availability of alternative sources, if any, to meet those needs on a timely basis; and delay costs to the licensee and to consumers."

Added to the Section E-2 criteria is the Court's remand instruction that:

" . . . the Commission should consider in detail whether this additional irretrievable commitment of substantial resources might affect the eventual decision reached on the NEPA review. The degree to which this expenditure might affect the outcome of the final NEPA process should be a paramount consideration in the decision on suspension reached after the hearings on remand." (Emphasis added.)

6. In this proceeding, we are concerned with the effects of continued construction during the NEPA review period, which by agreement of the parties encompasses the interval from June 1, 1972, through December 31, 1972, at which time we were assured by counsel for the Regulatory Staff that the final NEPA review will have been completed. Tr. 19, 24.<sup>3/</sup> As the Board views Section E-2 of Appendix D to 10 CFR Part 50, and the subsequent Court mandate, this proceeding is not concerned with the environmental effects of operation of the Davis-Besse nuclear plant, but on whether continued construction, and its concomitant element, namely, the irretrievable commitment of additional construction resources during the NEPA review, would: (a) cause environmental harm during the period of construction; (b) foreclose alternatives should the final NEPA decision require same; (c) affect the power needs to be served by the facility; and (d) affect costs to the consumers. The "final decision", to which we have reference, is not findings of environmental effects, but, rather, determinations regarding the

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<sup>3/</sup> Tr. = Transcript  
LPT = Licensees' Prepared Testimony

During this period, since the plant is still in the construction stage, it will not operate as a nuclear power plant. Thus, no thermal or radiological emissions will occur.

Davis-Besse nuclear plant itself; determinations involving abandonment, modification of design, or any other disposition that may be made with respect to said plant as a result of the final NEPA review.

7. Environmental considerations are reasons for alternatives to the presently conceived Davis-Besse plant. By restricting the issues to a determination of what the reasonable alternatives are and the effects of continued construction and additional resources on these alternatives, this Board, by implication, assumes every conceivable environmental finding, those favorable and unfavorable to plant operation. Consequently, discussion of environmental effects of operation of the completed plant is irrelevant.

We are not unmindful of the necessity of determining whether the additional investment resources during the NEPA review is merely a guise to build up investment at the expense of environmental harm. Nevertheless, such a review on our part must take into consideration the actual environmental harm during construction, and whether the additional investment cost is substantially disproportionate to the amount of resources already expended, and to the amount of the anticipated cost of

the plant should it be completed. In addition, this added investment must be considered in relation to the cost for abandoning the Davis-Besse project -- should that be the ultimate result of the NEPA review -- and to those additional costs that may be incurred in providing other means for obtaining electrical energy. Also, consideration will have to be given as to whether these additional investment costs will foreclose alternatives.

8. If we were to adopt the various contentions of the parties concerning environmental consideration, we would be "rehashing" much of the arguments previously presented in the construction permit hearing; for example, many of the safety systems contained in design specifications would be relevant for discussion herein since any failure of a safety system could affect the environment. The interim criteria for the emergency core cooling system would "raise its head" in this proceeding.

Furthermore, adoption of these contentions would require this Board to make the many environmental findings that will inevitably be made in the Commission's final environmental statement. This will result in costly and time-consuming duplication. The argument that this presiding board should permit a "limited" environmental

review "begs" the question. As a consequence of the right to cross-examination, we perceive great difficulty in attempting to "shutoff" questioning when the magic or minimum environmental review has been reached. This is evidenced by the failure of the parties in the actual hearing or in proposed findings to define for this Board "limited environmental considerations".

9. More importantly, however, consideration by this Board of various environmental issues during plant operation, as requested by the parties, may put it on a collision course with the final NEPA review without the Board having the benefits of all the sources of information available to the Commission. The Administrative Procedure Act places serious restraints on review of information failing to meet evidentiary standards under the substantial evidence rule of that Act. The Commission is under no such restrictions in the absence of an adjudicatory hearing.

Moreover, environmental review will place this Board in the repugnant position of having to prejudge or "second-guess" the Commission's findings. At best, our findings would be speculative. No matter how many arguments

one makes for a particular result, there will always be another argument calling for a different result. There is no way of absolutely determining in advance the Commission's decisions regarding environmental considerations.

10. For the foregoing reasons, we conclude that the only rational approach -- without requiring a prejudgment of the final NEPA review, without rehearing previously decided matters, and without deciding matters that may be raised at subsequent hearings following publication of the final NEPA statement -- is to follow the procedures outlined by this Board in paragraph 7 of this Initial Decision.

### 3. Proposed Findings Of The Parties

11. All proposed findings submitted by the parties which are not incorporated directly or inferentially in this Initial Decision are herewith rejected as being insupportable in law or fact, or as being unnecessary to the rendering of this Initial Decision.

12. Intervenors, although given an opportunity,<sup>4/</sup> have chosen not to file proposed findings. This declination was communicated in a document served on the Secretary of the Commission, the Board and all other parties on May 9, 1972. Instead, on that same date, they filed a "Motion To Reopen Suspension Hearings". By separate order, dated the same as the instant Initial Decision, the Board denied the motion.

13. Counsel for the intervenors herein in a voluntary and forthright statement during the opening session advised this Board that he had attempted to ascertain the status of Living In A Finer Environment (LIFE) in this proceeding and has been unable to obtain from said intervenor affirmative proof of its viability. Consequently, counsel informed us that he no longer considers himself representing that particular intervenor.<sup>5/</sup> We must, therefore, assume that LIFE is no longer a party to this proceeding.

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<sup>4/</sup> Tr. 502-503.

<sup>5/</sup> Tr. 8-9.

B. Environmental Effects of Continued Construction

1. Site and Description of Present Structures

14. The Davis-Besse site consists of 954 acres on the shore of Lake Erie in Carroll Township, Ottawa County, Ohio, with a lake frontage of 7,250 feet. The site includes 524 acres called the Navarre Marsh, which was acquired from the U. S. Bureau of Sport Fisheries and Wildlife under an exchange agreement that provided for continuation of 447 acres of marshland in the tract as a wildlife refuge. In addition, the Bureau will manage another 33 acres of marshland within the site. The main station area consists of almost 56 acres located almost entirely on an original upland portion of the site. LPT pp. 3-4. The already completed dike system isolates the marsh from the construction area. Wildlife at the present time is abundant in the marsh. The refuge area is virtually silent of construction noise and receives none of the airborne dust which might be generated on the construction site. Tr. 454-456; 459.

15. The station structures, except for the cooling tower, are located on 56 acres at the center of the site and about 3,000 feet from the shoreline. LPT pp 2-3. At the present time, the tallest structures are the 200-foot high shield building (at full height since May, 1971), on top of which is a 280-foot high crane. There is also a 300-foot tall meteorology tower which has been on the site since 1968. LPT p. 6; Tr. 143. The turbine and office building base substructure work is complete and 75 percent of the structural steel is erected. The auxiliary building below grade is complete and certain areas above grade are in place. LPT pp. 6-7.

## 2. Construction During Review Period

### a. Buildings

16. During the NEPA review period, the following significant construction activities will be conducted in or near the Davis-Besse main station area: erection of the hemispherical top of the steel containment vessel; completion of the turbine building and office building structural steel; continuation of work on the cooling tower, and water intake structure, and water treatment

building; and installation of some demineralizers and evaporators associated with the radwaste system. LPT p. 6-7; Tr. 171, 246, 458-459. Most of the work in this area will take place inside structures which are already erected. Construction noise levels will decrease as the structures are enclosed during the NEPA review period. Tr. 171. No additional land on the site will be cleared. Tr. 168. Continued construction will not involve any significant discharges to the air or to the water of Lake Erie, the Toussaint River or the marsh. Tr. 168.

b. Marsh

17. During the NEPA review period, licensees will not undertake any activity in the marsh which is related to the construction and operation of the Davis-Besse facility. LPT pp 2-4.

c. Dewatering

18. Dewatering operations in the excavated area will continue for part of the NEPA review period. The flow has remained very constant at about 350 gallons per minute (500,000 gallons per day) since the area was initially excavated and will remain at the same level until certain onsite structures are completed. This

completion is scheduled to occur during the NEPA review period. At that time, the dewatering operation will cease. Tr. 179-180. Although the zone of influence of dewatering on the water table does extend offsite for a short distance, dewatering has not in any manner affected surface water conditions. The effect on local wells has been minimal. When dewatering operations are completed, the affected aquifer will return to its normal level. LPT p. 6. This aquifer water has 5 ppm of free hydrogen sulfide and has a high (2,500-3,500 ppm) concentration of solids, including sulfates, chlorides, and calcium. Tr. 180-181. It is pumped to an aeration pond, where almost all the hydrogen sulfide is removed. Tr. 180.

However, the high concentration of solids remains about the same in the water. It then flows into a 7,000-foot drainage ditch which forms the southern site boundary. From the drainage ditch, the water flows into the Toussaint River near its mouth into Lake Erie. A check valve allows flow into the river but not from the river into the discharge ditch. Tr. 181.

Run-off from the construction areas is also routed to the drainage ditch and thence into the river. Tr. 183. Licensees, since the early stages of the dewatering operation, have monitored the chemical and physical quality of the flow. Tr. 182-183. Carp are abundant in the drainage ditch. Tr. 186.

d. Borrow pits

19. Operations in two of three borrow pits located onsite along with rock crushing operations will continue during the NEPA review period. LPT pp. 4-5; Tr. 458. One borrow pit is being used as a dump site for construction solid waste materials. Tr. first 458. On completion of dewatering, the three borrow pit areas will fill with water. The surrounding land will be landscaped. LPT p.5.

e. Cooling tower

20. The hyperbolic cooling tower is located northwest of the main station area and outside of the marsh areas. The tower is described in Sec. 4.6.4 of the Supplement to Environmental Report. Construction of the reinforced concrete shell will be completed by December, 1972. LPT p.7. This construction involves

substantial increase in height of the tower from its present elevation of about 70 feet to its contemplated final height of 493 feet. Tr. 498. No additional land will be cleared in conjunction with cooling tower construction. Tr. 168.

f. Temporary canal

21. Beginning in August, 1972, licensees are scheduled to dredge a 650-foot long channel from deep water in the Lake to the beachfront and to temporarily open the beachfront to connect with the open intake canal. (The intake canal itself was constructed in late 1970.) This channel will permit barge delivery of the reactor vessel. Following delivery, both the channel and the beachfront will be restored to their original condition. Restoration will take place in late September and October, 1972. The dredging will be shallow and involve only two acres of Lake bed. LPT p. 8; Tr. 360. The volume of material involved is 2,445 cubic yards of sand and 815 cubic yards of clay. Herdendorf testimony, p. 5. The material will be stockpiled and replaced to restore the original Lake contour. Tr. 368. The dredging depth will average 1.8 feet below datum into the Lake bottom, with a maximum depth of 3.6 feet. Tr. 356. Turbidity will be minimal

because of the nature of the dredged material.  
Herdendorf testimony, p. 9.

Introduction of dissolved pollutants into the water will be minimal in view of the low level of pollutants in the dredged material. Herdendorf testimony, p. 9; Tr. 363-365. The dredging will be carried out at a time when fish are not spawning. Tr. 366.

g. Transmission line

22. Away from the site, along a transmission line right-of-way, 24 acres of woodland, representing a distance of about 1.3 miles in length, will be cleared during the NEPA review period. Tr. 189.

h. Transmission line towers

23. Towers for transmission lines will be erected at the site. Tr. 256.

3. Environmental Effects of Construction  
During Review Period

a. Buildings

24. Since the marsh receives none of the dust from the construction site, we conclude that the environmental effect of dust is negligible.

Construction noise at the site has had no discernible effect on the environment. Tr. 456. Intervenor's contention that there is active removal of dead birds at the site by predator animals is tacit acknowledgment that the construction noise has not affected wildlife populations at this trophic level. Tr. 479. The environmental impact of noise will be insignificant.

There are no liquid or gaseous effluents involved in construction. Tr. 168.

b. Marsh

25. Construction activities do not appear to have any offsite environmental effects, or effects on the marsh areas. LPT pp. 4-7; Tr. 168, 171.

c. Dewatering

26. The present system of passing the polluted ground water through an aeration pond removes the potentially harmful effects of hydrogen sulfide, as evidenced by the abundance of fish life (carp) which has been observed in the drainage ditch. Tr. 186,454,458. The environmental impact of continued operation is thus insignificant.

d. Borrow pits

27. The proposed landscaping of the borrow pits should produce ponds compatible with the wildlife nature of the marsh areas. We can discern no unfavorable interim effects on the environment.

e. Cooling tower

28. We conclude that as many as 400 migratory birds may be killed each year under adverse weather conditions from impact in flight with the cooling tower. This estimate is based on the product of 100 birds killed in a single event and three or four events a year. Tr. 478, 482.

f. Temporary canal

29. Canal construction is scheduled for a time of year that does not interfere with fish spawning, in a zone relatively impoverished in benthos, and in sediments of low biological oxygen demand. Tr. 366, 367-368, 363. The overall effect on the benthos of the Lake in this region will be comparable to the effect each winter of the piling up of ice along the shore. Tr. 370. We thus conclude that the environmental impact of dredging will be insignificant.

g. Transmission lines

30. Although no testimony was offered on this point, we consider it self-evident that the conversion of 24 acres of woodland to brush or grassland will have adverse environmental impact on the species of plants and animals that depend on this woodland for their survival.

h. Transmission line towers

31. Construction of transmission towers at the site during the review period will have insignificant additional impact. This conclusion is based on testimony concerning effects of transmission lines on birds and the fact that the towers will not be as tall as the cooling tower (140 feet). Tr. 500-501,257.

4. Extent of Adverse Impact During  
Construction Period

32. In summary, then, the Board finds that continued construction will result in the loss of 24 acres of woodland habitat and the possible deaths of as many as 400 migratory birds each year.

33. Many thousands of acres of Ohio woodland have in the past been converted from woodland to farmland, residential sites, or freeways, or have been logged for production of lumber. We, therefore, conclude that the adverse impact of the clearing of 24 acres to permit construction of the transmission line is of a nature and extent not serious enough when balanced against the public need for power (see subsequent findings) to justify suspension of construction.

34. The death of 400 songbirds a year, while regrettable from an aesthetic point of view, must be considered in light of the dynamics of bird populations. Expert testimony presented by both Intervenor and Licensees (Tr. 481, 484-486, 496, 497) showed that the birds in question are not endangered species, that they naturally have short life spans, and that they raise each year many more young birds than are necessary to maintain their population. We, therefore, conclude that the adverse impact of continuing construction on the bird species in question is likewise of a nature and extent not serious enough when balanced against the public need for power to justify suspension of construction.

5. Redress of Adverse Environmental Impact

35. Should the construction license be terminated, the killing of birds by impact with the cooling tower and other tall structures can be redressed by demolition of these structures. Since the woodland is described as "second-growth" (Tr. 189) we judge that, left to her own devices, Nature in time will restore the 24 acres. No testimony was offered as to the rate at which this process proceeds in Northern Ohio.

C. Foreclosure of Alternatives By  
Continued Construction

Evidence was presented regarding numerous possible alternatives in the facility that could result from the ongoing NEPA review. Subdivisions of the facility for which alternatives were considered include (1) the radioactive waste treatment systems; (2) the cooling water system; (3) systems for the prevention or reduction of accidents; and (4) transmission lines.

1. Radioactive Waste Treatment  
(Radwaste) Systems

36. The radwaste systems collect, process, and control releases of radioactive effluents from the

the facility. They may be divided into three categories to treat the liquid, gaseous, and solid wastes.

37. Possible additions to the present liquid radwaste system design include more evaporators and demineralizers. LPT p. 15; Tr. 152, 164, 300. Alternative liquid radwaste systems include ultrasonic treatment in demineralizers, flocculation and precipitation, the use of additional chemicals to remove more ions in solution, conversion of some filters to Powdex units, and boron control. Tr. 301-302. A "zero-release" liquid radwaste system is impossible. Tr. 304.

38. Alternatives to the present gaseous radwaste system design include installation of cryogenic charcoal systems, additional hold-up of radioactive gases, the addition of charcoal absorbers and high-efficiency filters, the addition of cryogenic distillation systems, absorption by solvents, membrane separation and foam encapsulation, and the replacement of nitrogen cover gas with hydrogen. LPT p. 15; Tr. 152, 300, 301.

39. There presently exists no reasonable alternative to the normal solid radwaste system that is used in most nuclear facilities, including the Davis-Besse plant. Tr. 302. Continued construction

activities during the NEPA review period will not foreclose adoption of any of these alternatives to the radwaste systems. Tr. 166, 303.

## 2. The Cooling Water System

40. The present design uses a closed cycle, natural draft, evaporative-type cooling tower to discharge the waste heat from the condenser into the atmosphere (instead of into the lake). In this arrangement, the only discharge into the lake of any significance, is that of the cooling tower blowdown.

41. Possible alternatives to the use of the cooling tower now under construction include use of (1) a once-through, lake water cooling system, or (2) cooling ponds, with or without spray modules. Tr. 151-159. No dry cooling towers are available for a plant of the size and type of Davis-Besse. Tr. 159-160.

42. Possible supplements to the wet cooling tower as now envisioned include (1) the use of a mechanical forced-draft cooling tower during periods when the cooling tower blowdown temperature may become excessive, or (2) using cooling ponds (with or without spray modules) for handling cooling tower blowdown. LPT pp. 19,24; Tr. 151, 158, 160.

43. Continued construction activities during the NEPA review period will not foreclose the adoption of any of these supplements or alternatives to the cooling water system. Tr. 157-160.

3. Systems for the Prevention  
or Reduction of Accidents

44. Numerous alternatives were identified which would further mitigate the consequences of nuclear accidents. Tr. 274-288. These include: increasing the purification rate in the primary system; the use of additional filters (including charcoal filters); collection equipment on rotating and sliding seals; diking of outside tanks; the use of a closed sampling system to detect radioactive waste; additional tritium detectors; the use of a higher stack; the reduction of radioactive gas inventory in given tanks; the addition of xenon and krypton absorber systems; increasing turbine by-pass capacity; use of the turbine within a load following mode; installing an N-16 monitor on the steam line operating with a smaller percent of defective fuel; use of a quench tank for steam relief; modifying containment ventilation for recirculation mode operation; reducing the number of spent fuel elements transported in each fuel cask; reduction in containment leak rate; and addition of chemical additives to containment sprays. Tr. 274-288.

Continued construction during the NEPA review period would not foreclose subsequent adoption of any of these alternatives for the prevention or reduction of accidents. Tr. 288.

#### 4. Transmission Lines

45. Three transmission lines will serve the facility. The Davis-Besse to Bay Shore line is already essentially complete. Tr. 170. The route of the Davis-Besse to Lemoyne line is already well defined by the 75 percent of the right-of-way already cleared. No offsite construction will be undertaken on the third line, Davis-Besse to Beaver, during the NEPA review period.

Completing the construction of the Lemoyne line during the NEPA review period would not foreclose adoption of an alternate route. An alternate to the Beaver line would not be foreclosed during this same review period. Tr. 170-171.

46. In summary, there is ample evidence to show that continued construction during the review period will not foreclose subsequent adoption of alternatives in facility design of the type that could result from the ongoing NEPA review.

D. Effect of Delay on the Public Interest

47. Evidence was presented regarding the delay in startup of the Davis-Besse nuclear power station due to temporary suspension of construction and the resulting cost effects, as well as the effects on electric power supply reliability.

If a suspension of construction activity under the construction permit were to be ordered, and the completed NEPA review were to conclude that the facility could be completed as currently designed, the seven-months' suspension would result in delaying the commercial startup of Davis-Besse by ten months. The additional three months would be needed to restart construction and reassemble a trained construction force. LPT p. 41.

48. This delay in the startup of the Davis-Besse facility would result in additional costs. Each month that the facility is delayed would cost \$1.9 million in interest on funds already invested, escalation on items delayed and additional maintenance and security costs. The additional one-time cost of stopping construction and restarting it at a later date would be \$2.2 million. Thus, a ten-months' delay would add an estimated

\$21.2 million to the station's initial cost. LPT pp. 45-46. Detailed justification of each of these costs, their component elements, and the method for their computation was provided during cross-examination. Tr. 216-231.

49. In addition to this added capital cost, licensees and other members of CAPCO (Central Area Power Coordination Group, the operating and generating pool of which licensees are a part) would incur added costs to supply the power to replace Davis-Besse capacity. Without the Davis-Besse facility available for the peaks of December, 1974, and June, 1975, the load forecasts made by licensees and CAPCO indicate that they would not have reserves adequate to provide reliable service to their consumers. The reliability of such forecasts is borne out by the accuracy of previous load forecasts by licensees and CAPCO. LPT pp. 27-40. Licensees also showed that possible excess capacity from ECAR (East Central Area Reliability Coordination Agreement, composed of CAPCO and ten other operating pools) would not necessarily be available for purchase. LPT pp. 41-44.

50. Mr. A. L. Toalston of the Federal Power Commission testified on behalf of the AEC Regulatory staff regarding the impact of a delay of the Davis-Besse Nuclear Plant on the reliability of power supply. Tr. 375-414. This

testimony indicates that projected generation reserves of about 20 percent are required for a pool such as the Central Area Power Coordination Group (CAPCO) of which the licensees, Toledo Edison Company and Cleveland Electric Illuminating Company form a part. Tr. 388. This 20 percent generation reserve is required to provide for contingencies that are almost certain to occur, such as forced unscheduled outages, scheduled maintenance outages, generator deratings due to both seasonal factors and equipment limitations, slippage of scheduled generator additions, and output restrictions due to possible fuel shortages or pollution limitations. Tr. 386-387.

51. A broad picture of the overall reserve situation within the Eastern half of the United States for this period was presented, considering first the electric groups surrounding the East Central Area Reliability Coordination Group (ECAR). The focus was then narrowed to ECAR, to CAPCO and finally to Toledo Edison and Cleveland Electric. It was stated that the areas having the higher projected reserve margins are those which are distant from the licensees' system. Tr. 391-398.

52. Based on a detailed analysis of the peak period in the summer of 1975, the FPC witness testified that a delay in operation of the Davis-Besse plant would reduce reserves for the Toledo Edison Company from 7.7 percent to minus 24.7 percent, the Cleveland Electric Illuminating Company from 21.3 percent to 9.4 percent, and CAPCO from 17 percent to 9.6 percent. Tr. 395-396.

The projected reserve margins for CAPCO and the licensees' systems for this period of time are summarized as follows. Tr. 394-396.:

<u>Company or Pool</u>	<u>Projected June, 1975, Generation Reserves</u>	
	<u>Davis-Besse</u>	
	<u>In Commercial Operation</u>	
	<u>Yes</u>	<u>No</u>
Cleveland Electric Illuminating Co.	21.3%	9.4%
Toledo Edison Co.	7.7%	-24.7%
CAPCO Group	17.0%	9.6%

53. The minus 24.7 percent reserve figure for Toledo Edison indicates that its projected load would be greater than its projected generation even before contingencies, and that some form of additional power would have to be obtained or load would have to be curtailed. Tr. 396.

Thus, a delay in the commercial operation of the Davis-Besse plant beyond June, 1975, would result in subpar reserves for the CAPCO pool in general and specifically for the licensees' systems, with a resulting decrease in power supply reliability for the area. Tr. 382.

Although the staff witness had not conducted a similar detailed analysis for power supply in the Winter of 1974, he agreed that licensees' figures for that period were reasonable, particularly if scheduled maintenance was to be considered. Tr. 410-412.

54. The critical period in terms of effects of any suspension of work on reliability of power supply would appear to be the summer (June) 1975 peak. LPT p. 49. There is a reasonable probability that the Davis-Besse plant will be ready for commercial operation about December, 1974, in the absence of a suspension. Construction could not be accelerated following a suspension of the plant, or any of its major systems, to make up lost time. In critical schedule areas, licensees are already on a two-shift basis. A three-shift basis would be unlikely to further accelerate construction because of loss of productivity and lack of additional qualified manpower. Tr. 195-206. However,

this expected completion date is based upon no delays in delivery of major components or delays resulting from contract negotiations. Tr. 701-702. There has already been some delay in meeting construction schedules for the project, and delays in construction projects such as this are common. Tr. 198-201. Therefore, there is some reason to question the estimated commercial operation date of December, 1974.

55. The consequences of CAPCO's failure to provide a 20 percent reserve could result in load-interruption or load-shedding unless sufficient emergency power were available from surrounding areas. Tr. 389. Those utilities, pools, and regional reliability councils which are closest to CAPCO were also projected as having low reserves. Tr. 391-394. Because of this reserve situation, licensees' ability to purchase power to replace delayed Davis-Besse capacity could not be assured. The reasonable availability of purchased power is also threatened by slippage in the construction of new fossil and nuclear generating plants. LPT pp. 41-42; Tr. 399.

Licenseses provided additional justification for their load projections by showing that neither a change to a so-called regressive rate structure nor a change in licenseses' advertising program would lead to lower peak loads. Reed S. Reynolds, Toledo Edison's Corporate Planning Economist, testified that the impact of having an increasing (rather than a decreasing) rate per kilowatt hour would be very slight. Tr. 437-438. Mr. Reynolds also testified that, based upon multiple regression analyses considering intercompany differences in promotional expenditures per customer, he had found no correlation between advertising and electrical demand. Tr. 347. Licenseses also testified that the purpose of their advertising was to increase load factor and off-peak usage and not to increase the peak load demand. For that reason, air conditioning is not encouraged by advertising. Tr. 417-421.

Because power from other sources could not be relied upon to replace delayed Davis-Besse capacity, the only other alternative would be to install combustion gas turbine generating units. Tr. 403. These turbines would have to be fueled with fuel oil since natural gas is not available in most areas. Tr. 210. Licenseses

and the FPC witness agree that substitute installation of a fossil plant would be impossible within the time period. LPT p. 44; Tr. 403.

56. If Davis-Besse were to be delayed, the installation of combustion gas turbines three years ahead of scheduled CAPCO requirements would result in additional fixed charge costs of \$16.6 million. The total excess cost for substituting turbines for delayed Davis-Besse capacity, including savings from not operating Davis-Besse during this period, would total \$33.8 million. LPT pp. 46-47. This delay cost would mean cost increases to the customers of Toledo Edison alone as follows: (a) to residential consumers of 5 percent; (b) to commercial consumers of 5 percent; (c) to industrial consumers of 9 percent; and (d) to other customers (schools, Government buildings) of 6 percent in the first year of delay. Tr. 234-236. Delay in Davis-Besse would also require increased generation from CAPCO's older coal and oil-fired units, with the resulting release of sulfur dioxide, nitrogen oxides, carbon dioxide, and particulates into the atmosphere. LPT p. 44.

57. There is no assurance that gas turbines could be installed in time. Tr. 400. Gas Turbines are far less reliable than nuclear plants (Tr. 400-401), have higher outage rates (Tr. 401), and are much more expensive to operate than nuclear plants. Tr. 401-403.

58. The consequences of licensees subpar power reserves could be major. If emergency power could not be obtained from surrounding areas, a load curtailment program may have to be initiated. Tr. 389. While this may only inconvenience some, others who depend on electricity for their well being may be seriously or critically affected. Tr. 390. It is not possible to curtail electricity only to those who will be merely inconvenienced. Tr. 390-391. In addition, when the excess reserves are remote, and an emergency occurs, power rushes in from all the interconnected companies. If load curtailment is not rapid enough, there will be a shortage of reserves throughout, and a widespread interruption, such as the one experienced during the 1965 northeast blackout, could occur. Tr. 400.

59. Another cost to the public which would be caused by a suspension could be the job loss for the duration of the suspension for people now working at the Davis-Besse site. As of June 1, 1972, approximately

750 construction workers will be employed on the site. During the suspension period, only 75 persons would be required onsite. Tr. 231-232.

60. Summarizing, this Board finds that a suspension of construction at this time will adversely affect the reliability of the supply of electricity into the areas serviced by the licensees, thereby imposing financial hardship on said licensees which inevitably will be reflected in charges to the consumers. In addition, we find that there is a substantial probability that suspension will result in either a "blackout" or a "brownout" in the served areas during the peak power demand of 1975.

E. Irretrievable Commitment of Resources  
During Review Period

61. Evidence was presented regarding the cost of abandoning the Davis-Besse facility at the end of the NEPA review period. The costs were calculated in two steps: (1) assuming suspension of activities during the review period, and (2) assuming continuation of the project along its present schedule. LPT pp. 26a-27<sup>6/</sup>. The cost of abandonment has three components: (1) the

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<sup>6/</sup> Licensees' testimony regarding investment during NEPA review and cost of abandonment may be found in their prepared testimony submitted on April 27, 1972 (Part IV), and incorporated in their prepared testimony which is a part of the record herein.

unrecoverable costs of abandoning Davis-Besse; (2) the additional generating costs; and (3) the fixed charges on storage costs of salvageable material. LPT p. 26c.

62. With regard to component (1), the record contains the unrecoverable cost of abandoning the Davis-Besse plant at the end of the NEPA review period assuming a suspension of construction on June 1, 1972, and assuming no suspension, as follows:

<u>Costs</u> Assuming Suspension of Construction on June 1, 1972	<u>Description</u>	<u>Assuming Construction Continues to December 31, 1972</u>
\$ 97,249,000 (1)	Total Investment and Interest During Construction through 5/31/72	\$ 97,249,000 (1)
6,240,000 (2)	Less Interest During Construction	6,240,000 (2)
<u>\$ 91,009,000 (4)</u>	Total Investment	<u>\$ 91,009,000 (4)</u>
<u>Added Investment Costs</u>		
-	Containment	8,187,000 (3)
-	Auxiliary Building	9,024,000 (3)
-	Turbine Building	5,528,000 (3)
-	Cooling System	2,369,000 (3)
-	Switchyard	545,000 (3)
-	Miscellaneous Structures	3,561,000 (3)
-	Temporary Barge Canal	25,000 (3)
2,582,000 (3)(8)	Station Eng. & Const. Mgmt.	2,582,000 (3)
-	Transmission	1,187,000 (3)
770,000 (3)(9)	Administrative Costs	770,000 (3)
-	Sub-Total	<u>33,778,000 (3)</u>
<u>12,963,000 (10)</u>	Equipment Payments (6/1/72 to 12/31/72)	12,963,000 (10)
\$ 16,315,000 (4)	Sub-Total	-
10,658,000 (4)	Interest During Construction through 12/31/72	11,393,000 (10)
32,409,000 (4)	Equipment Delivered after 12/31/72	32,409,000 (11)
14,327,000 (4)(5)	Construction Contractors Cancellation	11,805,000 (11)
<u>\$164,718,000 (4)</u>	Total Investment & Int. as of 12/31/72	<u>\$193,357,000 (11)</u>
75,146,000 (4)(6)	Less Salvageable Material	75,146,000 (6)
<u>\$ 89,572,000 (4)</u>	Total Abandonment Costs	<u>\$118,211,000 (12)</u>
	Added Cost of Abandonment due to Const. 6/1/72 to 12/31/72	\$ 28,639,000 (7)(12)

Notes:

- (1) Total shown in Table IV-2, LPT p. 25.
- (2) Interest during construction shown in Table IV-2, LPT p. 25.
- (3) Total of monthly costs shown in Table IV-1, LPT p. 26.
- (4) Amounts shown in note to Table IV-3, LPT p. 26c.
- (5) Cost shown in text, LPT p. 26a.
- (6) Amount shown in text, LPT p. 26b; Tr. 337-338.
- (7) Difference in total abandonment costs shown in text, LPT p. 26c; Tr. 242.
- (8) Total of "Engineering and Construction Management" shown on Licensees' worksheet "Cost of Construction with Delay," Intervenor's Exhibit 7.
- (9) Total of "Administrative Costs" shown on Licensees' worksheet "Cost of Construction with Delay," Intervenor's Exhibit 7.
- (10) Tr. 239.
- (11) Tr. 240.
- (12) Tr. 241

The added unrecoverable cost of abandonment if construction is permitted to proceed until the end of the NEPA review period would be \$28,639,000 (equivalent to a January 1, 1975, present work of \$34,182,000).

63. With regard to cost component (2), additional generating costs were determined as follows: if Davis-Besse were abandoned, its generating capacity would have to be replaced since abandonment would not reduce the demand for power. Tr. 152. As stated earlier, combustion gas turbines would be the only method of replacing Davis-Besse capacity by December, 1974. Older fossil plants would be used more extensively until new base load plants are built. Sites for these plants might include the Davis-Besse site for a new fossil plant. Tr. 152-155. The additional generating costs to CAPCO, if Davis-Besse were to be abandoned, were determined by a complete economic analysis comparing the present CAPCO capacity addition plan through 1990 with an alternative plan substituting combustion gas turbines for Davis-Besse in 1974, and utilizing the salvageable material from the Davis-Besse plant as early as possible in a nuclear unit at another site. The alternative plan is \$30,900,000 more expensive (January 1, 1975, present worth). Tr. 243-244.

64. Component (3) of the cost of abandonment is the fixed charges on storing salvageable material from the Davis-Besse plant. Use of the salvageable

material would, of course, minimize the cost of abandoning Davis-Besse, since there would be in excess of \$75 million in salvageable material. LPT p. 26c; Tr. 330-332, 337-338. The earliest that a nuclear unit replacing Davis-Besse and making use of the salvageable material from Davis-Besse could be completed would be 1980. LPT p. 26a. The additional cost of that unit over Davis-Besse as well as the other excess costs of the CAPCO capacity addition plan, based upon abandonment of the Davis-Besse facility, are included in component (2) of the cost of abandonment with the exception of storage costs on the salvageable material. These costs would be accrued until the replacement nuclear plant went into operation and would then be charged as fixed charges over the life of that plant. On a January 1, 1975, present worth, the fixed charges are \$24,597,000. LPT p. 26c; Tr. 244. This amount would be the same whether or not construction continued until the completion of the NEPA review period.

65. In summary, by totalling the three components of abandonment cost, i.e., (1) the unrecoverable cost of abandoning Davis-Besse; (2) the additional generating costs if Davis-Besse is abandoned; and (3) the fixed charges on storage costs on salvageable material from

Davis-Besse, the January 1, 1975, present worth of the cost of abandoning the Davis-Besse plant on December 31, 1972, would be \$162,406,000, if construction were to be suspended on June 1, 1972, and \$196,588,000 if construction were to continue until December 31, 1972, for a January 1, 1975 present worth difference of \$34,182,000. LPT p. 26c. This is approximately 21 percent of the above \$162,406,000 figure and about 12 percent of the estimated total power plant cost of \$269,000,000 plus \$10,000,000 for transmission lines. Tr. 135, 445. In addition, the actual expenditures incurred through May 31, 1972, are more than double the amount contemplated to be expended during the review period. LPT pp 25-26, 26c; Tr. 134-135.

66. These small fractions in the total cost picture, the ratio of actual expenditures to date to the irretrievable commitment of resources during the NEPA review period, and in view of the rather small environmental effects during construction, convince this Board that a reasonable or prudent man would conclude that these irretrievable costs would not affect in any significant manner the eventual decisions reached in the NEPA review.

F. Conclusions

1. Continued construction during the prospective review period will have a rather small adverse impact on the environment, and redress of such adverse environmental impact can reasonably be effected should modification, suspension, or termination of the permit result from the ongoing NEPA review.
2. Continued construction during the NEPA review period will not foreclose subsequent adoption of alternatives in facility design of the type that could result from the ongoing NEPA review.
3. Delay in the construction of the Davis-Besse Nuclear Power Station will seriously hamper the ability of the licensees to provide urgently needed electrical power to consumers during the projected peak power demand of 1975. It will result in substantial added costs to the licensees which will be reflected in higher charges to consumers. Moreover, there is a substantial probability that construction delay may cause a "blackout" or a "brownout" during the peak power demand of 1975.
4. The irretrievable commitment of resources during the review period can reasonably be expected to have a negligible affect on the outcome of the NEPA review.

Accordingly, this Board finds that construction of the Davis-Besse Nuclear Power Station should not be suspended pending completion of the NEPA review.

ATOMIC SAFETY AND LICENSING BOARD

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Mr. Jerome Garfinkel, Chairman

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