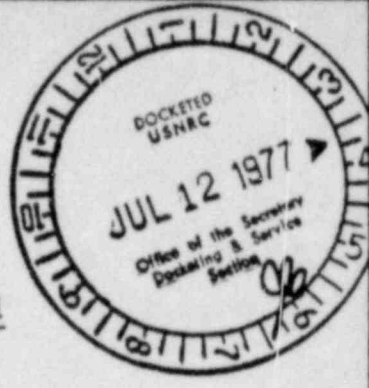

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	Docket Nos. 50-329
CONSUMERS POWER COMPANY	)	50-330
	)	
(Midland Plant, Units 1 and 2)	)	

PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW OF INTERVENORS OTHER THAN DOW CHEMICAL COMPANY

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Introduction

1. This proceeding results from two rulings of the Court of Appeals for the District of Columbia Circuit: Aeschliman v. NRC, 547 F.2d 622 (D.C. Cir. 1976), cert. granted, ____ U.S. ___, 45 U.S.L.W. 3570 (Feb. 22, 1977), and Natural Resources Defense Council v. NRC, 547 F.2d 633 (D.C. Cir. 1976), cert. granted, ____ U.S. ____, 45 U.S.L.W. 3570 (Feb. 22, 1977). The first of those cases reversed the Commission's grant of a construction license to Consumers Power Company ("Consumers") in connection with Units 1 and 2 of the proposed Midland Nuclear Plant, and remanded the case to the Commission for further hearings on specified issues. The second decision, partially incorporated into the first ruling insofar as it held that fuel cycle matters must be addressed anew, invalidated the Commission's earlier fuel cycle rule and remanded that matter to the Commission for further consideration. In these hearings, we do not yet deal with the merits of the issues remanded in Aeschliman. Rather, the Midland proceeding is now before us for

a decision, pursuant to the direction of the Commission in Consumers Power Company (Midland Plant, Units 1 & 2), CLI-76-11, NRCI-76/8, 65 (August 16, 1976), as to whether construction of the Midland nuclear facility should be suspended pending completion of the full remanded hearings on the merits required by the Court of Appeals.

2. Because we do not write on a clean slate, a summary of the prior history of this lengthy and hotly-contested matter is important to a full understanding of the suspension issue and the context in which it arises. Part I below sets out the necessary factual and procedural background, both before and after the decision of the Court of Appeals. In Part II, we then provide a brief overview of the nature of the issues before us and the positions of the parties--Consumers Power Company (the applicant), Dow Chemical Company (without whose active participation and support, according to the final Environmental Impact Statement in the earlier licensing proceedings, the proposed Midland Plant would be only half as large and quite possibly located at a different site),* numerous individuals and groups opposing the project (collectively referred to as "Midland Intervenors" or simply "Intervenors") and the Commission Staff. Part III then analyzes the evidence (or, in some instances, the lack of evidence) on the suspension issue and sets forth our conclusions. Part IV contains our Order.

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* Despite its crucial role in the Midland project, Dow has objected to being treated as a party here. The Board ordered, however, that Dow be treated as a party, since Dow's electric and steam needs and its relationship with Consumers are central issues. See paragraphs 40, 42-51 below.

I.
FACTUAL AND PROCEDURAL BACKGROUND

A. The Proceedings Prior to the Court of Appeals' Decision.

3. On January 13, 1969, Consumers filed with what was then the Atomic Energy Commission an application for a license to construct and operate a dual purpose pressurized water nuclear power plant, located in Midland, Michigan and described as follows by the original Licensing Board in its Initial Decision, Consumers Power Company (Midland Plant, Units 1 & 2), LBP-72-34, 5 AEC 214 (1972):

> "The proposed plant, designated the Midland Nuclear Plant, Units 1 and 2 . . . , would produce approximately 1,300 megawatts of electricity and 4,050,000 pounds of process steam for sale by [Consumers] to the Dow Chemical Company."

1. The Dow Issue.

4. The Dow Chemical Company ("Dow") involvement in the Midland project is of great importance. Paragraph 46 of the Licensing Board's Initial Decision noted that "[t]he chief benefits claimed by [Consumers] and the [Commission] Staff are the production of electricity (and process steam) and the elimination of the air pollution from Dow's present fossil-fuel steam plant," and the Final Environmental Impact Statement ("FEIS") prepared prior to the Initial Decision went even farther (at page XI-3):

> "If [Consumers] were not to supply process steam to the Dow Chemical Co., one unit of the Midland Nuclear Power Plant would be cancelled and consideration would be given to transferring the other unit to a different site, probably the existing Palisades site." [Emphasis added.]

5. On February 1, 1974--while this case was pending in the Court of Appeals--Consumers and Dow announced a major renegotiation of their contracts concerning the Midland Plant. The new contracts* made a number of significant changes in the parties' relationship. First, while the original contracts had required Dow to purchase all of its Midland electric and steam needs from the Midland Nuclear Plant, the new contracts radically cut back both of those commitments. Under the new contracts, Dow became committed to purchase no electricity from the Midland Plant other than as "auxiliary or standby" to Dow's fossil-fuel generating facilities; similarly, the renegotiated contracts obliged Dow to purchase only 2,000,000 lbs./hr. of steam from the Midland Plant, while the Initial Decision--and the FEIS--contemplated double that amount. The new contracts also no longer required Dow to close down its fossil-fuel facilities. Tr. 2342-46, 2384-85. Since both the FEIS and the Initial Decision regarded the sale of electricity and process steam to Dow, and the shutdown of Dow's antiquated fossil-fuel facilities, as the major justifications for both the size and location of the proposed Midland Plant (see paragraph 4 above), Intervenors promptly sought reopening of the records for further cost-benefit evidence, on the ground that the renegotiated contracts had fundamentally undercut the cost-benefit analysis of the plant--which was also open to doubt on the additional ground that by January, 1974 the projected cost of the plant had risen to approximately $940,000,000, almost triple the cost on which the construction application and the FEIS were based. Again

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* Consumers' Exhibits 7(a-c).

Intervenors were unsuccessful. The Commission twice refused to reopen the proceeding in order to consider the changed circumstances. Consumers Power Company (Midland Plant, Units 1 & 2), CLI-74-77, 7 AEC 147 (1974); Consumers Power Company (Midland Plant, Units 1 & 2), CLI-74-8, 7 AEC 149 (1974). Thereafter, prompted by what it termed the "rather unusual step" of Dow's withdrawal from the proceedings in the Court of Appeals, the Commission (without notice to or participation by Intervenors) obtained and reviewed copies of the revised Dow-Consumers contract. Again, the Commission concluded that the proceedings should not be reopened. Consumers Power Company (Midland Plant, Units 1 & 2), CLI-74-15, 7 AEC 311 (1974).

2. The Energy Conservation Issue.

6. In the course of the initial license proceeding, Intervenors also attempted to raise numerous other contentions, many of which were rejected by the Licensing and Appeal Boards in rulings brought before the Court of Appeals and culminating in the Aeschliman decision previously mentioned. For example, the Licensing Board initially held that no environmental contentions at all could be raised in the proceeding; even after Calvert Cliffs' Coordinating Committee v. AEC, 449 F.2d 1109 (D.C. Cir. 1971), and the resulting revision of the Commission's rules to permit consideration of environmental questions, Intervenors still experienced difficulty in raising their environmental claims. Although Intervenors forcefully pointed out that both the draft and the final EIS prepared by the Staff totally failed to consider energy conservation

alternatives to the Midland project, contrary to the requirements of §§ 102(C)(iii) and 102(D) of the National Environmental Policy Act ("NEPA"), 42 U.S.C. §§ 4332(C)(iii), 4332(D), the Licensing Board rejected energy conservation issues as "beyond our province." Initial Decision, supra, ¶¶ 48-49, 70.* Even after the Commission itself held that energy conservation alternatives should be considered in license proceedings, Niagara Mohawk Power Corp., CLI-73-28, 6 AEC 995 (1973)--a development which occurred after the Midland license had been granted and the case was pending in the Court of Appeals--the Commission refused Intervenors' request to reopen the Midland record to allow evidence concerning energy conservation and held that Niagara Mohawk would be applied prospectively only. Consumers Power Company (Midland Plant, Units 1 & 2), CLI-74-5, 7 AEC 19 (1974).

3. The ACRS Issue.

7. During the original license hearings, Intervenors also attempted to challenge the adequacy of the safety report prepared and submitted by the Advisory Committee on Reactor Safety ("ACRS"). That report was submitted in the form of two letters, the first of which (dated June 18, 1970) said in pertinent part:

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* The Appeal Board affirmed on the ground that Intervenors' contentions were "beyond the pale of what we view as required by NEPA." While it suggested that energy conservation alternatives had been "inherently" part of the Licensing Board's analysis, the Appeal Board cited for that premise the very portions of the Licensing Board's Initial Decision in which the Licensing Board had had refused to consider energy conservation. Consumers Power Company (Midland Plant, Units 1 & 2), ALAB-123, 6 AEC 331 (1973).

"Other problems related to large water reactors have been identified by the Regulatory Staff and the ACRS and cited in previous ACRS reports. The Committee believes that resolution of these items should apply equally to the Midland Plant, Units 1 and 2.

"The Committee believes that the above items can be resolved during construction . . . . "

The ACRS did not identify what the "other problems" were, nor indicate how they could be "resolved during construction." Intervenors accordingly argued that the report did not satisfy the requirements of 42 U.S.C. §§ 2039, 2232b, and that its cryptic language prevented Intervenors from fully exploring safety problems. Since the ACRS report must be offered "in evidence" at the license hearings, 10 C.F.R., Part 2, § 2.743(g), and the Licensing Board is authorized to rely upon the conclusions of the report unless they are formally disputed by a party, Id., Appendix A, ¶ V(f)(1), and since the Board is affirmatively directed to "review and become familiar with" the ACRS report before hearings begin (Id., App. A, ¶ I(d)), Intervenors also argued that the report constituted substantive evidence in the proceedings and sought discovery concerning what the "other problems" were, what sort of "due consideration" the ACRS felt they should be given, and why the ACRS had concluded that they "could be resolved during construction." Denial of those contentions was affirmed by the Appeal Board. Consumers Power Company (Midland Plant, Units 1 & 2), ALAB-123, 6 AEC 331 (1973).

4. The Fuel Cycle Issue.

8. During the initial license proceedings, Intervenors

also unsuccessfully attempted to raise issues concerning the environmental impact of generating, disposing of, and reprocessing nuclear waste material. In part, their contentions were rejected on the ground that--as the FEIS asserted (at pp. XII-11, 12)--the environmental costs associated with waste disposal problems are "remote and speculative," because waste disposal matters are "beyond the licensee's control" and because, as stated in Vermont Yankee Nuclear Power Corp., ALAB-56, 4 AEC 930 (1972), "it has not yet been determined what the nature or location of the ultimate depository [for high level waste] will be." In addition, Intervenors' fuel cycle contentions were rejected on the ground that waste disposal is a "generic issue" appropriately handled in rule-making proceedings rather than in the context of individual license hearings. Consumers Power Company (Midland Plant, Units 1 & 2), ALAB-123, 6 AEC 331, 353 (1973).

5. The QA-QC Issue.

9. In addition to their unsuccessful attempts to raise the Dow "changed circumstances" issue, the energy conservation issue, the ACRS issue, and the fuel cycle issue in the original license proceedings Intervenors also raised numerous contentions concerning quality assurance and quality control ("QA-QC") problems experienced at the Midland Plant. QA-QC requirements are the Commission's primary line of defense against safety problems (see AEC Doc. No. WASH-1240 (1973), at pp. 2-1ff., 3-19), and full compliance with all QA-QC regulations is essential. Vermont Yankee Nuclear Power Corp., ALAB-124, 6 AEC 358, 362 (1973).

10. Concerning the QA-QC issues, however, the earlier Licensing Board took the view that its only function was to ascertain whether an appropriate QA-QC program had been adopted; it regarded the question of whether Consumers could or would live up to the requirements of that program as beyond its province. Initial Decision, supra, ¶¶ 28-29. The Appeal Board disagreed, holding that "the [Licensing] Board also should have determined whether there was a reasonable assurance that [Consumers] . . . would carry out the terms of the program," and finding as a fact:

> " . . . that neither [Consumers] nor [its] architect-engineer had provided reasonable assurance that the QA program will be implemented properly. . . . . They have in this project not demonstrated their concern with maintaining QA programs in synchronization with their construction programs, nor have they demonstrated that they will have properly trained people on site to implement the QA programs."

Consumers Power Company (Midland Plant, Units 1 & 2), ALAB-106, 6 AEC 182, 184-85 (1973). However, instead of reversing the grant of the construction permit or remanding the proceeding for further hearings on QA-QC issues, the Appeal Board simply imposed additional "reporting requirements" on Consumers--requirements which the Board deemed necessary "because of the history of the failure of [Consumers] and the architect-engineer to observe the required QA practices and procedures, as documented in this record." Id.,

p. 187.*

B. The Review Proceeding in the Court of Appeals.

11. The Licensing Board's Initial Decision, granting the Midland construction permit, was issued on December 14, 1972. On May 18, 1973, the Appeal Board affirmed that Order, Consumers Power Company (Midland Plant, Units 1 & 2), ALAB-123, 6 AEC 331 (1973); the Commission declined to review those rulings. On August 6, 1973, the Mapleton Intervenors filed a Petition for Review in the United States Court of Appeals for the District of Columia, and on September 7, 1973, both Dow and Consumers intervened in the review proceeding (although, after the contract renegotiation described in paragraph 5 above, Dow withdrew its intervention). That proceeding was subsequently consolidated with the Saginaw Intervenors' Petition for Review of the Midland rulings.

12. In addition to the unavoidable delay in the judicial review proceedings occasioned by awaiting Commission rulings on Intervenors' petitions to reopen the record for "energy conservation" and "Dow changed circumstances" reasons, a further delay arose from the fact that, after the Midland review proceedings were

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* Although the Appeal Board subsequently concluded that QA requirements had been satisfied, Consumers Power Company (Midland Plant, Units 1 & 2), ALAB-147, 6 AEC 636 (1973), not long thereafter the Appeal Board decided that its optimism had been unjustified. By letter of November 26, 1973 to the Director of Regulation, the Appeal Board concluded that: "... contrary to our findings in ALAB-147 ... there is not a reasonable assurance that appropriate QA action is now being taken. If anything, there is a solid assurance that exactly the opposite is the case." A show-cause proceeding was instituted, but was eventually terminated favorably to Consumers.

instituted, Petitions for Review were also filed in other proceedings involving the Commission's handling of nuclear waste reprocessing and disposal issues. Because Intervenors had raised similar issues in this case (see paragraph 8 above), on April 8, 1975 (after the Midland oral argument) the Court of Appeals sua sponte entered an Order holding this case in abeyance pending its decision in Natural Resources Defense Council v. NRC, 547 F.2d 633 (D.C. Cir. 1976). Since this case had already been argued orally, it appears that it was the Court of Appeals' sua sponte Order, rather than any delay attributable to the parties, which caused the ensuing 18-month gap between the oral argument and the final decision.

13. During the pendency of the case in the Court of Appeals, construction of the Midland Plant continued, numerous additional QA-QC problems arose (see paragraph 56 below) and the total cost of the Midland project continued to soar. As previously indicated, in January, 1974 the project cost was estimated at approximately $940,000,000, or 250% of the total project cost estimated in the application and the FEIS and relied on in the Initial Decision. Between January, 1974 and July, 1976 (when the Court of Appeals issued its decision), that $940,000,000 figure itself nearly doubled, and the total project cost is now conservatively estimated at $1.67 billion. Tr. 5684; see paragraphs 46 and 48 below.

C. The Decision of the Court of Appeals.

14. On July 21, 1976, the Court of Appeals decided both this case and the fuel-cycle case (in connection with which it had held this case in abeyance). Aeschliman v. NRC, 547 F.2d 622 (D.C. Cir. 1976); Natural Resources Defense Council v. NRC, 547 F.2d 633 (D.C. Cir. 1976). The holdings and reasoning of the Court must be explained in some detail, because they frame the nature and scope of the full remanded hearings on the merits as well as indicating what deficiencies in the licensing record must be cured before any affirmative licensing decisions can be made, and thus bear directly on the suspension-of-construction question presently before this Board.

1. Energy Conservation

15. The Court of Appeals' Aeschliman opinion begins by taking up the energy conservation problem. Noting the failure of the Midland EIS to consider energy conservation and the rejection of that subject by the Licensing and Appeal Boards, as well as the Commission's contrary ruling in Niagara Mohawk Power Corp., CLI-73-28, 6 AEC 995 (1973), the Court turned to the Commission's refusal to reopen the Midland record after Niagara Mohawk was decided. Aeschliman, 547 F.2d at 625-26. The Commission's 1974 ruling had imposed a "threshold test" on energy conservation issues, under which such issues need not be considered unless the alternatives were "reasonably available" and, further, unless the alternatives "would, in their aggregate effect curtail demand for electricity

to a level at which the proposed facility would not be needed." Consumers Power Co. (Midland Plant, Units 1 & 2), CLI-74-5, 7 AEC 19 (1974). First, the Court of Appeals concluded (547 F.2d at 627 n. 10) that:

> "Contrary to the Commission's formulation, an alternative cannot be ignored simply because it would not totally alleviate the need for a proposed facility . . . . [Citations omitted.]
>
> "It is sufficient that energy conservation might reduce projected demand for electricity so that a smaller facility, having lesser adverse environmental impact, would be adequate."*

Next, the Court of Appeals turned to, and rejected, the other requirement of the "threshold test," which effectively placed the burden upon Intervenors to show that proposed energy conservation measures are feasible and realistic (547 F.2d at 627):

> "Saginaw contends that the 'threshold test' applied in this case is inconsistent with NEPA's 'basic mandate' to the Commission to 'take the initiative' in considering environmental issues. Calvert Cliffs' Coordinating Comm., Inc. v. AEC, 146 U.S. App. D.C. 33, 449 F.2d 1109, 1118-19 (1971). We agree.

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* Under the circumstances here, that holding has particular impact. There is at present considerable controversy over how far (if at all) Dow is willing to go in supporting the Midland project. See paragraphs 42-51 below. As the earlier FEIS noted (at page XI-3), if Dow is removed from consideration, all parties agree that the Midland Plant could and should be considerably smaller, and probably located at a different site. Even if Dow remains in the picture, moreover, its ongoing negotiations with Consumers--negotiations which, historically as well as presently, have been in the direction of lesser commitments on Dow's part--require careful examination. Like energy conservation measures, the effects of the negotiations may be to "reduce projected demand . . . . so that a smaller facility, having lesser adverse environmental impact, would be adequate."

> "In Calvert Cliffs the Commission proposed to limit the consideration of environmental issues under NEPA to those 'which parties affirmatively raise.' Id., 1119. This court reversed, pointing out 'it is unrealistic to assume that there will always be an intervenor with the information, energy, and money required' to investigate environmental issues. Id. The court held that the 'primary responsibility' for fulfilling NEPA must lie with the Commission, which may not merely 'sit back, like an umpire, and resolve adversary contentions at the hearing stage.' [Citations omitted.] The same considerations persuade us that the Commission may not refuse to consider energy conservation alternatives unless an intervenor first brings forward information satisfying the strictures of its 'threshold test.'"

The Court went on to hold that "an intervenor's comments on a draft EIS raising a colorable alternative not presently considered therein must only bring 'sufficient attention to the issue to stimulate the Commission's consideration of it,'" and that Intervenors' comments in this case had met that test. Aeschliman, 547 F.2d at 628-29. Noting that the Federal Power Commission "routinely requires" consideration of energy conservation alternatives in deciding whether to build hydroelectric facilities, and stressing the important role of energy conservation in terms of overall energy policy--a role significantly heightened, we might add, by the Administration's energy program--the Court concluded (547 F.2d at 629):

> "It follows that energy conservation was not to be dismissed by the Commission without inquiry or explanation."

2. The ACRS Report.

16. The Aeschliman opinion then addresses the ACRS issue. After analyzing the legislative history of Congress' requirements that the ACRS report on the safety of each reactor proposed for licensing and that the report be made public, the Court of Appeals

determined that the report serves two essential functions: (i) to provide a thorough, substantive evaluation of all safety issues so that they can be fully discussed and resolved before the reactor is licensed, and (ii) to provide the public with full information concerning "the safety or possible hazards of the facility." Aeschliman, 547 F.2d at 631. The Court then held that the opaque and unexplained "other problems" language of the ACRS report, described in paragraph 7 above, was inadequate (547 F.2d at 631):

> "While the reference to 'other problems' identified in previous ACRS reports may have been adequate to give the Commission the benefit of ACRS members' technical expertise, it fell short of performing the other equally important task which Congress gave ACRS: informing the public of the hazards. At a minimum, the ACRS report should have provided a short explanation, understandable to a layman, of the additional matters of concern to the committee, and a cross-reference to the previous reports in which those problems, and the measures proposed to solve them, were developed in more detail. Otherwise, a concerned citizen would be unable to determine, as Congress intended, what other difficulties might be lurking in the proposed reactor design."*

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* The court might well have added that Intervenors, as well as "concerned citizens," are prevented from addressing safety issues by an unduly cryptic ACRS report. As the court commented, 547 F.2d at 631 n.18, "When ACRS conclusions are controverted, a factual record is compiled anew before the Licensing Board." But those conclusions cannot be "controverted," nor can important safety issues be fully explored in licensing proceedings, unless the ACRS advises the parties (as well as the public) of what its conclusions actually are in sufficient detail to be understandable. Just as an inadequate ACRS report fails to trigger the desirable public debate over the possible hazards of a nuclear reactor, so it also fails to trigger the extremely important process of resolving those difficulties, in the open, during the licensing proceedings. See paragraphs 52-55 below, where these points are analyzed in the framework of the present hearings.

Accordingly, the Court concluded (Id., at 631) that "the ACRS report on its face did not comply with the requirements of the statute" and that the Licensing Board should therefore, sua sponte, have returned the report to the ACRS "for further elaboration of the cryptic reference to 'other problems.'" The importance of full and conscientious Board compliance with that ruling is underscored by the Court's rejection of Intervenors' contention that they were entitled to discovery from the ACRS. Since Intervenors cannot themselves ensure that ACRS reports fulfill the Congressionally-mandated purposes described by the Court, the Board must bear full responsibility for enforcing the statutory requirements and goals.

3. The Fuel Cycle Issue.

17. The Court of Appeals next took up Intervenors' fuel cycle contentions, which the Court held were controlled by its contemporaneous decision in Natural Resources Defense Council v. NRC, 547 F.2d 633 (D . Cir. 1976). In that case, the Court held that the Commission could not refuse to consider the environmental problems of nuclear waste reprocessing and disposal on the ground that--although concededly the operation of any nuclear plant results in "an incremental environmental effect" on the waste problem through the creation of additional waste--that effect is "presently indefinable." Citing its decision in Scientists' Institute for Public Information, Inc. v. AEC, 156 U.S. App. D.C. 395, 481 F.2d 1079 (1973), the Court held that "the obligation to make reasonable forecasts of the future is implicit in NEPA and

therefore an agency cannot 'shirk [its] responsibilities under NEPA by labeling any and all discussion of future environmental effects as "crystal ball inquiry."'" NRDC, 547 F.2d at 639. The Court added (Id. at 640):

> "As more and more reactors producing more and more waste are brought into being, 'irretrievable commitments [are] being made and options precluded,' [citation omitted], and the agency must predict the environmental consequences of its decisions as it makes them. See Aberdeen & Rockfish R.R. v. SCRAP, 422 U.S. 289, 320, 95 S.Ct. 2336, 45 L.Ed. 2d 191 (1975)."

The Court also rejected the argument that consideration of the environmental effects of waste disposal and reprocessing could appropriately be deferred until license proceedings for reprocessing plants. The Court held (547 F.2d at 640-41):

> "The real question . . . is whether the environmental effects of the wastes produced by a nuclear reactor may be ignored in deciding whether to build it because they will later be considered when a plant is proposed to deal with them. To answer this question any way but in the negative would be to misconstrue the fundamental purpose of NEPA. Once a series of reactors is operating, it is too late to consider whether the wastes they produce should have been produced, no matter how costly and impractical reprocessing and waste disposal turn out to be; all that remain are engineering details to make the best of the situation which has been created . . . . Decisions to license nuclear reactors which generate large amounts of toxic wastes requiring special isolation from the environment for several centuries are a paradigm of 'irreversible and irretrievable commitments of resources' which must receive 'detailed analysis' under § 102(2)(C)(v) of NEPA, 42 U.S.C. § 4332(2)(C)(v). We therefore hold that absent effective generic proceedings to consider these issues, they must be dealt with in individual licensing proceedings."

The Court went on to hold that the generic proceeding which resulted in the fuel cycle rule was fatally defective. Accordingly,

the Court set aside the fuel cycle rule and remanded the case to the Commission, noting (547 F.2d at 641 n.17) that "until an adequate generic proceeding is held . . ., these issues will be ripe in individual licensing proceedings."

18. The Court of Appeals applied its fuel cycle holding to this case as follows (Aeschliman, 547 F.2d at 632):

> "The final EIS prepared in regard to Midland Plant Units 1 & 2 says only that fuel wastes will be shipped to unidentified offsite disposal areas. On remand, the Commission shall undertake appropriate consideration of waste disposal and other unaddressed fuel cycle issues, and restrike the cost-benefit analysis, as necessary, in accordance with NRDC v. NRC, supra."

4. The Dow Issue.

19. In summary, then, the Court of Appeals concluded: (i) that both the Environmental Impact Statement and the record in the initial Midland construction permit proceeding were fatally defective, because both failed to consider energy conservation issues and because both failed to consider fuel cycle issues; and (ii) that the record in the license proceedings was further defective because, contrary to the explicit requirements of 42 U.S.C. § 2232b and the Commission's regulations (see 10 C.F.R., Part 2, §§ 2.101(b), 2.101(c), 2.743(g); Id., App. A, ¶¶ I(a), (b), V(f)), a valid ACRS report had not been prepared. The Court of Appeals also made it plain that the material changes in the Dow-Consumers relationship should be fully considered in the hearings on remand (547 F.2d at 632):

> "As this matter requires remand and reopening of the issues of energy conservation alternatives as well as recalculation of costs and benefits, we

> assume that the Commission will take into account the changed circumstances regarding Dow's need for process steam, and the intended continued operation of Dow's fossil-fuel generating facilities."*

Further impetus for a searching reexamination of the Dow-Consumers relationship (crucial to any cost-benefit analysis of the Midland project, as noted in paragraphs 4-5 above) appears from Commonwealth Edison Co., ALAB-153, 6 AEC 821, 823-4 (1973):

> " . . . [I]t is not proper to resolve a major environmental question on the basis of a set of facts existing in the past if there is good reason to believe that there may have been an appreciable, and material, change in the factual situation."

D. The Proceedings Since the Court of Appeals' Decision: The Stay Motions, the Motions to Halt Construction, and the Suspension Hearings.

20. Following the Aeschliman and NRDC decisions, on August 16, 1976 the Commission issued a General Statement of Policy (41 Fed. Reg. 34707) reopening the fuel cycle rule-making proceeding (in order to supplement the record concerning nuclear waste management and reprocessing and to determine whether its prior treatment of those issues should be revised) and ordering that no new or full-power construction or operating licenses issue until a revised environmental survey and an interim fuel cycle rule had been prepared. Id. at 34708. The General Statement of Policy directed

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* Citing Union of Concerned Scientists v. AEC, 163 U.S. App. D.C. 64, 499 F.2d 1069, 1084 n.37 (1974), the court emphasized that in reanalyzing costs and benefits, complete abandonment of the project is "an alternative to be considered," and repeated its long-standing holding that "sunk costs" may not be considered in the new cost-benefit analysis. Aeschliman, 547 F.2d at 532 n. 20.

case-by-case treatment of whether existing construction or operating licenses should be modified or suspended as a result of the NRDC fuel cycle decision, adding: "An evidentiary hearing on other issues will be required in Midland, barring further review. That hearing, however, should not be commenced until the Midland decision has become final." Id. at 34709. Also on August 16, 1976, the Commission issued a Memorandum and Order in these dockets, reconvening an Atomic Safety and Licensing Board "for the limited purpose of considering, in light of the facts and the applicable law, whether the construction permit for [the Midland] facility should be continued, modified, or suspended until an interim fuel cycle has been made effective," and repeating that "no hearing on the merits of the other issues assigned for reconsideration by the Court of Appeals in the Aeschliman v. NRC decision will be appropriate until the decision of the Court of Appeals has become final." Consumers Power Company (Midland Plant, Units 1 & 2), CLI-76-11, NRCI-76/8, 65 (August 16, 1976).*

1. The Stay Motions.

21. Very shortly after the Licensing Board was reconvened, Consumers began a series of attempts to prevent or stay the suspension proceedings. On August 26, 1976, Consumers moved the Commission to recall and reconsider its August 16, 1976 Order reconvening

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* The Commission designated the members of the reconvened Midland Board on August 18, 1976. On December 21, 1976, the Board was reconstituted pursuant to § 2.721 of the Commission's rules of practice by replacing the prior Chairman, Daniel M. Head, Esquire, with the present Chairman, Frederic J. Coufal, Esquire.

the Licensing Board. That request was denied by the Commission, in a ruling which pointed out that the Court of Appeals had issued its mandate in Aeschliman despite Consumers' strenuous opposition, and noted: "We cannot disregard the Court's issuance of its mandate despite Consumers Powers' arguments to it along lines similar to those offered here. Hearings on the issue of suspension are immediately ripe and should be addressed by the Hearing Board." Consumers Power Company (Midland Plant, Units 1 & 2), CLI-76-14, NRCI-76/9, 163 (September 14, 1976).* Undaunted, on October 22, 1976, Consumers again sought to stay further proceedings before this Board, arguing that consideration of the remanded issues would be inappropriate until the Supreme Court acted on Consumers' petition for certiorari in Aeschliman. Although the Commission halted other "fuel cycle" suspension proceedings by issuing a Supplemental General Statement of Policy, 41 Fed. Reg. 49898 (November 11, 1976), it again refused to halt these hearings insofar as the three non-fuel-cycle issues remanded by the Court of Appeals--energy conservation, the ACRS report, and the Dow-Consumers changed circumstances--were concerned. Consumers Power Company (Midland Plant, Units 1 & 2), CLI-76-19, NRCI-76/11, 451 (November 5, 1976).

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* In the same ruling, the Commission noted that the issuance of the Aeschliman mandate "alters the situation from what it had been when the [General Statement of Policy] was issued. Now the decision in Aeschliman is final and consideration of all issues remanded to the Commission by the Court of Appeals is appropriate." The Commission accordingly issued a fresh order to the Licensing Board, directing it to consider those issues as well as the waste issue.

22. Although its attempts to halt these hearings had been rejected both by the Court of Appeals and (twice) by the Commission, on March 4, 1977, Consumers again sought to stay the suspension hearings, this time on the ground that on February 22, 1977, the United States Supreme Court had granted certiorari in both the Aeschliman and the NRDC cases. (Consumers also asked this Board to defer further proceedings until the Commission had ruled on the Motion. By Order issued March 11, 1977, supplemented by Memorandum Opinion issued March 16, 1977, the Board declined to do so, both on grounds of practicability and because "[w]e are now proceeding as ordered by the Commission and we are reluctant to do otherwise unless we are directed to do so.") The Commission referred Consumers' motion to the Appeal Board, which denied the motion in language which speaks directly to the suspension issue now presented for decision:

> " . . . The basic issue which is before the Licensing Board on the merits--whether to re-authorize the construction of the Midland facility in the face of claims that the project as presently structured cannot survive a proper NEPA cost-benefit analysis--can be prejudiced by a continuing commitment of resources to the project. The more that is expended, the less likely it is that, on account of environmental considerations, either the cost-benefit balance will be tipped against the plant or potential alternatives will remain feasible. In essence, [Consumers] is seeking to defer decision on the wisdom of completing the facility while continuing the construction activity that could tilt the decision-making process in its favor. There is a saying for this--having your cake and eating it, too. Only the most extraordinary circumstances could justify our requiring a party to stand by while another is satiated at its expense." [Emphasis added.]

Consumers Power Company (Midland Plant, Units 1 & 2), ALAB-395, 5 NRC ___ (April 29, 1977). On May 24, 1977, Consumers also asked

the Court of Appeals to recall its mandate. On June 23, 1977, the Court of Appeals denied that motion.

2. The Motions to Halt Construction.

23. In addition to an oral motion made at the close of Consumers' direct presentation (Tr. 4107ff.) and based on Consumers' asserted failure to carry its burden of proof on the suspension issue (which Consumers admittedly bears: Tr. 4126), Intervenors have filed four written motions seeking an immediate halt to further construction of the Midland Plant, pending completion of the full remanded hearings on the merits. On September 3, 1976, Intervenors asked the Commission to halt construction, on the ground that the Court of Appeals' just-issued mandate in Aeschliman so required. The Commission denied that motion, ruling that Intervenors had not offered sufficient reason for altering its belief (announced in the August 16, 1976 General Statement of Policy) "that the question of modification or suspension . . . is not appropriate for summary disposition and should be decided 'in formal proceedings in light of the facts and the applicable law.'" Consumers Power Company (Midland Plant, Units 1 & 2), CLI-76-14, NRCI-76/9, 163 (September 14, 1976). On September 10, 1976, Intervenors also moved this Board to halt construction, arguing: (i) that the spending of additional funds on construction pending completion of the remanded hearings would be unfair and improper (in large

part for the reasons articulated by the Appeal Board in its April 29, 1977 ruling, discussed in paragraph 22 above); (ii) that as a matter of law the Court of Appeals' invalidation of the EIS and its ACRS ruling rendered issuance of the original construction permit invalid, so that activity could not properly proceed under that permit; and (iii) that the Court of Appeals' decision, by requiring a complete restriking of the cost-benefit analysis, also required suspending construction until that fresh analysis was complete. On October 4, 1976 the Board denied that Motion, explaining (in a Memorandum filed on October 21) that evidentiary hearings were required in order to produce an up-to-date record.* On December 31, 1976, Intervenors again urged the Board to put a stop to further construction. In addition to the points they had earlier presented, Intervenors argued that the drastic changes in the Dow-Consumers relationship and the lack of candor shown by Consumers as to those changes (see paragraphs 29-33, 42-51 below) required immediate suspension. On the basis of such decisions as Hammond Packing Co. v. Arkansas, 212 U.S. 322, 350-51 (1909), Alabama Power Co. v. FPC, 511 F.2d 383, 391 (D.C. Cir. 1974), and Warner Barnes & Co. v. Kokosai Kisen Kabushiki Kaisha, 102 F.2d 450, 453 (2d Cir. 1939) (per L. Hand, J.), Intervenors argued that Consumers' attempts to

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* The Board also noted that Consumers had been acting for over 3 years "in reliance on the [construction] permits [originally] issued by the Commission." However, that time lag was not the parties' fault (see paragraph 12 above), and, in view of the prohibition against considering "sunk costs" when restriking the cost-benefit balance (see paragraph 19 above), it does not of itself militate against a suspension otherwise appropriate. The Board's point was that Consumers is entitled to a hearing--not that three (or even ten) years of operation pursuant to an invalid permit could ex post facto legitimate it.

manipulate the testimony of Dow witnesses justified an inference "that prospects for the success of the Midland project are even worse than we have already found out." The Board has not yet ruled on that Motion. Finally, on March 12, 1977 Intervenors asked the Appeal Board for an immediate halt to construction, repeating their earlier arguments to this Board and asserting that although both Consumers and the Staff had finished their direct presentations, the record contained no showing that construction should be permitted to continue. In the same ruling denying Consumers' motion to stay these proceedings, the Appeal Board declined to act on Intervenors' motion, on the ground that the suspension issue should be determined by this Board. Consumers Power Company (Midland Plant, Units 1 & 2), ALAB-395, 5 NRC ____ (April 29, 1977).

II.

THE NATURE OF THE SUSPENSION ISSUES AND THE PARTIES' PRESENTATIONS.

24. The hearings before this Board on the suspension issue occupied very nearly a full month of actual trial time. Hearings were held on November 30, 1976; December 1-3, 1976; January 18-21 and 31, 1977; February 1-4, 7-9, 11, 15, and 16, 1977; March 21, 23, and 24, 1977; and May 9-13, 1977. In addition to the hearings themselves, the parties have also submitted several hundred pages of written testimony and well over a hundred exhibits. Because of the length and complexity of the hearings and the evidence before the Board, it is appropriate to preface our detailed examination

of the evidence with an overview of the issues before the Board, the nature of the evidence presented, and the positions of the parties.

A. The Issues in this Proceeding.

25. At the opening of the hearings on November 30, 1976, the Board noted that the Court of Appeals had remanded the following issues to the Commission for reconsideration in this case (Tr. 4):

> " . . . Energy conservation as a partial or complete substitute for construction of the [Midland] facility, any changed circumstance concerning the need of the Dow Chemical Company for process steam, the impacts of the continued operation of Dow's fossil-fuel generating facility, clarification of a report by the Advisory Committee on Reactor Safeguards, and the environmental effects of nuclear waste disposal and fuel reprocessing."

The Board went on to point out that, although "the Commission originally appointed this Board to consider whether the construction permits should be continued, modified, or suspended until an interim rule regarding the fuel cycle issues could be placed in effect," on November 5, 1976, the Commission had also directed the Board to consider "all the issues that were remanded by the Court of Appeals"--except for the fuel cycle issue, concerning which "the Commission ruled that we should defer proceedings relating to suspension on the basis of fuel cycle issues." Tr. 5-6.* However, the Board made it clear that these hearings were not to be

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* As of May 4, 1977, the fuel cycle issues were again placed before the Board. However, because of the late occurrence of that event in terms of these hearings and the importance to the parties and the public of a prompt ruling on the suspension issue, the fuel cycle issues have not yet been considered by the parties or the Board. See paragraph 58 below.

considered the full hearings on remand ordered by the Court of Appeals and directed by the Commission. Rather, "the purpose of this particular hearing is to determine whether the construction permits for the facility should be continued, modified, or suspended pending completion of the reopened hearing." Tr. 6.

26. The Commission's August 16, 1976 General Statement of Policy set forth several factors to be considered in reaching a determination on the suspension issue, as opposed to the ultimate hearings on the merits and restriking of the cost-benefit balance (41 Fed. Reg. at 34709):

> "It is the Commission's understanding that resolution of [the suspension] question turns on equitable factors well established in prior practice and case law. Such factors include whether it is likely that significant adverse impact will occur until a new interim fuel cycle rule is in place; whether reasonable alternatives will be foreclosed by continued construction or operations; the effect of delay; and the possibility that the cost/benefit balance will be tilted through increased investment.[Citations omitted.] General public policy concerns, the need for the project, the extent of the NEPA violation, and the timeliness of objections are also among the pertinent considerations. [Citations omitted.]

27. Putting aside for the moment Intervenors' contention that suspension is required here as a matter of law (see paragraph 23 above), we believe that applying the suspension factors enunciated by the Commission to this proceeding results in presenting three major questions for decision at this stage:

1. Whether the record made so far enables us to say with reasonable assurance that a significant alteration of the cost-benefit balance is unlikely to result from full consideration of the issues remanded by the Court of Appeals, and restriking of the cost-benefit balance, during the remanded hearings on the merits.

(In view of the inevitable tendency of continued construction to foreclose alternatives and "skew" the cost-benefit balance, as the Appeal Board recognized in Consumers Power Company (Midland Plant, Units 1 & 2), ALAB-395, 5 NRC ___ (April 29, 1977), if we do not have a reasonable assurance that the remanded hearings will terminate in favor of the Midland project, a continuation of construction pending the outcome of those hearings cannot be justified.) This requires us to examine each of the issues remanded by the Court of Appeals, in order to determine whether on the record before us they present "a fair ground for. . . more deliberate investigation," so that a halt to construction is required. See Hamilton Watch Co. v. Benrus Watch Co., 206 F.2d 738, 740 (2d Cir. 1953).

2. Whether continued construction is necessary in order to permit Consumers adequately and reliably to fill the needs of its customers--or, put another way, whether a suspension would significantly impair Consumers' ability to serve those needs. In this connection, Consumers has argued that the remanded hearings on the merits are likely to last between five and nine months, and that (because of start-up delays and the like) a five- or nine-month suspension will probably result in an overall nine- or fifteen-month delay in the commencement of commercial operations by the Midland facility.* Accordingly, the question is whether Consumers' needs are so critical that a delay of that length--especially when viewed against Consumers' previous self-induced delays aggregating some seven or eight years (Tr. 407)--cannot be tolerated.

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* Intervenors have challenged the reasonableness of these time estimates and the extensive record already developed during these hearings suggests that less time may be required for the full remanded hearings than might otherwise be the case. A substantial question also exists as to whether the asserted start-up delays will last as long as estimated. Staff witness Lawrence Crocker, who testified on that question, conceded on cross-examination that his estimates (given in the text) were not based on any firsthand information. See paragraph 37 below. Conversely, the remanded hearings may require longer than estimated; that would pro tanto increase the liklihood that continuing construction--or, hypothetically, completion of the entire project--will foreclose alternatives, and thus increase the importance of preserving the status quo vis-a-vis those alternatives by declining to allow continued construction.

3. Whether the incremental costs occasioned by a nine- or fifteen-month delay in the commercial operation date of the Midland facility--assuming that they can properly be considered at all (see paragraph 74 below)--are so large as to militate against suspending further construction while the remanded hearings fully explore the merits of the issues identified by the Court of Appeals. In this connection, it is pertinent to recall that--again, for reasons unrelated to any proceedings before the Commission or the Court of Appeals--the cost of the Midland Plant has increased hugely during its construction, and now stands at approximately $1.67 billion. See paragraph 13 above.

Because Consumers stands in the shoes of an applicant for a license--the ruling of the Court of Appeals having undercut the basis for the original grant of a construction permit to Consumers--and because, as noted above, any continuation of construction inevitably tends to increase the difficulty of fully and fairly considering the remanded issues on the merits, Consumers bears the burden of proof on the suspension issue. Consumers has so recognized (Tr. 4126). Whether the ultimate suspension decision is perceived as one of "public policy" or "equity" (as Consumers suggests, Tr. 146), or as one of "likelihood of success on the merits" in the remanded hearings (as the Staff proposes, Tr. 158), any significant showing of facts tending to tilt the cost-benefit analysis against the Midland project, or indicating that a smaller facility than the one presently proposed may be adequate to meet Consumers' needs, warrants a halt to continued construction pending complete exploration of the issues. That is particularly true if such facts--tested on the basis of presently available information, as required by Commonwealth Edison Co., ALAB-153, 6 AEC 821, 823-24 (1973)--are not offset by new facts more favorable to continued construction than the facts available to the Licensing Board at the time of its Initial Decision.

B. The Positions of the Parties.

1. Consumers.

28. A discussion of Consumers' position during the suspension hearings must necessarily begin with a brief recitation of the facts surrounding Consumers' presentation of the testimony of Joseph G. Temple, who was until December 13, 1976 General Manager of Dow's Michigan Division and as such the Dow official most directly familiar with and responsible for Dow's participation in the Midland project, and who has now been promoted to the position of Vice President and Director of Marketing for Dow U.S.A. and membership on its Operating Board (Tr. 218, 385).*

29. Since the Dow-Consumers relationship is the principal reason for the present design and location of the Midland facility (see paragraph 4, above), a major--if not the major--issue in the suspension hearings is whether the Dow-Consumers relationship has undergone significant alteration. Accordingly, on October 21, 1976 the Board opened discovery concerning the Dow-Consumers relationship, and Consumers' evidentiary presentation began with the written testimony of Joseph G. Temple, incorporated into the record at

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* On June 15, 1977 the Board repeated that-though it has ordered the parties to complete the record concerning certain issues arising from the Temple testimony--it will not now decide those collateral issues, including the question of whether (and, if so, what) sanctions should be imposed against Consumers. Such issues unnecessarily interfere with a prompt decision on the suspension issue, which is required both by the public interest and in fairness to the parties. As appears below, however, the circumstances surrounding the Temple testimony inevitably tend to affect the credibility of much of Consumers' other presentation in this proceeding, and therefore merit brief description here.

Tr. 220. That testimony asserts (at pp. 2-3) that "at the present time circumstances have not changed sufficiently to call for a modification of Dow's commitment to nuclear produced steam to be supplied by Consumers Power in March of 1982. Under the present circumstances as known to Dow, the nuclear alternative remains the most attractive one economically."

30. That statement is at best seriously misleading, and at worst false. It omits the extremely important facts--unearthed by Intervenors in discovery--that: (i) Mr. Temple and Dow's Michigan Division have affirmatively concluded and repeatedly stated that the Midland nuclear project is no longer advantageous to Dow (see Board Ex. 1); (ii) although the Dow corporate review of the Division recommendations resulted in the decision that Dow would not oppose the Midland project in these hearings, that decision was largely if not entirely based on Consumers' threat to sue Dow for some $600,000,000 if Dow did not actively support the project, a threat Dow's counsel termed "pretty damn close to blackmail" (Midland Intervenors' Exhibit 25); and (iii) Dow's corporate management is so disenchanted with Consumers in general and the Midland project in particular that, if the Dow-Consumers contract were tendered to Dow today, Dow would refuse to sign it (Tr. 414-17, 2320, 2322, 2707). See paragraphs 42-51 below.

31. The record shows that Consumers knew those facts, but deliberately chose to conceal them from the Board. Mr. Temple so testified (Tr. 2379-82), and the documentary evidence is clear.

At a meeting between attorneys for Consumers and attorneys for Dow on September 21, 1976--prior to the filing of the Temple testimony--Consumers, according to the written notes of one of Dow's attorneys, told Dow:

> "Consumers assumes Cherry [Intervenors' counsel] will not appear because of lack of funds--Consumers says suspension hearing most critical--they believe that since there is no discovery, and probably no Intervenor cross-examination--will be able to finesse Dow-Consumers continuing dispute." [Emphasis added.]

In order to further the "finesse," Consumers suggested that Dow witness might be someone from Dow Chemical U.S.A. or corporate area who is unaware of Midland Division recommendation to Oreffice."* After Dow declined to do as Consumers wished, Consumers:

> ". . .then made naked threat that if Dow testimony not supportive of Consumers (Note: no longer if we just go too far) and that results in suspension or cancellation of permit, then Consumers will file suit for breach and include as damages cost of delay, cost of project if cancelled and all damages resulting from cancellation of project if it causes irreparable financial harm to Consumers (bankruptcy). (Note: pretty damn close to blackmail.)" [Emphasis added.]

Midland Intervenors' Exhibit 25.

32. Mr. Temple himself agreed, on cross-examination by Intervenors, that his written testimony was at best seriously misleading (Tr. 2307; see also Tr. 2379-82):

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* Both Mr. Temple and Mr. Oreffice, President of Dow U.S.A., testified to Consumers' desire to use "a witness who wasn't the most knowledgeable." Tr. 2399-2400, 2703.

"Q. . . . Would you agree with me that the presentation of your testimony if the goal was to tell in complete detail, everything that was going on at that point, that your testimony was, as judged by that criteria, not open, not honest, and not consisting of all the relevant information?

"A. I would--I would agree to that."*

The record shows that Mr. Temple's written testimony was prepared primarily by Consumers. In response to a request by the Board, the parties submitted briefs on the issues raised by the Temple testimony. Documents presented by Dow show that--prompted in part by Consumers' threats of litigation--Dow regarded the nature and scope of the Temple testimony as a matter to be determined by Consumers rather than by Dow. See, e.g., the October 20, 1976 letter from Mr. Nute (Dow's counsel) to Mr. Renfrow (Consumers' counsel), Exhibit A1 to Dow's December 22, 1976 Memorandum Regarding Hearing Preparation (Midland Intervenors' Group Exhibit 60A):

"Enclosed is a copy of the outline for Mr. Temple's affidavit which you drafted on October 18, when you were in Midland, and a copy of Mr. Temple's affidavit that conforms to that outline. . . .

". . . . We have agreed that the matters of what to include and what to exclude are issues to be decided by Consumers' counsel as the affidavit will be used to support Consumers' brief." [Emphasis added.]

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* Consumers' lack of candor has evidently infected Consumers' dealings with Dow, as well as Consumers' behavior in these hearings. Concerning Consumers' financial situation, which within 118 days after the signing of the 1974 renegotiated Dow-Consumers contract had taken a "disastrous turn," Mr. Temple testified that "either [Consumers] financial planning was in a bad state of repair, or else we didn't get the whole story." Tr. 2505-2507. Also, Consumers' present response to several of Dow's contract negotiation demands has been affected by Consumers' desire to postpone until after these hearings any changes having an adverse impact on the cost-benefit analysis. Tr. 439-444, 2413-14, 2457-58, 2466, 2718-19; see paragraph 49 below.

As the letter indicates, by October 20, 1976, Consumers had taken the laboring oar in terms of what the Temple testimony was to say. Thereafter, Consumers again redrafted the Temple testimony; on November 1, 1976 two of Consumers' counsel traveled to Dow's Midland plant for that purpose. On November 4, 1976, Mr. Nute again wrote to Consumers' counsel, enclosing "the final version of Mr. Temple's testimony for the suspension hearing," which was "essentially the same as the draft [Consumers' counsel] prepared when you were here on Monday," and making the following comments concerning Consumers' draft of the testimony"

> "I want to reiterate my agreement . . . that the question and answer form of testimony is the preferred form . . . . Using such a form obviates our concern that your initial draft of Mr. Temple's testimony could be said to be misleading, or even disingenuous, by the Intervenors or the NRC. It now is clear that Mr. Temple is responding to specific questions asked by Consumers Power, rather than attempting to tell an all-inclusive story. Use of this form of testimony also underscores the fact that those matters which were chosen to be covered by Mr. Temple on direct examination were chosen by Consumers Power and not by Dow." [Emphasis added.]

Exhibit B to Dow's December 22, 1976 Memorandum Regarding Hearing Preparation (Midland Intervenors' Group Exhibit 60A).

33. The facts described in the preceding four paragraphs (none of which is open to any significant dispute, since they are drawn from documents for the most part) are extremely disturbing, and raise serious implications for this proceeding in terms of the overall candor of Consumers' presentation at the hearings. It is clear that, in preparing the written Temple testimony, Consumers knew of both the strong recommendations of Mr. Temple and Dow's

Michigan Division (which were discussed at length in the course of preparing that testimony) and the direct relevance and importance of that information in this proceeding. At the September 21, 1976 meeting described in M.I. Exhibit 25, Consumers' attorneys expressed the flat belief that "if Dow accepts Division recommendation and takes that position in suspension hearing, then construction license will be suspended for at least one year--no doubt about it." In a further Consumers- Dow meeting on September 24, 1976, Consumers' Chairman of the Board agreed (Midland Intervenors' Ex. 64; Tr. 2394-95) that if this Board learned that Dow's continued support of the Midland Plant was reluctant or shaky, the likelihood that continued construction would be allowed pending completion of the remanded hearings would drop dramatically:

> "If Dow gave lip service to the contract between Dow and Consumers Power, but indicated it did not like the deal anymore--the odds would be reduced to 50-50. It was added that this would be a high-risk situation."

Nor can it be seriously contended that Consumers did not realize the full implications of what it was doing. Board Exhibit 2 shows that Consumers quite frankly expressed its intent to "finesse" the facts by suppressing information, attempting to induce Dow to present a nonknowledgeable witness, and threatening litigation if Dow did not cooperate, and it appears from the record (Tr. 2572) that Consumers has also attempted to present its desired view of the facts to the Staff on an ex parte basis prior to these hearings. Mr. Temple certainly understood what Consumers wanted (Tr. 2399, 2401):

> "Q. . . . Mr. Temple, at any time did you or others at Dow Chemical Company, as a result of the Aymond

and Falahee threats, feel that Consumers Power Company was making an attempt to prevent evidence from coming into this case through you or any other Dow witness?

"A. Yes, it was suggested, I believe, in the same meeting that it might be possible for Dow to furnish a witness from the U.S. area or Corporate area who was not aware of the Division's conclusion with regard to the Midland Nuclear Plant. . . . . Mr. Aymond was also suggesting that they would certainly rather have someone from Dow who is more enthusiastic about the project than Joe Temple.

* * *

"Q. But ultimately the Michigan Division position in substance became the Dow Corporate position, aside from the lawsuit threat, is that right?

"A. Well, that's a big aside, but that's my view."

34. These facts compel the conclusion that Consumers knowingly undertook to suppress evidence on an issue which it knew to be not only material, but possibly determinative of the outcome of these suspension hearings. While the question of sanctions (if any) in that regard will be determined in a later ruling, the Board must note at this point that Consumers' conduct inevitably impairs the credibility of the testimony and evidence it has offered in this proceeding. That impairment is strengthened by the fact--again, brought to light by Intervenors--that Consumers has apparently taken positions in these hearings seriously inconsistent with positions it is contemporaneously asserting in other cases, both before the Commission (see paragraph 70 below) and before the Michigan Public Service Commission (see paragraph 77 below).

35. In addition to the evidence concerning the Consumers-Dow relationship, previously mentioned, Consumers presented evidence

concerning the need for power from the Midland Plant (including Consumers' system reserve requirements and reliability criteria), the costs which would result from a suspension, and the nature and cost of alternatives to the Midland facility. As appears from the analysis in Part III below, much of Consumers' evidence is flawed by the use of inaccurate or incomplete information (e.g., Consumers' Exhibits 11 and 13 concerning peak demand and energy supply), by a failure to take pertinent facts into account (e.g., the time value of money, in calculating the net costs attributable to a suspension), and by reliance on guesswork as a substitute for hard information in areas in which Consumers could readily have obtained the facts if it had wished to do so. An example is Consumers' claim that sales to municipalities and cooperatives, projected to be made from the Midland plant, will have to be made by Consumers even if operation of the Midland plant is delayed. Not only does Consumers' position regarding those sales ignore the availability of power from Detroit Edison (see paragraph 70 below), but also--and despite repeated requests from Intervenors--Consumers refused to present any witness from the municipalities or cooperatives involved for the purpose of examining whether the projected sales will in fact be made. Similarly, although Consumers repeatedly attempted to inject into the hearings matters pertaining to the effect of a suspension on utilities and purchasers outside Consumers' system, it never presented any witness with firsthand information on those matters. Under the circumstances, including the matters previously discussed regarding the Temple testimony, the Board cannot ignore

the long-standing rule of evidence that a party who fails to produce information within his control is presumed to have done so because the information is adverse to him. See 2 Wigmore On Evidence (3d Ed. 1940), § 285; United States v. Di Re, 332 U.S. 581, 593 (1948); Sims v. Georgia, 389 U.S. 404, 406 (1967). In other areas, the record also indicates that Consumers based arguments on assumptions which, while tending to skew the evidence in Consumers' favor were contrary to sound utility practice (an example is the "forced purchase" inputs to Consumers' cost production computer runs, discussed in paragraph 77 below), or generated important information in ways precluding any proper validation of its conclusions (as with the "probability encoding" method used to estimate long-term load growth: see paragraph 65-66 below). Nor is it clear that all of the deficiencies in Consumers' presentation have been exposed. As appears from the following three paragraphs, the Staff has undertaken little if any independent investigation of the facts and assumptions underlying Consumers' presentation, and while Intervenors have pointed out many deficiencies in Consumers' analyses, financial constraints have precluded them from retaining any expert other than Dr. Timm, whose full-time job as Supervisor of Energy Planning for the State of Oregon has inevitably limited the time available to him for review of the mass of testimony and exhibits offered by Consumers. Given those circumstances, and in view of the

facts surrounding the Temple testimony and the discussion of Consumers' other evidence in this paragraph, Consumers' overall presentation must be viewed with a degree of skepticism.

2. The Staff

36. The Staff's position in this proceeding has been generally supportive of Consumers, and has been almost exclusively based on the information submitted by Consumers rather than on independent information generated by the Staff. See, e.g., Tr. 4294, 4296 (cross-examination of Staff witness Lawrence Crocker):

> "Q. It's clear that with respect to all of your testimony about your judgments you made no independent analysis based on any data, isn't that correct?
>
> "MR. HOEFLING: Objection. What does he mean by 'independent analysis'?
>
> "MR. CHERRY: I mean one done by him based on data he's collected. Would he tell me about it, explain it to me, show me.
>
> "THE WITNESS: I think that it is a fair statement, yes."
>
> * * *
>
> "Q. And there is no specific data that was collected by anyone in terms of hard evidence to support any part of your testimony; it's just your judgment based on what you were told?
>
> "A. That is correct."

See also p. 1, ¶1 of the prepared testimony of Staff witness Sidney Feld, on Need for Facility; and see Tr. 5070, where the

Board learned that the testimony of Staff witness Arnold Meltz consisted only of a "personal opinion . . . plus publicly available records," which Mr. Meltz considered "normal" practice for the Staff. As the Board later explained (Tr. 5081), that suggests a tendency to rely uncritically on "data that had been supplied basically by the licensee." A similar tendency appears from the cross-examination of Staff witnesses Walter J. Gundersen (Tr. 5152-53, 5161, 5175-76) and F. S. Echols (Tr. 3068, 3117-20, 3130, 3135), and from the fact that the Staff's limited attempts to ascertain factual information bearing on Consumers' presentation consisted largely of asking Consumers itself to obtain the data. See, e.g., Midland Intervenors' Exhibit 49; Tr. 4370-71, 4397-99. Unfortunately, this tends to reinforce the implication Intervenors drew from Consumers' apparent belief that it could "prepare" the Staff to support its position. See Tr. 2572.

37. Apart from relying heavily on Consumers' data rather than on independent inquiry, the Staff testimony also contains assertions which, on cross-examination by the Board, proved to be without foundation. For example, Staff witness Lawrence Crocker asserted in his prepared testimony that completion of the Midland units as presently designed was preferable to changing to a smaller plant because even if all of the projected Midland capacity is not needed, the plant can be run at lower power levels. Under questioning by the Board, however, Mr. Crocker conceded (Tr. 4231-32) that he did not regard that alternative as realistic: "It would not be realistic to me, no. I would

not operate it at less than rated output."* Similarly, Mr. Crocker's testimony on ACRS issues suffers from his admission that he has no idea of whether, or at what cost, safety issues identified by the ACRS can be resolved (Tr. 4259-62, 4265-66), and his testimony that "a period of four to six months would be required for remobilization of construction effort" in the event of a nine-month construction suspension suffers from his admission (Tr. 4290-91, 4293) that he had made no attempt to determine through factual inquiry whether that figure was reasonable. The same dearth of information affects the testimony of Staff witness Sidney Feld. Although testifying at length concerning the need for the power to be produced by the Midland plant, under the Board's cross-examination Dr. Feld conceded that the Staff had made no independent attempt to verify Consumers' "probability encoding" load growth forecast, and had undertaken no independent analysis at all of any of Consumers' assumptions with regard to the need for power. Tr. 4472-73, 4480-82. Even though he feels the question important and "worth looking into," Dr. Feld also admitted that he had no idea whether such a large user of electricity as the City of Lansing did or did not purchase power from Consumers. Tr. 4477-79, 4488-92.

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* That admission is of particular importance because operation at a lower output is virtually the only alternative to constructing a smaller plant which Mr. Crocker proposed. Mr. Crocker conceded, at page 3 of his written testimony, that "continued construction of the Midland plant to the current design does tend to further preclude a subsequent change to a plant with a smaller output." However, if the only alternative to a smaller plant is "unrealistic," as Mr. Crocker admitted, and if continued construction increasingly precludes the smaller-plant option itself, then it appears that a very strong showing should be required before allowing continued construction to foreclose the smaller-plant option.

3. Intervenors

38. As appears from the preceding paragraph, among the parties, Intervenors shouldered most of the burden of inquiry into the accuracy, candor, and completeness of Consumers' presentation. Unlike Consumers (which was represented by as many as four lawyers and some 16 witnesses) and the Staff (five lawyers and six witnesses), Intervenors undertook that task with the aid of only one expert witness (Dr. Richard Timm) and (except for the cross-examination of Dr. Timm) only one lawyer. Intervenors repeatedly requested financial assistance from the Commission, so that they could retain additional experts and present a fuller case,* but both the Board and the Appeal Board concluded that any such assistance was precluded by Commission policy. In the Matter of Nuclear Regulatory Commission (Financial Assistance to Participants in Commission Proceedings), NRCI-76/11, 494 (November 12, 1976). As stated in the Board's Order of February 25, 1977, it reached that conclusion in full recognition of the value of Intervenors' participation in these hearings and in the hope that Intervenors would be able to continue.

39. In addition to cross-examining most (though not all) of the witnesses put forward by Consumers and the Staff, Intervenors submitted a total of 130 pages of written testimony and numerous exhibits prepared by Dr. Timm. The bulk of Intervenors' prepared testimony and exhibits asserts the existence of multiple errors,

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* With very few exceptions, the witnesses appearing for Consumers and the Staff testified in the course of their regular employment, so that no out-of-pocket expense was incurred and the witnesses could devote as much time to their testimony as Consumers or the Staff desired.

inconsistencies, and incorrect or misleading assumptions in Consumers' presentation. Although Consumers cross-examined Dr. Timm for almost a full week, and took issue with the correctness of Dr. Timm's recalculation of Consumers' data, the existence of the errors in Consumers' presentation described by Dr. Timm is for the most part unchallenged. As appears from the discussion in Part III below, after the correction of occasional computational errors in the exhibits prepared by Dr. Timm, those exhibits indicate that both Consumers' claims of a need for the power to be produced by the Midland plant and its estimates of the incremental costs of a suspension are seriously exaggerated. In fact, Intervenors assert that a five- or nine-month suspension of construction* will not impair Consumers' ability to serve its customers, and that the incremental costs of a suspension are both insignificant in terms of the overall costs of the Midland plant and insufficient to offset the strong probability that continued construction of the Midland plant pending completion of the remanded hearings on the merits will tend to foreclose most, if not all, of the favorable alternatives to the Midland plant in its present form. As previously noted, in addition to those contentions, Intervenors also assert that an immediate halt to construction is required as a matter of law for several reasons.

4. Dow Chemical Company

40. Finally, the position of Dow Chemical Company in these proceedings must briefly be considered. Initially, Dow

* The period may be either longer or shorter, as noted in paragraph 27 above. Intervenors have used the 5-month/9-month figures suggested by Consumers, however, in order to minimize disputes over computation procedure.

took the position that it was not a party here in any sense, since it had withdrawn from the proceeding in the Court of Appeals (Tr. 119-122), and throughout the proceeding Dow has refused to take any position as to whether or not it remains contractually obligated to Consumers. Tr. 939-40, 2432-33. While Dow "officially" supports the Midland project and Consumers' position here, that support is reluctant at best and induced largely by Consumers' litigation threats (see paragraph 51 below), and is subject to reevaluation in the event of "any significant change that might take place from the current conditions--that could include almost anything." Tr. 323. In fact, Mr. Oreffice, President of Dow U.S.A., testified that he could only "speculate" concerning whether, "if the [Dow] corporate review [resulting in Dow support] were conducted today . . . the same conclusion would be reached" (Tr. 2690), and the extensive testimony and documentary evidence submitted by Dow shows that: (i) Dow regards the Midland project as only marginally (if at all) advantageous to it, (ii) Dow does not consider Consumers to be reliable and doubts that it can complete the project on the present time and cost schedule, and (iii) Dow is seriously considering rejecting any further involvement in the project and suing Consumers for breach of contract. Although Dow has submitted proposed Findings, they are extremely cursory and do not address (let alone alter) that testimony. Rather, they appear calculated to avoid any statement which might impair Dow's "realistic option" of withdrawing from the Midland project on the ground of Consumers' breach. See Tr. 2432, 2516, 2522, 2524, 2730, and paragraphs 42-51 below.

III
ANALYSIS OF THE EVIDENCE AND CONCLUSIONS

41. As we noted in Part II(A) above, it is not the purpose of these hearings--nor, on this record, is it yet possible--to undertake a complete restriking of the Midland cost-benefit analysis on the basis of a full consideration of all the issues remanded by the Court of Appeals, and of all significant changes in the facts during the four and one-half years since the Licensing Board's Initial Decision in this case, as required by Commonwealth Edison Co., ALAB-53, 6 AEC 821, 823-24 (1973). Rather, the Board now confronts only the three major questions described in paragraph 27 above. We discuss those questions below, looking first to the condition of the record with regard to the issues remanded by the Court of Appeals, next to the impact (if any) of a suspension on Consumers' ability to serve its customers during the suspension period, and finally to what costs are attributable to a suspension and whether they are significant in light of the history of this case and the record in these hearings. Throughout, the ultimate inquiry is whether continued construction of the Midland plant pending completion of the full remanded hearings on the merits--thus risking the foreclosure of desirable alternatives to the Midland plant and, in the words of the Appeal Board in Consumers Power Company (Midland Plant, Units 1 and 2), ALAB-395, 5 NRC _____ (April 29, 1977), allowing Consumers to "have its cake and eat it, too"--is justified.

A. Can It Be Reasonably Concluded That The Full Remanded Hearings On The Issues Identified By The Court Of Appeals Will Not Produce A Significantly Altered Cost-Benefit Analysis?

1. The Consumers-Dow Dispute and the Slippage in Costs and Timing of the Midland Project.

42. An indication of the current position of Dow Chemical Company concerning the Midland project can be gleaned from the discussion in paragraphs 29-33 above concerning the Temple testimony. However, the record contains much more detailed evidence as to Dow's position. Since Dow's support of the Midland project is crucial to its success and to its feasibility, as the original Environmental Impact Statement acknowledged (see paragraph 4 above), we begin with the evidence on that subject.

43. Two primary factors bear upon Dow's position: factors pertaining to the Midland project itself, and factors pertaining to Dow's ability to operate its present fossil-fuel generating plant past 1980. The latter factors are of great importance because if in fact Dow cannot operate its existing facilities past 1980, then it will inevitably have to invest in other facilities to meet its needs without regard to whether Midland construction is suspended. Even on the present schedule Consumers does not anticipate that either unit of the Midland plant will be placed in operation prior to sometime in 1981.* Naturally, Dow's

* Quite apart from the issue of suspension and the possible effect of the remanded hearings, there is reason to doubt whether the 1981 date is one in which we can have confidence. As Dow's Mr. Temple testified (Tr. 407, 2299), Consumers has repeatedly promised that the Midland plant would be placed in operation at a given time--and, just as repeatedly, has been wrong.

willingness to support the Midland project is conditioned on its ability to obtain electricity and steam from the Midland plant before its own fossil-fuel facilities must be shut down or rebuilt. Otherwise, Dow would be placed in the untenable position of being compelled to spend large sums of money for new generating facilities pending completion of the Midland nuclear plant, and, at the same time, be committed to spending additional large sums for redundant electricity and steam from the Midland plant itself.

44. From Dow's point of view, the pertinent dates are 1980 and 1984. The written testimony of Joseph Temple points out (at p. 4) that, although Dow's fossil-fuel facilities violate applicable Michigan air pollution requirements, the Michigan Air Pollution Control Commission has consented to continued operation of those facilities until 1980, but adds that no post-1980 prediction is possible:

> "Continued operation of these units beyond 1980 will be dependent upon obtaining a further consent order from the MAPCC. It is not possible to predict at this time whether such an order can be obtained or for that matter what new regulatory or statutory provisions Dow may be faced with at that time." [Emphasis added.]

If the MAPCC will not accept an extension of the Consent Order past 1980--a point we cannot now determine--then the nuclear plant becomes a burden, rather than a possible advantage, both from Dow's point of view (see paragraph 43 above) and from the full cost-benefit standpoint (see paragraph 4 above). This "unknown", which must be fully explored during the remanded hearings, therefore argues against continued construction and expenditure of large additional sums pending those hearings.

45. It is possible, however, that MAPCC will consider an interim extension of the Consent Order past 1980, provided that there is some reasonable degree of assurance that completion of the Midland nuclear plant will not be unduly delayed. However, for other reasons there is a 1984 outer limit on Dow's ability to await commercial operation of the Midland plant. Dow has advised both the MAPCC (Board Exhibit 3) and this Board that, come what may, it cannot operate its existing facilities past 1984:

> "[Dow's present] facilities are quite old, with major pieces of equipment that will be 30 to 50 years old in 1982. Dow is concerned that some of these turbogenerators and boilers already may have been stretched beyond their meaningful life. Dow has studied as carefully as it can how much further these powerhouses can be pushed, and it has concluded that there is simply no way in which they can be made to operate safely and reliably beyond 1984 at the outside. Dow will be continuously reviewing the situation to see whether 1984 itself isn't indeed too far."

46. Just as Dow's willingness to continue supporting the Midland project is heavily dependent on Consumers' ability to meet the required completion date, Dow's position is also heavily dependent upon questions of cost. As previously noted, since the execution of the initial Consumers-Dow contract in 1967, the cost of the Midland project has soared. The $554,000,000 estimate given in the final Environmental Impact Statement (on which the original cost-benefit analysis was based) has more than tripled, and Consumers presently estimates the cost of the Midland project at $1.67 billion. That estimate itself is open to considerable doubt. It appears that the $1.67 billion figure rests on highly optimistic assumptions concerning labor troubles, QA-QC problems,

and the like which have not proved justified in the past (Midland Intervenors' Exhibit 68--notes of a May 19, 1976 Dow-Consumers meeting--at p. 21) and may not be valid in the future. Tr. 2412, 2722-23; Midland Intervenors' Exhibit 68 (notes of a September 13, 1976 Dow-Consumers meeting), p. 7; see also paragraph 56 below. Although the prepared testimony of Mr. Joseph Temple asserts (at pp. 2-3) that "under the present circumstances as known to Dow, the nuclear alternative remains the most attractive one economically," on cross-examination Mr. Temple candidly admitted that the economic advantage is tenuous if not nonexistent. For some time, both Mr. Temple (in his former capacity as head of Dow's Michigan Division) and the Michigan Division itself have taken the position that the Midland nuclear plant is no longer attractive economically, as well as for other reasons (Tr. 2288-2290):

> "Q. By the time of your testifying in Midland, you had already told Consumers Power Company, either in writing or orally, that you believed that the cost-benefit analysis in favor of nuclear steam was about to be lost if it wasn't lost already. Isn't that correct?
>
> "A. I would like to rephrase it. I said that as far as Dow was concerned, we had concluded that it was not likely to be advantageous for us, the Division.
>
> "Q. And you meant not likely economically?
>
> "A. Economically.
>
> "Q. And that is still your position, isn't it?
>
> "A. Yes, it is. Although there is today, still based on the $1.67 billion cost and the March, 1982 startup, some economic advantage to the

nuclear system versus our own internal alternative, strictly on the economic basis.

* * *

"A. . . . . There are other noneconomic factors that cause me and others on the negotiating team to feel that as the future unfolds and events took place, that the economic advantage would disappear and probably become a disadvantage."

If the current Bechtel Power Corp. estimate of the total Midland project cost is correct, in fact, the marginal economic advantage to which Mr. Temple referred has already disappeared (Tr. 2290-2291):

"A. . . . . The economic advantage that nuclear has over our proposed new powerhouse, if we were to build one in the Division, is about $4 million per year in cost of steam and electricity. And there are several factors not terribly large, that would cause that advantage to evaporate if they all went against the nuclear case.

* * *

"A. Well, if the cost of the plant indeed was higher than $1.67 billion, that advantage would disappear. If the relationship between the costs of nuclear fuel and the costs of coal were to change significantly, that would affect it. Almost any combination of cost factors and capital that work to the disadvantage of the nuclear case, such that $4 million disappears out of the total cost of, I think in the range of $100,000,000--

"Q. So we are talking about an advantage of about four percent a year, which is eroded by any increased capital costs, is that correct, on an annual basis?

"A. Well, for instance, I looked at the number that Bechtel has given to Consumers as a potential increase in costs of $90,000,000, and if nothing else changed, that would evaporate the advantage of the nuclear project versus the current coal-fired facilities that we would anticipate we might build now. Although as you know, there is other technology we are considering."

That testimony gains added force from the fact that Consumers' own in-house review team concluded that the $1.67 billion figure should be increased by $80,000,000--just $10,000,000 short of the Bechtel figure (Tr. 5684) and that, as noted above, the Consumers/Bechtel figures appear to err on the side of optimism. Although Consumers has officially declined to adopt the result of its in-house review, we cannot ignore the significance of that review and, in light of the testimony of Mr. Temple just quoted, its significance in this proceeding.

47. The conclusion drawn by Mr. Temple and the Michigan Division from the standpoint of the timing and cost issues just discussed is as follows (Tr. 2322):

> "Q. If your position and Dow's position are inconsistent, then tell me both. Now with that background, let me state the question again: From Dow's standpoint, would you agree with me today that from a cost-benefit standpoint, knowing all you know including the prospect of an increased price and everything we know, that we have discussed, that the project should not be continued?
>
> "A. From Dow's point of view?
>
> "Q. Yes.
>
> "A. I would agree with that."

Mr. Oreffice, President of Dow U.S.A., agrees (Tr. 2707):

> "Q. Now, Mr. Oreffice, you are familiar generally with the terms and conditions of the arrangement with Dow Chemical and Consumers Power; are you not?
>
> "A. Yes.

"Q. With the $1.6 billion cost, the schedule, 1981-82, and the hardness or lack of hardness of those figures; in other words, I want you to take exactly that situation as it exists today with all of the uncertainties or certainties and if there were no contract with Consumers Power at all today, none at all, would Dow Chemical sign that contract today?

"A. The contract, as of today, would we sign it today? This is an opinion, a speculation; no."

The analysis on which that conclusion is based is broadly accepted within Dow, and has not been challenged or questioned by the Operating Board of Dow U.S.A. See Tr. 409-10, 460, 2299-2301, 2309, 2311-2312, 2494-95, 2699, 2707-09. Particularly in light of the substantial evidence that fossil-fired alternative facilities are both feasible and more economical from Dow's viewpoint than the Midland project is likely to be (Midland Intervenors' Exhibit 26, an analysis of alternatives prepared by Dow; Tr. 2405-2411, 2417-19, 2456-57, 2492, 2553-55) and in view of the Board's obligation to determine the issues on the basis of presently existing facts, Commonwealth Edison Co., ALAB-153, 6 AEC 821, 823-24 (1973), the doubtful or nonexistent character of the financial benefit of the Midland project to Dow is a matter of grave concern. It cannot blandly be ignored on the theory that, economic or not, Dow is contractually obliged to purchase steam and electricity from the Midland project. The purpose of the NEPA cost-benefit analysis required by the Court of Appeals is to determine where the true economies or diseconomies, and thus the true public interests, lie, independent of contractual coercion; in any event, this record does not permit a conclusion as to whether or not the Consumers-Dow contract requires (though from

a NEPA standpoint it clearly cannot justify) Dow to endure economic hardship for the sake of the Midland project. As noted in paragraph 40 above, during these hearings Dow has assiduously resisted all attempts to compel it to take a position on whether the contract is binding, though it has asserted that repudiation and suit on the ground of breach is a "realistic option." Tr. 2432, 2516, 2522, 2524, 2730.

48. In addition to the issues of increasing costs and uncertain completion dates, Dow management also expresses concern over Consumers' financial ability to complete the Midland project. As Consumers' answers to interrogatories indicate, in 1974 Consumers suffered what Mr. Temple described (Tr. 2505) as "a disastrous turn of events financially," such that it was compelled to slow down construction of the Midland facility due to lack of funds and the value per share of its common stock dropped almost 50 percent between 1973 and 1974. While the value of its stock has since risen, Consumers' November 9, 1976 stock prospectus, quoted in the prepared testimony of Staff witness Arnold Meltz (fol. Tr. 5065), indicates that Consumers' ability successfully to finance completion of the Midland project depends in large part on factors not within Consumers' control:

> "The Company [i.e., Consumers] will need significant and timely rate increases if revenues and income are to reach and be maintained at levels which will result in sufficient internally generated funds to meet its operational requirements and permit external financing of its construction program at reasonable cost."

Even if rate relief is granted, that will not alone suffice to finance completion of the Midland plant. Consumers' prospectus also notes that in order to finance its construction program and meet debt maturities, "it will be necessary for the Company to sell substantial additional securities, the amounts and types of which have not yet been determined," and that Consumers' ability effectively to finance construction through the issuance of securities "will be contingent upon increases in earnings through rate increases or otherwise." Meltz, supra, p. 5. Consumers' 1976 Annual Report (Midland Intervenors' Exhibit 57) supports that view, adding (at pp. 1-2) that its rates are "inadequate," its preferred stock and bond credit ratings are "low," it has issued stock at less than book value, and it will be unable to achieve "adequate earnings and stock performance" without large rate increases, which past experience indicates will not easily be obtained. Both because Consumers was apparently less than candid with Dow concerning its financial difficulties (see Tr. 2505-07) and because of the other factors just described, Mr. Temple and Mr. Oreffice (speaking for Dow management generally) have expressed a lack of confidence in Consumers' financial and management ability (Tr. 407, 2709, 2711-12), and Mr. Oreffice categorized Consumers' proposal that Dow make a $400 million interest-free loan to Consumers to help finance continued construction as "extortion" (Tr. 2710-11, 2723-24). That proposal itself, in fact, raises serious questions about Consumers' financial ability to complete the Midland plant--a goal which Staff witness Mr. Meltz (supra, at p. 7) considers

"attainable" but concerning which he immediately adds: "Whether it will be attained is not something one can answer with any degree of certainty." The record indicates that the $400 million loan is quite possibly essential to Consumers' plans for completion of the Midland project, and also that there is little or no prospect that Dow will agree to the loan. Tr. 2427-30, 2711-12, 2720-21, 2723-24. The record also indicates that, loan or no loan, Consumers will be unable to finance completion of the Midland project unless it succeeds in selling a sizable portion of Midland projected capacity to certain municipalities and cooperatives--sales which may never materialize (see paragraph 70 below) and which are presently barred by the Consumers-Dow contract. See Midland Intervenors' Exhibits 29 (a Consumers memorandum to file dated September 14, 1976); and 67 (notes of a September 13, 1976 Dow-Consumers meeting). These facts indicate that Dow's lack of confidence in the Midland financial picture is far from groundless, and is shared by Consumers itself. We cannot ignore those problems in our analysis.

49. A further factor in Dow's reluctance wholeheartedly to support the Midland project is the ongoing negotiations between Dow and Consumers concerning contract revision. Since the 1974 revisions (outlined in paragraph 5 above), Dow's lack of confidence in Consumers and Consumers' repeated announcements of cost increases and completion delays have led Dow to formally demand adequate assurance of performance from Consumers, without receiving what Dow regards as a satisfactory response (Tr. 664-65, 2524);

to consider as a "realistic option" a breach-of-contract suit against Consumers and a possible claim that the contract has been abrogated by Consumers' breaches (Tr. 2432, 2522, 2524, 2730) and thus avoid taking any final position here with regard to the validity of the contract (Tr. 939-40, 2432-33); and to demand, so far with no success, contract revisions which would put an absolute outer limit on Dow's alleged obligation to deal with Consumers and relieve Dow of any and all restrictions on its "right to make, purchase and utilize process steam and electric power at any time at the [Dow] Midland Plant" (Temple Testimony, p. 7; Tr. 2695-96). In particular, Dow regards removal of the contractual restrictions on its generation and use of its own power as essential in order to preserve Dow's flexibility and--as it has repeatedly stated (see paragraph 40 above)--to keep its options open. Tr. 2356. Those contractual restrictions are also a subject of concern to this Board. It appears that Dow is barred from sharing or resale of electricity provided by Consumers (Consumers' Exhibit 7(b), ¶4), which effectively increases its cost to Dow since Dow must pay for 60% of its contract demand whether it uses the electricity or not (Tr. 2384).* In addition, Dow is barred from sharing or resale of steam (Consumers' Exhibit 7(c), ¶10; Tr. 2356-57), and

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* Dow's cost is also increased if Consumers is correct (which Dow disputes) in asserting that Dow must pay for its full electricity contract demand even before steam is available. Tr. 2456-57. Dow believes that Consumers has taken that position, at least in part; in order to avoid the "eroding effect on the cost-benefit relationship" which would flow from accepting Dow's position. Tr. 2457-59.

Consumers has demanded, as a condition of any alteration in those provisions, that Dow agree to a noncompetitive price clause and a firm 10-year, 100%-of-need contract and in effect to language barring Dow from buying power from any third party which itself buys from Consumers (Midland Intervenors' Exhibit 78, pp. 6, 7, and 18 of Dow's minutes of a February 24, 1976 Dow-Consumers meeting). These provisions appear to present a "situation inconsistent with the antitrust laws." Because we have no antitrust jurisdiction, on June 15, 1977 we referred the matter to the Appeal Board--before whom the Midland antitrust decision is now pending--with the suggestion that the Midland Antitrust Board be directed to reopen the record.

50. As a result of the facts described in paragraphs 42 through 49 above, the Dow-Consumers relationship, vital to the success of the Midland project, has eroded to the point where the parties are now further apart than they have ever been before concerning the Midland project (Tr. 409, 2296-98, 2707-09). Dow presently has no confidence in Consumers' overall management ability vis-a-vis the project, in its ability to finance completion of the project, in its projected on-line dates for the Midland plant, or in its cost estimates--which have already increased so far that the Midland project is at best only "marginally" advantageous to Dow and may even be economically disadvantageous (see paragraph 46 above). Tr. 407-09, 2289-90, 2299-2301, 2311-12, 2505-07, 2513-14, 2708-09. Dow considers repudiation of its contract a "realistic option" (see paragraph 49 above), and Messrs. Temple

and Oreffice testified that Dow would abandon the contract if it could do so without penalty and, if the contract were tendered today, would probably be unwilling to sign it. Tr. 405-06, 2288-89, 2311-12, 2322, 2707; see paragraph 47 above. It also appears that Dow's own projections indicate that self-generation of Dow's electric and steam needs would be less costly to Dow than continuing with the Midland project.* Under date of January 13, 1977, Dow prepared a comparison of alternatives, including the nuclear option, for supplying its steam and electric needs (Midland Intervenors' Exhibit 26), basing its nuclear cost estimates on Consumers' data and its non-nuclear estimates on the best information available (including some data from Consumers). Tr. 2293-94, 2404-09, 2553-55, 2738-39. The comparison shows that Dow self-generation of electricity, with steam as a by-product, from a coal-fired plant is less expensive to Dow than the Midland project by some $43,000,000 per year, and slightly less expensive than the Midland project even on a 20-year total cost basis if a 15% return on investment--a reasonable figure (Tr. 2408)--is assumed. That alternative, Case C on Midland Intervenors' Exhibit 26, includes projected inflation (Tr. 2732) and the cost of complaince with all environmental regulations (Tr. 2492); it involves fewer "unknowns" than any of the others

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* Intervenors have also argued that a similar alternative, coupled with an 800 MW fossil-fired plant to be built by Consumers, would be less costly (a) to Consumers and (b) overall than completion of the Midland project. See paragraph 78 below. For present purposes, however, we limit our analysis to Dow's costs.

considered, including the nuclear options (Tr. 2405-06, 2417-19). In response to questions by the Board, Mr. Oreffice testified that Dow would have "no problem at all" in obtaining the necessary capital to proceed with the Case C alternative. Tr. 2739-41.

Conclusion

51. It is impossible to conclude that the facts analyzed in the preceding nine paragraphs will not play a major, perhaps decisive role in the restriking of the Midland cost-benefit balance following the full remanded hearings on the merits. Without Dow's active support and participation--which on this record is at best extremely reluctant and subject to change at any moment--the Midland project in its present form is neither economically nor environmentally justifiable. See paragraph 4 above. Its costs have more than tripled since the original cost-benefit analysis, and may already have reached the point at which it is an economic burden to Dow (see paragraphs 46 and 50 above); in addition, the record compels serious doubt as to whether Consumers can finance the project in its present form. Dow is most unlikely to advance the $400 million interest-free loan Consumers has demanded, and even if the loan were made it would further tilt the economic balance against the project from Dow's standpoint. Similarly, the sale of capacity to municipalities and cooperatives, important for financing purposes, may not materialize and apparently cannot take place without

changes in the Dow-Consumers contracts. See paragraph 48 above, and cf. paragraph 50, noting the deep gulf between the parties' negotiating positions. The current state of negotiations and the antitrust problem outlined in paragraph 49 above add a further element of uncertainty. If Dow does not prevail in the negotiations, litigation is a real possibility; but if Dow does obtain the changes it wants--an outcome we cannot predict--the cost-benefit balance will be affected adversely to the Midland project, according to Consumers' negotiating team. All of these factors will require fuller exploration during the remanded hearings on the merits, and we cannot conclude that they are unlikely to affect the ultimate cost-benefit determination. Inasmuch as continued construction increasingly tends to foreclose alternatives to the Midland project in its present form (see paragraphs 22 and 27 above)--alternatives which become extremely important if, as the foregoing analysis indicates is possible, either the Board's or Dow's ultimate cost-benefit conclusion does not favor the Midland project in its present form--our analysis does not support a continuation of construction. Nor can we conclude that continued construction is necessary from Dow's point of view. Dow has asserted that it will wait until the end of 1984, or two and one-half years beyond the presently scheduled Midland completion date, for steam and electricity from the Midland plant, provided that the Michigan Air Pollution Control Commission is willing to extend its consent order and other circumstances do not change significantly. Tr. 2515, 2546, 2672.

2718. The record also indicates that Dow can wait until approximately two years from now (more than twice as long as the parties estimate will be required to complete the remanded hearings on the merits) before irrevocably committing itself to either the Midland project or one of Dow's alternatives (Tr. 2323), and that the cost of the alternatives is not, in Dow's opinion, likely to increase significantly in that period (Tr. 2405-06, 2732, 2737-39). It does not appear, therefore, that a suspension per se will affect Dow's position one way or the other. See Tr. 2515. If the 1980 expiration date of the MAPCC Consent Order (see paragraph 44 above) becomes crucial because the MAPCC refuses to grant further relief, Dow will be required to seek alternatives regardless of the effect of a suspension, since Consumers cannot complete the Midland project by 1980. See paragraph 43 above. Nor will a suspension per se affect Dow's end-of-1984 deadline, because a suspension is not expected to push the completion date past 1983. See paragraph 27 above. Finally, a suspension will not affect the most important time consideration from Dow's standpoint--the time required to complete the remanded hearings and reach a final cost-benefit reevaluation of the Midland project--since we will proceed "with appropriate dispatch" in that regard. See Pacific Gas & Electric Co. (Stanislaus Nuclear Project, Unit No. 1), ALAB-400, 5 NRC ___ (May 20, 1977), Slip Op. at 7. Finally, we note that Dow's proposed findings (cursory in the extreme, as we commented in paragraph 40 above) do not provide much guidance. They avoid any reference to the great bulk of the evidence discussed in the preceding nine

paragraphs, and effectively decline to take any position as to the present desirability of the Midland project to Dow. Certainly they do not undercut the plain and repeated testimony of Messrs. Temple and Oreffice concerning Dow's lack of confidence in Consumers, the marginal or nonexistent economic value of the Midland project to Dow, the strong possibility that Dow will reassess its position of reluctant support for the project in the event of "any significant change" which may include "almost anything" (Tr. 323), or the existence and feasibility of Dow self-generation alternatives. The record strongly indicates that Dow's present support for the Midland project, tenuous as it is--in essence the very "lip service" Consumers' Chairman Aymond feared (see paragraph 33 above)--rests principally if not exclusively on Consumers' litigation threats, which Mr. Oreffice quite reasonably saw as calculated to influence Dow's stand in these hearings (Tr. 2707). As Mr. Temple testified (Tr. 2311), with the explicit concurrence of Mr. Oreffice (Tr. 2714-16; see also Tr. 2494, 2699, 2707-09):

> "Q. All right. Now just between you and me, Mr. Temple, isn't it true that the only reason that [the] Midland Division's findings and conclusions was not the Corporate finding and conclusion was a lawsuit. Wasn't that the only significant reason?
>
> "A. In my judgment that's true."

The cursory and ambiguous nature of Dow's proposed Findings tend, if anything, to support the conclusion that Dow is an extremely reluctant bride whose "support" of Consumers results far more from contractual compulsion (see Tr. 2563) and litigation threats

than from a genuine belief that the Midland project is still in its best interest. Given those threats, the Board feels that great weight must be accorded to the frank and straightforward testimony of Messrs. Temple and Oreffice.

2. The ACRS Report and Other Safety Issues.

52. As directed by the Court of Appeals, on October 14, 1976, the Board returned to the ACRS both the ACRS letter Report of June 19, 1970 and the ACRS supplement of September 23, 1970, for clarification of the Report's reference to "other problems." On November 18, 1976, the ACRS submitted a three-page Supplemental Report identifying 11 "other problems related to large water reactors," together with copies of the ACRS reports and other proceedings in which those problems had been identified. On February 11, 1977, the ACRS materials just described were received in evidence (over the objection of Intervenors) as Staff Exhibits 1, 2, and 3. However, the Board explained (Tr. 4183-4185) that Staff Exhibits 1, 2, and 3 were received only to show that the ACRS had submitted a response to the Board's request, and not as showing or implying that the Board considered the ACRS response adequate. To the contrary, on January 28, 1977 the Board had again written to the ACRS, identifying three major areas of

concern with the November 18, 1976 Supplemental Report (and indicating that the areas identified were intended only as examples of a pervasive ambiguity and lack of clarity in the Supplemental Report), and requesting that the ACRS respond further. The Board noted that the minutes of an ACRS meeting discussing the Midland plant (enclosed with the November 18, 1976 Supplemental Report) themselves included ambiguous references to "matters of concern" not described in sufficient detail to meet the requirements of the Court of Appeals' opinion; that at least some of the 11 "other problems" identified by the ACRS were described in unclear and nonspecific terms, again failing to meet the requirements of the Court of Appeals; and that the references to other ACRS letters in the Supplemental Report included letters which themselves contained ambiguities identical to those disapproved by the Court of Appeals. The Board's January 28, 1977 letter to the ACRS, raising these points, concluded by noting that because of the need for a prompt response in order to facilitate resolution of the suspension hearings, the Board had prepared its letter "without waiting to fully identify all of the possible areas of concern" in the November 18, 1976 ACRS Supplemental Report.

53. In addition to the problems identified in the preceding paragraph and in the Board's January 28, 1977 letter to the ACRS, Intervenors' cross-examination of Staff witness Lawrence Crocker (who testified concerning the ACRS Supplemental Report) disclosed

additional difficulties with the Supplemental Report. The original ACRS Report had stated, with regard to the "other problems" to which it referred, that:

> ". . .the above items can be resolved during construction and that, if due consideration is given to these items, the nuclear units proposed for the Midland plant can be constructed with reasonable assurance that they can be operated without undue risk to the health and safety of the public." [Emphasis added.]

That language presents the question of what constitutes "due consideration," and the related question of whether a failure to "resolve the items during construction" would affect the ACRS' conclusion that the Midland plant did not pose an undue health and safety risk. Concerning those questions, Mr. Crocker testified (Tr. 4217-4221):

> "THE WITNESS: . . .The ACRS in the letter identifies areas pertaining to a particular plant or a series of plants where they feel that either the Staff and/or the Applicant should give some additional design consideration. The ultimate resolution of these matters in some cases is taken care of by the time the plant is constructed. Others are continuing concerns that may or may not be resolved at the time the plant finally is constructed, but during the final review for the operating license we, the Staff, and the ACRS must come to an agreement that the facility as constructed is going to be adequate to assure public health and safety.
>
> "BY MR. CHERRY:
>
> "Q. What I'm trying to get at is your understanding of the term 'due consideration,' Mr. Crocker. Let me see if I can go about it in another way. Is it your understanding

that due consideration does not mean the problem must be resolved prior to the completion of construction by a fix?

"A. Yes, I would guess this is correct. It need not be totally, finally resolved.

* * *

"Q. But 'due consideration' may just mean a good-faith effort and continually trying to find the answer?

"A. In many areas this is precisely the state that we're in, yes.

* * *

"Q. Do you know what the standard that the ACRS applies as to what is good-faith working on the answer to a problem? I mean, how do you figure out whether someone is doing the best job they can to try to solve a safety problem?

"A. I do not know the standards that the ACRS applies to it, no.

* * *

"Q. So as you understand the problem these outstanding safety problems that the ACRS says due consideration should be given to, it's your understanding that the plant can be constructed, operated, decommissioned, dismantled and buried, and so long as the applicant was trying to work to solve the problem the ACRS standard would be met?

"A. I think the plant in fact could go through its entire lifetime with some of these items still being held in a resolution pending category by the ACRS, yes." [Emphasis added.]

That amounts to a statement that there is, in effect, no way to determine at any given time whether a problem "identified" by the ACRS: (i) is capable of resolution, (ii) requires resolution in order to assure safe operation of the facility, or (iii) is

serious. Mr. Crocker also testified that, even though the cost of resolving problems identified by the ACRS might well have an impact on the cost-benefit analysis with regard to a particular facility such as the Midland project (Tr. 4265-4266), he could not say how much it would cost to resolve (or attempt resolution of) the items identified by the ACRS in either its original or its Supplemental Report (Tr. 4259-4261):

> "Q. . . . .Since you interpreted due consideration as essentially good faith working on a program you were not in a position to say that all of the outstanding ACRS matters will be resolved prior to the completion of construction, is that correct?
>
> "A. That is correct.
>
> "Q. And you cannot tell me what the cost of resolution will be if they are resolved during the course of construction, is that also correct?
>
> "A. I could not tell you the precise cost, no.
>
> * * *
>
> "Q. You cannot tell me at all what the figure will be, because you don't know whether the problem will be solved; isn't that correct?
>
> "A. I could not give you a total figure for what the resolution of the problems might be. That is correct.
>
> "Q. Well, forget about what might be, Mr. Crocker. It is true that neither you nor the Regulatory Staff nor Consumers Power Company nor the ACRS, to your knowledge, can set down a reliable cost for the resolution of the problems which are not yet resolved; isn't that correct?
>
> "A. That is correct." [Emphasis added.]

Consumers' Mr. Keeley agreed. Tr. 3711-12, 3718-19, 3756-58.

54. Accordingly, the November 18, 1976 ACRS Supplemental Report neither complied with what this Board considers to be the requirements laid down by the Court of Appeals, nor affords information sufficient to the task of factoring the cost of compliance with ACRS concerns into a cost-benefit analysis. Indeed, from the testimony of Mr. Crocker it appears that neither the Board nor the parties are presently in a position even to determine how serious the "other problems" identified by the ACRS in its Supplemental Report may be. Nor has the Board received a satisfactory response from the ACRS to the Board's letter of January 28, 1977. On March 16, 1977, by letter to the Chairman of the Commission, the ACRS refused to respond to the Board's January 28, 1977 request. Rather than explaining the ambiguities and obscure references noted in the Board's request, the ACRS asserted that the Board has "misinterpreted the Aeschliman decision" and concluded: "The ACRS does not feel that any further clarification of its reports on Midland is necessary."

55. With regard to the ACRS Supplemental Report, the recent comments of two of the three Licensing Board members in Tennessee Valley Authority (Hartsville Nuclear Plant), LBP-77-_____, 5 NRC _____ (April 28, 1977)--a majority which included one of the members of this Board--are pertinent. At ¶¶ 159-163 of that decision, Board members Drs. F. J. Remick and J. V. Leeds, Jr. expressed their "reluctance to assume" that ACRS language identical to that involved in this case did not

mean that the problems in question required resolution during construction. Drs. Remick and Leeds also noted (Id., ¶ 165) that the opacity of the ACRS language--again, identical to that before us here--did not "provide sufficient information to fully understand ACRS intent, hampered the licensing process, and failed to perform "the other equally important task 'which Congress gave ACRS: informing the public of the hazards.'"*

56. In addition to the continuing ACRS difficulty, the record in this proceeding indicates the occurrence of other disturbing developments which, while not expressly the subject of the Court of Appeals' remand (see Aeschliman v. NRC, 547 F.2d 622, 632, n. 21 (D.C. Cir. 1976), nonetheless require mention in light of the Board's obligations to act on the basis of all currently available information, Commonwealth Edison Co., ALAB-153, 6 AEC 821, 823-24 (1973), and to deal with QA-QC problems as they occur, Duquesne Light Co., ALAB-408, 5 NRC ___ (June 2, 1977), Slip Op. at 8. As noted in paragraphs 9-10 above, Consumers' handling of QA-QC matters concerning the Midland project has historically been so unsatisfactory that the Appeal Board not only imposed special requirements on Consumers but also, sua sponte, took the unusual step of contradicting its own findings and causing the institution of a show cause proceeding. The record before us shows that since then, and continuing

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* Significantly, Dr. Leeds (who has had the duty of reviewing both documents) concluded that despite its manifest inadequacy "the Hartsville letter is better than the Midland letter discussed in Aeschliman." Tennessee Valley Authority, supra, ¶ 167.

even during these hearings, further QA-QC problems have developed with alarming regularity. In May, 1976, Consumers told Dow that:

> "The NRC is concerned about the trend of [QA-QC] problems. The NRC feels that this is a very important [adverse] trend that Consumers hasn't handled very well . . . . [T]his problem spotlights the effectiveness of the whole Midland QA-QC program."

Midland Intervenors' Exhibit 68 (Dow's notes of a Dow-Consumers meeting), at 21. In addition, as recently as August 10, 1976 the Commission's Office of Inspection and Enforcement reported that eleven separate trend analyses, representing "significant construction or problems which involved a number of nonconforming reports," were "unsatisfactory" and that inspection disclosed "no systematic evaluation of the nonconformances and deficiencies." IE Inspection Report Nos. 050-329/76-05, 050-330/76-05 (Aug. 10, 1976), pp. 3, 5, 7; see also IE Inspection Report Nos. 050-329/76-04, 050-330/76-04 (July 2, 1976). Three additional infractions were noted as of October 18, 1976 (IE Inspection Report Nos. 050-329/76-08, 050-330/76-08); in February, 1977 a serious problem with Unit No. 2 containment liner plate bulging, causing considerable damage, was identified and led to special inspections (IE Inspection Reports Nos. 050-330/77-02, 050-330/77-03, 50-330/77-06); and in April, 1977 misplaced and omitted tendon sheaths in the Unit 1 containment building were identified (IE Inspection Report No. 50-329/77-03). These problems cannot be regarded as minor. The cost of correcting them may be substantial, as Consumers has admitted to Dow,* and in a letter of April 29,

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* S[illegible]and Intervenors' Exhibit 67 (Dow's notes of a September 1[illegible] Dow-Consumers meeting), p. 7. For example, Consumers has estimated that repairing the liner plate bulge may cost more than $800,000, and as of June 15, 1977 had still not fully determined its evaluation of damage or "the corrective action and the safety implications of the correction." Midland Intervenors' Exhibits 79 (a Midland Daily News article of May 27, 1977) and 80 (Consumers June 15, 1977 Interim Report).

1977 to Consumers, the Commission's Region III Office repeated that continuing violations and past history:

> ". . . indicate further evaluation of your QA-QC program may be needed to assure safety related work is accomplished in accordance with your commitments and design specifications."

Conclusion

57. We do not regard the ACRS November 18, 1976 Supplemental Report as adequate, either to satisfy the Court of Appeals or to permit full analysis of safety issues and their possible substantial impact on the cost-benefit analysis (see paragraphs 54-55 above), nor can we now assess the potentially significant impact of the continuing QA-QC problems discussed in paragraph 56 above on the cost or schedule of the Midland project. Those matters must be thoroughly explored during the full remanded hearings on the merits, both because of the great importance of timely and complete resolution of safety-related issues (see paragraph 9 above and Duquesne Light Co., supra, and cf. Aeschliman, supra, 547 F.2d at 631) and because Aeschliman contemplates a de novo consideration of safety contentions which, due to the opacity of the ACRS Report, could not earlier be raised. See paragraph 16 above.* At this

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* In Tennessee Valley Authority (Hartsville Nuclear Plant), LBP-77-____, 5 NRC ____ (April 28, 1977) previously mentioned, Drs. Leeds and Remick agreed (at ¶ 164) that they could "rely[] on ACRS' belief that [generic] items can be resolved during construction." They based that conclusion, however, on the fact that no ACRS items had been contested in that proceeding. As stated in the text, we cannot take the same approach here, in view of the different nature of this proceeding, the Court of Appeals' directions, and the fact that the ACRS conclusions are not uncontested.

stage, the record clearly cannot support a finding that the ACRS and QA-QC issues will not have a significant effect on the ultimate cost-benefit analysis. The Midland project's long and almost uniformly unsatisfactory QA-QC history precludes such a finding in the QA-QC context; in fact, since a suspension of construction will allow additional time for review and correction of QA-QC procedures, a suspension may result in a long-run saving by decreasing the amount QA-QC problems will add to the overall project cost. In terms of the ACRS issues, Drs. Leeds and Remick have noted in Tennessee Valley Authority (Hartsville Nuclear Plant), LBP-77-____, 5 NRC ____ (April 28, 1977, ¶ 163, that to authorize continued construction without first determining which (if any) of the problems identified by the ACRS must be resolved during construction may produce substantial difficulties at the operating-licensing stage. "[A]t that point, the ACRS might have to advise withholding an operating license or modifying a plant that could result in delay if the Staff's interpretation of the ACRS letter is wrong." Also, continued construction, and the expenditure of additional millions of dollars, inevitably tends to render increasingly difficult any decision to withhold an operating license or modify the plant design, for the same reason that continued construction tends to affect the ultimate cost-benefit analysis. See Consumers Power Company (Midland Plant, Units 1 and 2), ALAB-395, 5 NRC ____ (April 29, 1977), quoted at paragraph 21 above. Intervenors, pointing out that the ACRS' refusal to comply with either the Board's requests or the Court

of Appeals' ruling has so far prevented consideration of safety issues or their cost-benefit impact, and that QA-QC problems also require direct action in order that continuing construction not prejudice full compliance with vital Commission regulations, have stated that they intend to raise safety contentions in those areas during the remanded hearings and have moved for an immediate halt to construction as the only appropriate course. Tr. 6029-37, 6043-44. Like Intervenors, we cannot regard with equanimity the unsatisfactory and incomplete state of the record concerning safety issues or the prospect that continued construction may tend to foreclose full and punctilious consideration and resolution of safety problems, any more than we can ignore the impact of continued construction on the cost-benefit analysis required by the National Environmental Policy Act.

3. The Fuel Cycle Issue.

58. Leaving to one side for the moment the "energy conservation" issue (see paragraph 59 below), the remaining issue remanded by the Court of Appeals is the effect of nuclear waste reprocessing and disposal matters on the cost-benefit analysis. As indicated in paragraphs 21 and 25 above, the Commission's November 11, 1976 Supplemental General Statement of Policy (41 Fed. Reg. 49898) removed fuel cycle issues from consideration in suspension proceedings pending adoption by the Commission of an interim fuel cycle rule. On March 14, 1977, an interim rule was promulgated (42 Fed. Reg. 13803), and on May 4, 1977, the Appeal Board instructed this Board to consider fuel cycle matters

in the context of: "(1) the terms of the interim rule; (2) the Commission's counsel in CLI-77-10; and (3) [the Appeal Board's] comments in ALAB-392." Consumers Power Company (Midland Plant, Units 1 and 2), ALAB-396, 5 NRC ____ (May 4, 1977). The Appeal Board's ruling does not in terms address itself to the suspension issue presently before this Board, but speaks rather of fuel cycle matters in the context of the remanded hearings on the merits. For that reason, and because of the importance of a prompt suspension ruling, we have not asked the parties to address fuel cycle issues in detail at this stage, and we therefore do not determine whether those issues will have a significant effect on the ultimate cost-benefit analysis. We note, however, that those issues will require discussion during the full remanded hearings, and that Dow's Mr. Temple testified that it would be difficult for him to finalize Dow's cost-benefit analysis without considering fuel cycle matters, since "in the discussions we've had . . . we've concluded that the cost [of nuclear fuel] will go up when all these answers are found." Tr. 2419-22. Since that testimony, Consumers has already significantly increased its nuclear fuel cost estimates. See paragraph 77 below.

B. The Need For The Midland Project And Energy Conservation: Will A Suspension Significantly Impair Consumers' Ability To Serve Its Customers' Needs?

59. We turn now to a consideration of whether the record supports a finding that energy conservation measures--the final issue remanded by the Court of Appeals--are unlikely to produce any significant alteration in the cost-benefit analysis resulting

from the remanded hearings, by leading to the conclusion that some or all of the electricity to be produced by the Midland project is not needed. Because that question involves examination of Consumers' load forecasts, demand projections, and system reliability criteria, as does the question of whether a suspension will impair Consumers' ability to meet its customers' needs during the added period prior to completion of the Midland plant (see paragraph 27 above), we treat the two questions together.

1. Load Forecasts and Energy Demands.

60. Testimony presented by Consumers projects electric energy sales increases of 3.5% for 1977, and an average annual compound rate of growth of electricity sales of 5.2% for the period from 1977 through 1985. Consumers projects the same average annual compound growth rate for the period 1978-1982 (Tr. 3429-39, 3441-45, 3448, 3453-54; Board Exhibit 4, p. 1.1-17; Midland Intervenors' Exhibit 11, p. III(2)), although Consumers' Mr. Mosely conceded that growth may well be lower during those years (Tr. 3414-16, 3426). That projection is based on: (i) a short term "Budget Forecast" for the balance of 1976 and 1977, (ii) a less detailed, planning forecast for 1978-1985, and (iii) a "verifying study" performed by Consumers' witness Philip L. Bickel in connection with the long term forecast. Since the Budget Forecast is the starting point of the long range forecast, we discuss it first.

61. The Budget Forecast (Midland Intervenors' Exhibit 11) is divided into six sectors, the first of which is "domestic average use, excluding space heating." The forecasted non-space

heating residential use is based on a trending of historical data from 1964 through 1976; trends are developed for each month, with the chill factor, time, and the temperature/humidity index as independent variables, and are then adjusted by judgment factors. This "trending" approach, however, does not properly take into account price elasticity, the Federal Energy Administration's program to increase the efficiency of home appliances, or the change in the relationship between average annual residential electric customers' bills and average annual disposable income per household, because most of those factors have become significant only in the last two or three years. See Tr. 1935, 1953-58, 3262-63, 3279-80, 3326. According to Midland Intervenors' Exhibit 80 (Consumers' compilation of the relationship between residential electric bills and disposable personal income for the years 1961-1975), for example, since 1973 residential electric customers' bills have increased much more rapidly than disposable personal income. A continuation of that trend--which appears highly probable in view of the Administration's recently announced energy program*--will tend to further reduce demand. It is instructive to compare Consumers' failure to give express consideration to these demand-reducing factors with the September 21, 1976 statements of its own Messrs. Bishop and MacIntosh (quoted at page 47 of the prepared testimony

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* See Midland Intervenors' Exhibit 61, the Administration's detailed Fact Sheet, for a description.

of Intervenors' witness Dr. Richard Timm) concerning the impact of "a continued emphasis on conservation as a result of higher energy costs and the recognition of a continuing energy supply problem along with the lack of large new appliances, fewer and smaller new homes being added as a result of high construction costs, and a continued low birth rate."

62. The second category of demand addressed by Consumers' short-term Budget Forecast is that of "residential space heating use." Historical data from February 1973 through April 1976 were used to arrive at a forecast for the May 1976-December 1977 period, with changes in electric rates (a rate increase of 10.6% from March 1976 through December 1977 was assumed), degree days, and the temperature/humidity index as independent variables. Largely as a result of the assumed rate increase, actual space heating electricity use per customer was projected to decline, by 2.1% between 1975 and 1976 and 1% between 1976 and 1977. Notably, those declines follow 5.9% and 13.2% declines reported for the two previous heating seasons. Tr. 1896-97. This emphasizes the importance of explicitly considering price elasticity in demand forecasting--a consideration lacking in Consumers' long-term forecast and in its short-term forecast of commercial and industrial sales (for which the regression equation contains no price effects and is primarily an extrapolation of past trends)--since when price increases are considered, the effect is a significant reduction in demand. See Tr. 1913-16, 3279-80. Nor are substantial price increases unlikely to occur. It is common

knowledge (cf. Rule 201(b) of the Federal Rules of Evidence) that price increases are a major component of the Administration's energy program, and the record also shows that Consumers will require--as its own cost production computer runs (see Tr. 3799-3800) anticipate--

> ". . . significant and timely rate increases if revenues and income are to reach and be maintained at levels which will result in sufficient internally generated funds to meet its operational requirements and permit external financing of its construction program at reasonable cost."

Testimony of Staff witness Arnold H. Meltz (fol. Tr. 5065), p. 3.

63. With regard to "residential electric customer gains," "GM account," and "small accounts" (each a separate category in the short-term Budget Forecast), analytical deficiencies appear. The residential electric customer gains analysis, for example, is based on nothing more precise than an "eyeball estimate of ratio of gains to national [housing] starts," and the statistical accuracy of the "GM account" and "small accounts" forecast is not great; Consumers' standard error of estimate is 10% of the largest monthly use value and 1,000% of the smallest value. See Testimony of Intervenors' witness Dr. Richard Timm, pp. 49-50; Tr. 3801.

64. Analysis of Consumers' short-term Budget Forecast thus yields four significant points. First, the short-term forecast depends heavily on trending historical data, which may produce overly large demand forecasts in view of recent demand-reducing

factors and energy conservation programs (many too recent to be fully reflected in a historical trending analysis). Second, where price factors were considered explicitly in the short-term analysis, those factors had a substantial downward impact on projected use per customer. This not only shows the importance of explicit price elasticity consideration, but also calls into question the accuracy of forecasts made without such consideration. Third, the statistical accuracy of the trending regression equations in several sectors of the short-term forecast is quite poor, so that the forecast may be significantly in error--errors which are inevitably magnified if the Budget Forecast is used (as it was) as a basis for a long-range forecast. Fourth, the short-term forecast projects an overall energy growth through 1977 of only 3.5%, significantly less than the projected 5.2% long-range growth forecasted. See paragraphs 60-64 above.

65. Consumers' long-range load growth forecast is troublesome in several respects. In the first place, the "probability encoding" method used to generate the forecast presents grave difficulties. Consumers' witness Philip Bickel and W. Jack Mosely testified that it is heavily subjective in nature and that the subjective bases for its results were not probed (Tr. 1918-20, 3293-94, 3299, 3363). As Mr. Bickel explained (Tr. 1918-1920):

> "Q. Well, let me ask it another way: Does your forecast essentially come down to your talking to a lot of people at the company?

"A. It certainly consists of gathering input from a lot of people at the company in conversation and in document form. I then take the information--and again this is a general rule the best information I can find available--and make calculations and try to come up with something that looks reasonable to me, review it with the people from whom I got the information, try to get an overall consensus of something that looks reasonable to the knowledgeable people within the company before I present it to the forecast committee. . . .

* * *

"Q. . . .Is it fair to say that the study which you are supporting here today was more or less based on entirely subjective considerations, whether verbal, documentary or feedback loops.

"A. The forecast was based primarily on professional judgment. . . .

"Q. Would you answer my question, Mr. Bickel?

"A. The answer to your question is yes." [Emphasis added.]

As a consequence, it is simply impossible to determine whether the method or its results are reliable, as Staff witness Dr. Sidney Feld testified in response to questioning by the Board (Tr. 4471-72):

"Q. Have you made an evaluation of this method in any respect? Do you know of any other utilities where, for example, they use it?

"A. I would say that the most serious weakness associated with something like the probability encoding methodology is that the methodology and the assumptions that go into that defy any kind of validation on the part of anyone who wants to make a determination of how reasonable it is. All you essentially get

is the bottom line, the end result. And in that case, the probability encoding methodology, in my opinion, is not one that I would have much confidence in, at least I couldn't validate it. . . ." [Emphasis added.]*

The unverifiability of the long-range forecast is not its only drawback. It also appears that--despite the dramatic effect of explicit consideration of price elasticity on the short-term forecast--the long-range forecast did not give express consideration either to price elasticity or to any of the energy conservation possibilities identified at pages 17-18, 50(b)-50(c), 53 of the testimony of Intervenors' witness Dr. Timm. Tr. 3262-63, 3326. Messrs. Mosely and Bickel conceded on cross-examination that the "probability encoding" analysis had not used even the price elasticity data available within Consumers (Tr. 1913-16, 3279-80), and many of the data inputs to the analysis appear to be out of date (Tr. 1907-09, 1918, 1997, 3398) or, as regards energy conservation, the product of subjective judgment (Tr. 1911, 1994). That judgment must be considered somewhat lacking in depth as a result of the admitted lack of familiarity of both Mr. Mosely and Mr. Bickel with the Energy Policy and Conservation Act and the Industrial Energy Conservation Program of the Federal Energy Administration. Tr. 1990, 3326; see paragraph 67 below.

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* Dr. Feld also testified, on further questioning by the Board, that the Staff had made no evaluation of the spread of numbers generated by Consumers' long-term forecast, and could not say whether Consumers' identification of 5.2% growth as the "most probable" estimate was correct; Dr. Feld added that "I honestly don't know enough about that type of methodology to answer" how the "most probable" figure was obtained. Tr. 4472-73.

66. Consumers' long-range forecast, moreover, is subject to substantial doubt even on the part of Consumers' Energy Forecast Executive Review Committee ("EFERC"), which was esponsible for its adoption. Just as Dr. Feld was unable to say whether Consumers' 5.2% prediction had been appropriately derived (Tr. 4472-73) and Mr. Mosely could not identify the subjective bases for that figure (Tr. 3293-94, 3299, 3363), so an October 9, 1976 memorandum prepared by EFERC (Midland Intervenors' Group Exhibit 11) shows that a majority of EFERC members believe that: (i) there is only a 50% likelihood that Consumers' annual growth rate will even equal 5%, and (ii) the likelihood of the 5.2% prediction is only 33%. The same memorandum adds that one member of EFERC "takes the position that there is essentially no probability that the growth rate will be outside of the range of 2% to 5%," and candidly describes the forecast as a "first attempt," remarking that "we have more to do respecting market analysis and in perfecting our techniques."* The three independent studies reviewed by the Staff similarly suggest that the 5.2% figure is too high. The August, 1976 study by the Michigan Governor's Advisory Commission on Electric Power Alternatives ("GACEPA") projects growth on the combined Consumers-Detroit Edison system of 4.59% annually between 1975 and 1985, without "vigorous conservation measures." Testimony of Dr. Sidney Feld (fol. Tr. 4375), pp. 15-16. (Dr. Feld testified that he himself had not taken mandatory energy conservation measures into

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* On cross-examination, Mr. Mosely admitted that the "probability encoding" technique was new to Consumers, and that he knew of no other utility using the technique. Tr. 3388.

account, even though "[i]t certainly is a possibility" in the next five years. Tr. 4468.) If Michigan causal variables are assumed to "move at the same rate forecast for the nation by Chase Econometrics," the GACEPA projected annual growth rate drops to 3.4%. Feld Testimony (fol. Tr. 4375), pp. 15-16. A February, 1976 Federal Energy Administration study also yields a projected 4.65% annual sales growth rate (4.79% for Consumers' system alone). Id., pp. 19-21. The remaining study, performed by the Michigan Public Service Commission, is less than current (it dates from late 1974), is not based on independent data but rather on a review of Consumers' and Detroit Edison's 1974 forecasts, and is "overly optimistic on growth." Feld Testimony (fol. Tr. 4375), p. 10; Tr. 4415-16.

67. Consumers' Mr. Bickel (Testimony, fol. Tr. 3995) also undertook his own "verifying study" with regard to the "probability encoding" long-range forecast. The verifying study, however, is sharply challenged by Intervenors' witness Dr. Richard Timm (at pp. 51-59 of his prepared testimony), and appears to suffer from serious deficiencies with regard to each of its three major sectors (residential, commercial, and industrial). The residential forecast, for example, improperly adopts without inquiry some of the EFERC assumptions, so that the validity of those assumptions is never tested. See Timm Testimony, pp. 51-52. It also incorporates a number of highly doubtful assumptions, such as that of a 21.4% increase in residential space heating use (from 16,060 kwh/customer to 19,500 kwh/customer) between 1977 and 1985 (Midland Intervenors'

Group Exhibit 11), which ignores both the actual 1974 13.2% and 1975 5.9% declines (Tr. 1897) and the Budget Forecast projected 1976 2.1% and 1977 1% declines (Id.) and also assumes (without documentation) a change in the "mix" of residential space heating customers. (Tr. 1960-1968, 2013. It appears that the more recent data, not used in the verifying study, contradict that assumption. See Tr. 1965-66, 1968.) In addition, the verifying study projection of a 2% annual growth in residential domestic average use did not consider changes in real personal income, even though Consumers' senior executive economist, Mr. Denton, projects a decline in real personal income over the next five years (Tr. 2015; Midland Intervenors' Exhibit 22), nor did it explicitly consider changing insulation standards and other home heating conservation efforts (Tr. 1953-58) or price elasticity (Tr. 1935). On the other hand, the verifying study did include such asserted demand-increasing factors as "the invention of new electricity-using appliances for homes that are not yet envisioned." Tr. 1959. The commercial forecast in the verifying study, which projects commercial sector load growth of between 3.56% (for 1976) and 5.55% (for 1985) also fails to consider price elasticity (Midland Intervenors' Exhibit 20; Tr. 2020) or Mr. Denton's projected decline in real personal income (Tr. 2015, 2018), and assumes a net increase in Michigan state population despite the fact that both Mr. Denton and the Michigan Department of Management and Budget foresee "no net change. . .within the foreseeable future" (Tr. 2004; Midland

Intervenors' Exhibit 22). The industrial forecast in the verifying study contains even more serious difficulties. In addition to overlooking all of the factors noted with regard to the commercial forecast, it ignores completely the impact of the Energy Policy and Conservation Act, 43 U.S.C. §§ 6341ff., and the Federal Energy Administration's Industrial Energy Conservation Program* as well as the conclusion of Consumers' EFERC (Midland Intervenors' Exhibit 36) that "Michigan will not be sufficiently attractive to industry . . .to cause any significant growth in industry." The important General Motors component of the industrial forecast also ignores the potential impact of price increases on GM energy consumption (Tr. 2007), even though GM regards itself as price-responsive in that area (Midland Intervenors' Exhibit 21); predicts a 14.66% greater energy consumption per vehicle in 1984 than in 1986, even though a greater percentage of total vehicle production will be automobiles, which require less energy than trucks (Tr. 1979, 1981, 1983-84) and even though Mr. Mosely expects no increase in per-vehicle consumption (Tr. 3322-23); and completely fails to take into account: (i) GM's specific statement to Consumers that GM expects to reduce its energy consumption (Midland Intervenors' Exhibit 21--GM's response to Consumers' Load Management Survey--a document with which Mr. Bickel was not familiar, Tr. 1985); (ii) the transportation industry commitment to the Federal Energy Administration to reduce energy consumption per vehicle by 16%

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* Mr. Bickel is "not particularly familiar" with that program (Tr. 1990), even though--for example--Dow Chemical Company is committed to it (Tr. 2474-75).

for 1980 (Tr. 1991); and (iii) the conclusion by Consumers' own Mr. Denton that GM energy consumption will lessen, both overall and per vehicle, as "proportionally more cars and trucks [are] assembled in other than GM's home plants [which] are located outside Michigan" and thus outside Consumers' service area (Midland Intervenors' Exhibit 22; Tr. 2000-01, 2006). The impact of those errors is significant. Intervenors' witness Dr. Timm calculates (at p. 58 of his prepared testimony) that if one assumes with Consumers' Mr. Mosely (Tr. 3322-23) that electrical consumption per vehicle remains constant (which appears conservative in view of the facts just discussed), a reduction in estimated peak demand of between 67 megawatts and 122 megawatts results.

Conclusion

68. It is extremely difficult to accept Consumers' 5.2% long-range load growth forecast on the basis of the information presently contained in the record of this proceeding. Even a slight change in the assumptions used to generate the forecast, or in its result, can produce a substantial change in the peak demand estimates on which Consumers bases its claim that power from the Midland facility is needed during the period of any possible suspension. For example, a 1977-1983 drop in compound annual load growth from 5% to 4% results in a decrease in 1983 sales of more than 7%, and an equal decrease in 1983 projected peak load.* Similarly, if one assumes that space heating use per

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* Consumers' forecasting assumes equal growth in sales and peak demand. See testimony of Dr. Sidney Feld (fol. Tr. 4375), p. 22.

customer remains constant at its 1977 value through 1984, rather than increasing by the dubious 21.4% assumed by Mr. Bickel, approximately a 60 megawatt savings in 1984 forecasted growth results. Timm Testimony, p. 53. As noted in paragraph 67 above, an even larger saving results if price elasticity, the impact of Federal conservation policies, the General Motors' own energy reduction goals are taken into account in forecasting the GM demand. At a minimum, these facts and the other facts discussed in the preceding paragraphs compel the conclusion that substantial further examination of probable load growth is required before confident predictions can be made. Neither the highly subjective and unverifiable nature of Consumers' "probability encoding" forecast nor Consumers' past tendency to overestimate demand growth (Tr. 3384-85; see also Consumers Power Co., Quanicassee Units 1 and 2, Dkts. 50-475, 50-476. Petition to Withdraw Notice of Hearing, May 9, 1974) induces confidence in the accuracy of the long-range forecast. While it might seem prudent at first blush to err on the side of overestimating load growth, that causes serious consequences to both Consumers and its rate payers (Tr. 3318-19; Timm Testimony, pp. 61-64), and major errors are introduced into the cost-benefit analysis. Indeed, because of the importance of price elasticity, unduly rapid construction of facilities in order to meet overly large growth expectations, and the consequent increase in the utility rate base and in charges paid by customers, can itself operate as a significant demand-reducing factor. While the record does not permit the drawing of any

hard conclusions with regard to Consumers' system in this regard, it should be recalled that, as explained in paragraphs 48 and 62 above, Consumers expects (and will require) substantial rate increases in the near future even apart from the impact of new construction. In sum, we cannot conclude that Consumers' load growth estimate is sufficiently free from doubt to warrant a finding that it will survive further examination during the full remanded hearings on the merits.

2. Reliability and Reserve Requirements

69. In addition to our inability to accept without further inquiry Consumers' load growth forecast for the 1978-1985 period, an equally serious difficulty is presented by Consumers' contention that commercial operation of the Midland plant on the present schedule is needed in order to assure Consumers of meeting its LOLP criterion of one-day-in-ten-years. Intervenors challenge Consumers' assertion on two grounds--first, that even if Consumers' long-range forecast is correct a proper consideration of demand factors shows that the 20% reserve requirement projected by Consumers can be met without the Midland plant, and second, that the 20% reserve requirement (which Consumers asserts to be necessary in order to meet the LOLP criterion) is itself overstated, Intervenors contend (Timm Testimony, p. 19), that "at least a two-years' delay can be tolerated without adversely affecting the availability and reliability of electrical energy to Consumers' customers."

70. Consumers' contentions rest principally on Consumers' Exhibits 11 (showing the effect of suspending or cancelling Midland construction on summer reserves) and 13 (showing the effect of suspension or cancellation on energy supplies), prepared by Consumers' witness Gordon L. Heins. Even assuming the accuracy of Consumers' 5.2% long-range growth forecast, however, the system reserves shown in those exhibits appear to be significantly understated. First, the peak demand figures incorrectly assume that Consumers' demand remains constant regardless of (i) the commercial operation date of the Midland plant, and (ii) whether or not Dow continues its present self-generation of its needs. Conservatively assuming that Dow will cease all self-generation as soon as the first Midland unit is commercially on-line (which is Consumers' present interpretation of the Dow-Consumers contract: Tr. 2456-57, 2724-25) and accepting Dow's estimate of its electrical demand from Consumers in the "as scheduled," "5-month suspension," "9-month suspension," and "cancel Midland plant" cases (set forth in Dow's January 28, 1977 Answers to Interrogatories, Midland Intervenors' Exhibit 30), a major reduction in Consumers' 1981-84 summer peak demand--and thus an increase in both the amount and percentage of its available reserves--results.* Second,

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* Midland Intervenors' Exhibits 31A, 31B (recalculations of Consumers' Exhibits 11 and 13 by Intervenors' witness Dr. Timm, who, as explained at ¶¶ 9-12 of his Rebuttal Affidavit, performed the recalculation using the same assumptions and procedures adopted by Consumers' Mr. Heins with the sole
(Footnote continued on the following page.)

Consumers' Exhibits 11 and 13 assume that Consumers will be required to satisfy the demands of several municipalities and cooperatives, presently projected to purchase a portion of the Midland plant capacity, regardless of when (or whether) the Midland plant is on-line. Consumers' witness Mr. Heins conceded on cross-examination, however, that Consumers is under no contractual obligation to serve those municipalities and cooperatives (aggregating some 272 MW of demand) even if the Midland plant commences operation on schedule--let alone if it does not (Tr. 1664-66, 1782-84, 1788, 1799-1800; see also Midland Intervenors' Exhibits 14, 15, and 16); at ¶¶ 1-2 of his rebuttal testimony, bound in a separate March 23, 1977 transcript volume, Mr. Heins also indicated that Consumers does not customarily include in its load projections anticipated demand from interconnected entities such as the municipalities and cooperatives, since there is no contractual obligation to supply that demand. In addition, Mr. Heins conceded on cross-examination that the municipalities and cooperatives do not need to rely on Consumers during the 1981-

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(Footnote continued from preceding page.)

exception of correcting for Mr. Heins' improper handling of Dow sales). The rebuttal testimony of Consumers' witness David Lapinski challenged Dr. Timm's use of Dow's demand estimates rather than the Dow energy requirements estimated by Consumers (shown in Midland Intervenors' Exhibit 18). However, Consumers does not challenge the fact that the original calculation of Consumers' Exhibit 11 was erroneous; in addition, ¶¶ 3-8 of Dr. Timm's Rebuttal Affidavit and Table A thereto show that the aggregate reductions in peak demand resulting from correcting Consumers' Exhibit 11 to reflect proper treatment of Dow sales are not significantly affected by whether Consumers' or Dow's projection of Dow's energy needs is used.

84 period, since Detroit Edison's Fermi plant will have sufficient capacity to supply their needs (Tr. 1809) and Ontario Hydro will also have such capacity (Tr. 1848-49). In view of the relatively inexpensive power available from those sources--approximately 6.19 mills for the Fermi plant, versus as much as 64 mills for Consumers' most expensive plants (from which the added demand would necessarily be met), according to Consumers' cost production computer runs--it would appear likely that the municipalities and cooperatives will not purchase their needs from Consumers, even if those needs exist and are not met by self-generation.* As noted in paragraph 35 above, Consumers presented no witness (or other evidence) from the municipalities and cooperatives to support Mr. Hein's assertion of their needs. Midland Intervenors' Exhibits 31C and 31D show the impact on Consumers' Exhibits 11 and 13 of removing the municipalities and cooperatives' 272 MW demand from Consumers' peak load, energy supply, and reserve projections. Third, Mr. Heins testified that Consumers' Exhibits 11 and 13 include the assumption that Consumers' 686 MW Palisades plant output will be reduced by 35 MW per year, beginning in 1977, and will be cut off entirely in 1981 and 1982 (Tr. 1668, 1670). Mr. Heins based that assumption on "a possibility that further steam generation tube problems will reduce [Palisades output] on a year-by-year basis," coupled with "my judgment that we should consider if this deterioration of output continues. . .taking [Palisades] out of service during the period 1981-82 for re-

* See Timm Rebuttal Affidavit, ¶17.

conditioning" (Tr. 1670 emphasis added). However, during cross-examination Mr. Heins conceded that Palisades is not now losing capacity (Tr. 1833), that as a result of altered operating techniques it is also possible that no further steam tube deterioration will occur (Tr. 1671), that even if such deterioration is found "sleeving" the tubes may well solve the problem with no loss of Palisades capacity (Tr. 1671), and that in any event Ontario Hydro projects sufficient available capacity for the 1978-80 period to permit a two-year withdrawal of Palisades from service without affecting Consumers' available energy supply (Tr. 1848-49). In addition, Intervenors have noted (Timm Testimony, p. 32) that there is presently pending before the Commission an application by Consumers for a 100 MWe uprating of Palisades. The draft EIS Addendum in that proceeding, prepared by the Staff in November, 1976, does not mention steam tube degeneration problems or possible derating of Palisades in the near future; it is reasonable to conclude, on that basis, that Consumers does not regard the derating postulated by Mr. Heins as a likely occurrence. Nor does the Staff regard the problem as exigent. The Staff Safety Evaluation supporting Amendment No. 28 to Palisades' Operating License--an extension of the steam generator tube inspection interval--shows that as of June 17, 1977 "the [tube] wastage rates at Palisades have . . . decreased" and "steam generator tube corrosion [has been] effectively minimized," so that inspection can safely be deferred for five months. Midland Intervenors' Exhibit 83, p. 2.

Midland Intervenors' Exhibits 31K and 31L show the cumulative effect on Consumers' Exhibits 11 and 13 of removing Mr. Heins' assumed derating of Palisades and his assumed sales to municipalities and cooperatives, and correcting his erroneous handling of Dow sales. Those recalculated Exhibits indicate that when the corrections are taken into account Consumers' energy supply reserves and percentage reserves exceed the 20% level considered adequate by Mr. Heins (Tr. 1663), regardless of a five- or nine-month suspension. That remains true, in fact even if it is assumed that the 272 MW sale to municipalities and cooperatives is actually made (so that Consumers' Exhibits 11 and 13 are corrected only for the improper handling of Dow sales and the Palisades derating). Tr. 1696-97, 1840-41; Midland Intervenors' Exhibits 31I and 31J. That does not even take into account, moreover, the fact that Mr. Heins' Exhibits 11 and 13 assume a sale of 60 MWe from Consumers' Campbell 3 generating unit, despite Mr. Heins' admission on cross-examination that the sale has not been contracted for and may never be made (Tr. 1816-17) and despite the quite different treatment of such hypothetical sales in Consumers' filings with the Michigan Public Service Commission (Tr. 5996).*

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* Indeed, Intervenors have noted substantial and, so far as appears, unexplainable differences between Consumers' filings with the Michigan Public Service Commission in the pending rate proceeding (Case No. U-5331) and its filings here--notably with respect to the use of different capacity factors for Consumers' fossil fuel units. See Midland Intervenors' Exhibits 50-55; Timm Rebuttal Affidavit, ¶¶ 27-28; Tr. 5989-6005.

Accordingly, even if Consumers' 5.2% long-range growth forecast and Mr. Heins' assumption that a 20% reserve margin is needed are both assumed to be correct, a suspension does not impair Consumers' ability to serve its customer load with the desired one-day-in-ten-years LOLP criterion.

71. Intervenors, however, question whether the 20% reserve margin selected by Mr. Heins is necessary to meet the one-day-in-ten-years LOLP criterion. Noting Mr. Heins' testimony that 30% to 40% of Consumers' peak load is "normally available from other utilities" as back-up power (Heins Testimony, fol. Tr. 1648, at p. 9; Tr. 4446, 4449) and using Consumers' projections of generating unit reliabilities for the 1981-84 period (found in Midland Intervenors' Exhibit 32), Intervenors' witness Dr. Timm has calculated that the desired LOLP criterion can be met with only 16% installed reserve margin in 1981-82, decreasing to only 13% in 1984. Midland Intervenors' Exhibit 35R (a correction of Exhibit 35 for a computational error); Tr. 5846-47. While Consumers' witness David Lapinski asserts that if effect is given to anticipated summer derating the installed reserve requirement increases by .9%, that still yields figures significantly less than Mr. Heins' 20% assumption. Mr. Lapinski also asserts that Dr. Timm's use of Consumers' projected generating unit reliability figures (Midland Intervenors' Exhibit 32) rather than its somewhat lower historical figures (Midland Intervenors' Exhibit 33) results in overly optimistic reserve margin conclusions. However, the projected figures are those used by Mr. Heins in calculating replacement power costs,

Heins Testimony (fol. Tr. 1648), pp. 8, 16, so that use of those figures achieves consistency; use of the historical figures would significantly decrease replacement power costs. Timm Testimony, pp. 38-39; Timm Rebuttal, ¶ 25. In addition, Consumers' projections appear reasonable. Consumers' 1976 Annual Report notes (Tr. 6125-26) that between 1973 and 1976 Consumers' system maintenance program was sharply scaled down for financial reasons--resulting in a drop of approximately 10% in overall plant availability, as shown on Attachment C to the May 19, 1977 Rebuttal Affidavit of Consumers' witness Mr. Lapinski--but has now been substantially increased. Accordingly, historical reliability figures will tend to suffer from the budget cutback. Conversely, since Consumers' projected availability figures for 1982 and 1983 are only slightly higher than the overall actual figures in 1973 (before the budget cut), as shown on Mr. Lapinski's Attachment C, it appears that Consumers in effect has six years (from 1976 until 1982) within which to regain, with the aid of the new plant maintenance program announced in the 1976 Annual Report, the reliability lost during only three years of budget cutbacks. That prospect, and its attainability, is confirmed by Consumers' projections.

72. Further difficulties with Consumers' reserve requirement projections result from the question of which system is used in the calculations--Consumers' alone, the Michigan Electric Coordinated System ("MECS") consisting of Consumers and Detroit Edison, or the entire East Central Area Reliability Coordination

Agreement ("ECAR") group of utilities. During cross-examination and Board examination of Staff witness Dr. Sidney Feld, it was established that reserves on Consumers' own system between 1981 and 1984 range from 23.6% to 39.4% even in the event of a suspension, or substantially in excess of Mr. Heins' 20% goal (which is for Consumers' system alone, though it assumes some available Detroit Edison power: Tr. 4404), so that in effect Consumers is supplying extra reserves to the MECS in order to counterbalance extremely low reserves of Detroit Edison--which nevertheless quite recently negotiated a 200 MWe sale of new plant capacity. Tr. 4403, 4476-77. The most recent available data, moreover, show that Detroit Edison's demand projections have been substantially reduced and its reserve margins dramatically increased, from 5% to 16% in 1980, from 11% to 22% in 1981, and from 13% to 16% in 1982. Affidavit of Gordon L. Heins, May 19, 1977, p. 3. Similarly, if ECAR reserves are examined (which appears reasonable inasmuch as Mr. Heins' testimony assumes the availability of ECAR power: Tr. 4452), the most recent available data, which again were not used in Mr. Heins' initial calculations, show continually increasing reserves of 23% in 1980, 24% in 1981, and 26% in 1983--a dramatic difference from the decreasing reserves postulated by Mr. Heins at Tr. 4026. Affidavit of Gordon L. Heins, May 19, 1977, p. 4; see also Supplemental Testimony of Walter J. Gundersen. These new figures further support Intervenors' calculation (Midland Intervenors' Exhibit 35R) that a 20% reserve margin on Consumers' system is not needed.

Conclusion

73. As the preceding four paragraphs indicate, considerable doubt concerning Consumers' reliability and reserve requirement assertions exists on the present record. Especially as new information becomes available (see paragraph 72 above), problems arise with both of Consumers' major assumptions--the amount of its projected demand (paragraph 70 above), and its asserted need for a 20% reserve margin (paragraphs 71 and 72 above). When those uncertainties are added to the uncertainties discussed in paragraphs 60 through 68 above as to Consumers' long-range growth forecast, the conclusion must be reached that Consumers has not carried its admitted (Tr. 4126) burden of justifying continued construction, and the tendency to foreclose alternatives and "skew" the ultimate cost-benefit analysis which continued construction entails. In addition, both the dubious nature of Consumers' long-range growth forecast and the uncertain state of the record with respect to its reliability and reserve requirement also compel the conclusion that we cannot now find with reasonable assurance that full consideration of energy conservation alternatives in the remanded hearings on the merits will not significantly affect the ultimate cost-benefit analysis. As is apparent from paragraphs 60 through 68 above, energy conservation has received little if any deliberate consideration in Consumers' present forecasting; taken together with what on this record is an apparently marginal demonstration of need for the Midland plant even without energy conservation (although we

do not imply any prejudgment of what the full remanded hearings will show in that regard), that suggests a need for considerably more energy conservation evidence before a firm conclusion can be drawn.

C. Are The Incremental Costs Of A Suspension So Large As To Warrant Continued Construction In And Of Themselves?

74. In view of the foregoing analysis, the "cost of delay" issue (see paragraph 27 above) reduces to the question whether, even though other factors militate against continued construction, the costs which can be expected from a suspension are so large that construction must nevertheless be permitted to continue. That question itself, moreover, must be viewed in light of: (i) the very substantial delays and cost increases in the Midland project which have occurred for reasons unrelated to Commission or court proceedings, and which engender doubt that further delays and cost increases will not occur even if construction continues (so that the concept of a suspension is not per se shocking in view of the history of the Midland project); (ii) the fact that a suspension has real significance only on the assumption that the Midland plant will ultimately be built (since if the remanded hearings on the merits result in a conclusion that the plant should be reduced in size or cancelled, a suspension saves otherwise wasted funds rather than resulting in a true "cost"); and (iii) Intervenors' contention that as a matter of law the incremental costs of a suspension cannot properly be considered here,

since they are merely a form of "sunk costs" inappropriate for consideration under Aeschliman v. NRC, 547 F.2d 622, 632 n. 20 (D.C. Cir. 1976),* and Union of Concerned Scientists v. AEC, 163 U.S. App. D.C. 64, 449 F.2d 1069, 1084 n. 37 (1974), and since to refuse an otherwise warranted suspension on the sole ground of cost would appear to put a price tag on the Commission's fulfillment of its statutory obligations under NEPA in violation of Calvert Cliffs' Coor. Comm., Inc. v. AEC, 146 U.S. App. D.C. 33, 449 F.2d 1109, 1129 (1971).

75. Consumers' witnesses Gordon L. Heins and Gilbert S. Keeley assert that a 5-month suspension would effectively result in a 9-month halt in construction activity, and total increased costs of $335,935,000 (a $142,000,000 increase in total capital cost, an $11,935,000 increase in the cost of nuclear fuel, and a $181,900,000 increase in replacement and/or differential power costs). In the event of a 9-month suspension, which would mean an estimated 15-month construction delay, Consumers projects total costs of $578,831,000 (a $245,975,000 increase in total capital cost, a $19,756,000 increase in nuclear fuel cost, and a $313,100,000 increase in replacement and/or differential power costs). Consumers' Exhibit 16; Keeley Testimony (fol. Tr. 3638), at III; Heins Testimony (fol. Tr. 1648), at 13-16.

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* Apart from the general problem of whether all incremental costs are a form of "sunk costs," Intervenors have also pointed out that some of the costs projected by Consumers are explicitly "sunk costs" of the precise nature barred by Aeschliman. Tr. 3730-31.

76. These estimates appear exaggerated. First, the increased capital cost estimates omit to take into account the time value of money--the saving to Consumers' ratepayers which results from a 9- or 15-month delay in the commencement of payment for the remaining construction to be done on the Midland project. Consumers has failed to compare the total plant cost estimates for the "as scheduled" and "suspension" cases on a present-worth basis, which is necessary in order to arrive at a true cost differential rather than one improperly increased by the fact that, as payments are delayed, they are made in inflated dollars. While in the normal case the saving which results from delayed payment is overtaken by the added cost resulting from real price increases over time, in this case: (i) engineering activities on the Midland project are approximately 63% complete and construction itself is approximately 19% complete, so that real price increases and inflation do not affect those items (Keeley Testimony, fol. Tr. 602, at I-2); and (ii) it appears that a substantial portion of the power to be generated by the Midland facility will not need to be replaced during a suspension period (see paragraph 69 above), so that the cost of replacement power will be lower than in the normal case. There is general agreement that Consumers failed to consider the time value of money in its cost-of-suspension calculations, just as it also failed to consider (though fully including replacement power costs for a suspension period now) the logical corollary of a 9- or 15-month period at the "other end" of the 34-year

life of the Midland plant during which replacement or differential power costs will not be incurred. See, e.g., Affidavit of Arnold Meltz (May 19, 1977), p. 2. However, there is sharp disagreement over the effect on Consumers' cost-of-suspension analysis which results from factoring in the time value of money and the "credit" for the 9- or 15-month added life of the Midland plant. An admittedly simplistic and rough, but nevertheless informative, calculation performed by Intervenors' witness Dr. Timm (Timm Testimony, pp. 65-69; Tr. 5595-5640; Timm Rebuttal Affidavit, ¶¶ 37-41) indicates that assuming Consumers' present official $1.67 billion plant cost estimate, and a present worth factor of 11.75% and annual fixed charge rate of 17.57% (the reasonableness of which have not been questioned), an approximate present-worth saving resulting from considering the time value of money of $114 million (5-month suspension) or $140 million (9-month suspension) can be derived. That leads to a net decrease of some 33% in Consumers' 5-month suspension cost estimate. While those calculations are imprecise, as previously noted, it is apparent that the impact of considering the time value of money is substantial. Similarly, although calculation of the "credit" for the added life of the Midland plant is rather speculative in view of the uncertainties of predicting economic conditions 34 years from now, even the conservative assumption that replacing the Midland plant in 34 years will cost no more than building the plant now ($1.67 billion) yields a substantial "credit" in present-worth dollars

for the fact that the Midland plant will not have to be replaced, and $1.67 billion spent, until the expiration of the added 9- or 15-month period. Timm Testimony, pp. 68-69.

77. Second, Consumers' calculation of replacement and/or differential power costs attributable to a suspension--the largest single item in its cost estimates--appears inflated for several reasons. To begin with, Consumers' replacement power costs are based on the same demand, load growth, and reserve requirement forecasts and assumptions made by Mr. Heins and discussed at paragraphs 60 through 72 above; accordingly, they are flawed by a failure to consider reductions in Dow demand, an unwarranted inclusion of sales to municipalities and cooperatives, and an unwarranted derating of Consumers' Palisades plant (see paragraph 69 above), as well as by what appears to be an overforecast of long-range growth (see paragraphs 60 through 68 above) and reserve needs (see paragraphs 71 and 72 above). In essence, Consumers has premised its replacement power costs on an attempt to supply the Dow, Consumers, and municipality/cooperative loads exclusively from its own system rather than taking into account power available from other sources and giving appropriate credit for the reduced costs to other systems, such as Detroit Edison, resulting from its analysis. See Timm Testimony, pp. 71-72. This inflation of demand, moreover, inevitably exaggerates replacement power costs by a factor larger than the demand inflation, since as demand grows progressively less efficient and more expensive generating units are used to service the incre-

mental demand, and the incremental power cost thus exceeds the demand increment. (Timm Rebuttal Affidavit, ¶¶ 16-17.) In addition, Consumers' cost production computer runs used to generate the replacement power costs have produced inflated costs because of improper input. Midland Intervenors' Exhibit 37 (Consumers' workpaper describing the input in question) states:

> "Additional purchases made in delay case are labeled purchase 10. These purchases were based on a reserve level of 20%, if reserves fell below 20% an on-peak cap. [capacity] purchase at 90% C.F. [capacity factor] was made. . . .The cost of this purchased power was 20 mills/kwhr 1976 esc. at 10%/yr. This cost is based on baseload coal units, and is considered conservative."

In other words, Consumers' computer simulations include "forced purchases" introduced in a way which takes no account of whether the purchase is economical and which (because no prudent utility would actually make such purchases, and Consumers does not now do so: Tr. 1848) results in significant and unjustified increases in the cost of replacement power. Tr. 6121-6123; Timm Rebuttal Affidavit, ¶¶ 18-21 and attachments B1-3, C, D. A further apparent error in Consumers' estimates of replacement power costs is an improperly high coal cost estimate. The record indicates that Consumers projects extraordinarily large increases in coal costs (for example, an increase of more than 300% between 1976 and 1982 in coal costs for Karn Units 1 and 2), that its coal cost projections are substantially higher than those on which

Dow Chemical Company bases its own planning--and to which Dow has adhered despite Consumers' higher figures (Tr. 2293-95)--and that its projections are fully twice as high as the average low-sulphur coal cost estimates from studies identified by Intervenors' witness Dr. Timm. Tr. 6130-6131; Timm Rebuttal Affidavit, ¶ 32. In addition, Staff witness Dr. Sidney Feld testified that at least two Federal Government studies he has consulted (one prepared by the Federal Energy Administration and the other by the Council on Wage and Price Stability of the Executive Office of the President) project an actual decline in real coal costs between 1975 and 1980, and suggested that it would be reasonable to assume that factors tending to drive up the price of coal and those tending to drive down the price of coal "would balance each other out." Tr. 4538. We must also take into account, in calculating the difference between replacement power costs and the cost of operating the Midland facility as presently planned, recent increases in the cost of nuclear fuel. During the course of these hearings, Consumers' witness Gilbert S. Keeley has substantially revised upward the nuclear fuel cost estimate which he offered in his prepared testimony. Tr. 3781-85. In addition, one of Mr. Keeley's basic assumptions--that the cost of nuclear fuel will increase more slowly after 1985 because of plutonium recycling--now appears doubtful, according to Consumers' own testimony before the Michigan Public Service Commission (quoted in Timm Testimony, pp. 81-82). Consumers now believes that "it is not clear that the Government will permit reprocessing and recycling [of uranium and plutonium]

to be produced in the future" and that in computing nuclear fuel costs "uranium salvage value" should be zero. This Board can take official notice (see Rule 201(b) of the Federal Rules of Evidence) of the Administration's decision that plutonium reprocessing and recycling should not be pursued. While the ultimate outcome of the Administration's recommendations is not yet certain, they indicate that optimistic assumptions concerning reprocessing and recycling cannot now be justified.* A final but nonetheless significant error in Consumers' replacement power cost estimates results from assuming an unrealistically high availability factor for the Midland plant, and thus exaggerating the amount of power to be replaced. At page 77 of his prepared testimony, Intervenors' witness Dr. Timm notes that Consumers assumes that "Midland will operate at a capacity factor of 70% beginning from the first day it is placed in commercial operation," and correctly points out that "any new plant, whether it is coal or nuclear, when first placed in operation can be expected to have some initial problems which will reduce its overall availability and thus its capacity factor."

78. Consumers' erroneous calculations regarding the incremental costs of suspension, even if only partially correct, render an accurate computation of suspension costs virtually

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* The uncertainty we noted in our discussion of the overall fuel cycle issue (paragraph 58 above) affects the nuclear fuel side of the replacement power cost differential as well. Furthermore, we have not yet ruled on Consumers' proprietary claims concerning nuclear fuel documents--more of which Consumers transmitted to us on June 24, 1977, well after the evidentiary record was closed--and that adds to the incompleteness and uncertainty of the present record on fuel cycle and fuel cost issues and their impact on the cost-benefit analysis.

impossible. Without accurate cost production computer runs based upon genuine "economic dispatch" purchases from other utilities (as opposed to the uneconomical "forced purchases" which distort Consumers' original data and the total failure to consider any economic purchases which distorts its rebuttal presentation, see Timm Rebuttal Affidavit, ¶¶ 18-22), without an accurate computation of the savings resulting when the time value of money is considered, and without a complete recalculation of coal and nuclear fuel costs on the basis of appropriate and up-to-date estimates, we are unable to do more than guess at the true incremental costs of a suspension. Consumers could have provided that information had it wished to do so; in fact, Dr. Timm suggested that just such information was needed. Tr.

Consumers' silence cannot help its position. See paragraph 35 above. Even so, however, two points are clear. First, it appears unlikely that any increase in the total capital costs of the Midland project due to a suspension will exceed the enormous increases in capital costs which have occurred for other reasons during the past several years; indeed, because a suspension will afford some additional time within which to consider and correct the expensive and continuing QA-QC problems (see paragraph 56 above), a suspension may result in an ultimate savings, by decreasing the ultimate amount those QA-QC problems will add to the total project costs. Second, it appears probable that as time goes on, the Administration's energy program (which we cannot safely assume will fail completely in Congress) will tend

further to lower the cost of coal by encouraging additional coal production and use, and raise the cost of nuclear fuel by effectively prohibiting recycling and reprocessing activity. The former point gains support from the May, 1976 Federal Energy Administration Coal Mine Expansion Study (see Timm Testimony, p. 76), and the latter point from Consumers' own presentation before the Michigan Public Service Commission concerning nuclear fuel costs (see paragraph 77 above). Accordingly, even during the remanded hearings on the merits, the differential between the cost of power to be provided by the Midland project and the cost of alternative power during the suspension period can be expected to decrease.

79. A full consideration of possible alternatives to the Midland project is not presently before the Board--it must await the more detailed analysis and recalculation of costs and benefits to be undertaken in the full remanded hearings on the merits, and in any event is not possible at this early stage in the development of the record, since the parties have not addressed the question in detail. Nevertheless, with that caveat in mind it is instructive to note briefly the parties' submissions concerning the cost of alternatives, since they present in a summary fashion the outcome of much of the analysis contained in Part III of these Findings. While all of the parties have submitted testimony concerning possible fossil-fired alternatives to the Midland plant, Consumers' Mr. Keeley has postulated a 1600 MW coal-fired plant, (Keeley Testimony, fol. Tr. 3643, at IV-3), while

Intervenors have suggested two separate facilities--one to be built by Dow to meet Dow's electric and steam needs, and the other to be built by Consumers to replace the portion of Midland capacity Consumers expects to own (Timm Testimony, pp. 80-85). Intervenors' suggestion appears the more reasonable. In addition to incorporating the dubious fuel cost and other assumptions previously discussed (see Timm Testimony, pp. 80-82), Consumers' proposal fails to meet Dow's steam needs, since steam production has not been projected and in any case the alternative would be built at a different site (Tr. 3686; see Tr. 2670-71), and also would produce substantially larger amounts of electricity than Consumers would obtain from its own portion of the Midland plant. (In evaluating alternatives, we must subtract from the 1300 MW expected output of Midland, Tr. 3686, both the 272 MW Consumers expects third parties to own--see paragraph 70 above--and Dow's electrical demand, since Dow will generate its own electricity if, as Consumers' alternative implies, it must supply its own steam. Tr. 2404-05; see Tr. 2456-57. We must also take into account the fact that a coal plant has a higher capacity factor than is expected for Midland--80% for coal versus 70% for Midland--so that a smaller coal facility is needed to produce the same output.) Intervenors' proposal, on the other hand, contemplates the same electrical output Consumers anticipates owning from Midland and the same Dow steam and electric output Dow projects; in terms of its impact on Consumers, Intervenors' proposal is equivalent to construct-

ing a facility identical to Consumers' Campbell 3.* Intervenors derived all of their capital cost estimates from Mr. Keeley's workpapers or from documents produced by Dow (Timm Testimony, pp. 86-88), and assumed (Id. p. 83) that Dow would complete its separate facility by 1982 (as Dow itself assumes, Midland Intervenors' Exhibit 30) and Consumers would complete its 800 MW facility in 1983, a date derived from Consumers' planning studies (Tr. 5585-86). While Consumers questions that date, and has revised its planning studies, the record does not indicate any persuasive reason for the revision. Since Intervenors' proposal is identical to Consumers' Campbell 3 unit, in fact, it would seem that constructing the plant should require, if anything, less time than Campbell 3.

Conclusion

80. On the basis just described, Midland Intervenors' Exhibit 46R (correcting computational errors and updating the figures in an earlier exhibit: Tr. 6169-79) was prepared. That Exhibit estimates the the total cost of the Midland facility in 1981 dollars at $3.727 billion, and the total cost of separate Dow and Consumers coal-fired alternative facilities

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* See Timm Testimony, pp. 80-82, 86-88. Intervenors purposely selected the 800 MW coal-fired alternative because it would be identical to Campbell 3 and would thus permit the use of actual historical data pertaining to Campbell 3 rather than unsupported projections. For that reason, Intervenors' alternative has a capacity which exceeds that portion of the Midland plant capacity projected to be owned by Consumers. Accordingly, Dr. Timm adjusted his calculations for that fact by assuming that Consumers would sell the excess capacity. Timm Rebuttal Affidavit, ¶ 33.

at $3.439 billion, or a difference of $288,000,000 in favor of the alternative.* Those figures reinforce what on this record appears a substantial possibility that the full remanded hearings on the merits will result in a conclusion that the Midland plant cannot be justified in light of its present, hugely escalated cost (see paragraph 46 above). The figures also compel the conclusion, independently supported by the findings in paragraphs 75-78 above, that--even apart from the substantial legal issue of whether the incremental costs of a suspension can properly be considered at all (see paragraph 74 above)--we cannot find on this record that the incremental costs of a suspension are so large, in terms of the overall cost of the Midland project, as to mandate continued construction despite the predominance of other factors favoring suspension. See paragraphs 51, 57, and 73 above.

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* While the May 19, 1977 Rebuttal Affidavit of Consumers' witness Richard F. Brzezinski asserts that Intervenors' calculations contain eight errors, Mr. Brzezinski concedes that three are corrected by Midland Intervenors' Exhibit 46R, and ¶¶ 32-36 of Dr. Timm's Rebuttal Affidavit respond to the remaining five claims. The procedure adopted by Mr. Brzezinski in correcting the asserted errors, moreover, is not helpful. Mr. Brzezinski started from the assumption that the coal costs used by Dr. Timm were unduly low. Instead of correcting those coal costs, however, Mr. Brzezinski asserted that the entire alternative facility should be redesigned as a result. As Dr. Timm notes, the coal costs he used in preparing Midland Intervenors' Exhibit 46R are higher than the average low-sulphur coal costs found in studies on the subject (Tr. 4538, 6130-31), and in any event could be increased by as much as 30% without altering the conclusion that Intervenors' alternative facilities are cheaper than the cost of constructing the Midland plant in its present form.

D. Conclusion

81. On the basis of the present record and taking into account the present factual situation (as we must in restriking the cost-benefit analysis: see paragraph 27 above), a continuation of construction pending completion of the remanded hearings cannot be justified. That continued construction tends to foreclose alternatives to the Midland project, including partial redesign of the plant and including safety-related design or construction modifications, and to prejudice if not destroy full and impartial restriking of the cost-benefit analysis, is plain from the Appeal Board's recent ruling in this case (see paragraph 22 above) and, in fact, is admitted by Consumers (Tr. 1066-68, 1138) and the Staff (Crocker Testimony, fol. Tr. 4177, p. 3). The information developed during the hearings--the serious Dow-Consumers dispute (paragraphs 42-51), the huge increase in the cost of the Midland project and the resulting virtual disappearance of any Dow economic advantage from the project (paragraph 46) and serious doubt as to Consumers' ability to finance it (paragraph 48), the existence of continuing QA-QC problems which may have "a very adverse economic effect on the project" and "result in a big potential cost exposure for Consumers" (Midland Intervenors' Exhibit 3, Dow's notes of a Dow-Consumers July 15, 1975 meeting; see also Tr. 1054-46 and paragraph 56 above), the drastic increase in nuclear fuel prices (paragraph 77), and the growing doubt as to whether the project is needed

in light of past-1972 demand changes and presently increasing reserves (paragraphs 60-73)--forcefully argues that a fresh, hard look at costs and benefits is essential. Certainly "a fair ground . . . for more deliberate investigation" is presented, within the meaning of Hamilton Watch Co., v. Benrus Watch Co., 206 F.2d 738, 740 (2d Cir. 1953). And that does not begin to consider the information, vital to the revised cost-benefit analysis, which we do not have. We do not know whether Dow (which refuses to indicate one way or the other: see paragraphs 40, 49 above) will decide that Consumers has irreparably breached its contract; even if the contract remains in force we do not know what outcome will flow from the ongoing negotiations--except that, as Consumers has told Dow, almost any of the changes Dow demands will shift the cost-benefit balance away from the Midland project (paragraphs 49-51 above). But that information is essential to our ultimate task, as Consumers concedes (Tr. 1183, 1191-94). We do not know what sweep of ACRS and QA-QC issues will develop when the ACRS finally provides the information requested by the Board and the QA-QC issues are explored in depth, nor can we predict their effect on the cost-benefit analysis--but, here again, we noted above that the effect may be substantial. We do not know what impact resolution of Consumers' fuel-cycle "proprietary" claims, or of fuel cycle matters themselves, will have on the cost-benefit analysis, though the increased nuclear fuel prices already of record and the analysis of

alternatives in light of those prices (paragraphs 58, 77 above) preclude any sanguine sloughing off of the issue, as Dow's Mr. Temple testified (Tr. 2419-22).

82. In light of those "knowns," almost uniformly adverse to the Midland project by comparison with the information on which the original cost-benefit analysis was based, and those important "unknowns," to authorize continued construction and risk effectively aborting the results of "more deliberate investigation" would be allowing Consumers to "have its cake and eat it, too" with a vengeance. See Consumers Power Co., ALAB-395, 5 NRC ___ (April 28, 1977), Slip Op. at 13-14, quoted at paragraph 22 above. Only an extraordinary showing of need (Id.) could justify such a course. Consumers has made no such showing here. Apart from the flaws in its evidentiary presentation (see paragraphs 35 and 77), Consumers' predictions of intolerable delays seems overstated, both in view of its admission that the existing schedule has up to four months of leeway (Tr. 3695-96, 3722-24; compare the two years of leeway, in addition to the present schedule, which Dow is willing to accept, Tr. 2515, 2546, 2672, 2718) and in view of the fact that even if only a few of its miscalculations are corrected its available reserves meet its own 20% requirement despite a delay of as much as a year. Tr. 1696-97, 1840-41; see paragraph 70 above.

83. Accordingly, the Board finds that, balancing all of the factors involved in this proceeding, continued construction

of the Midland facility should not be authorized pending completion of the full remanded hearings on the merits in this matter. As repeatedly indicated herein, that imports no conclusion either way as to the ultimate outcome. Rather, we simply find that, in view of the adverse consequences of allowing continued construction in terms of the ultimate cost-benefit analysis and possible foreclosure of alternatives and in view of the existence of numerous issues "so. . .substantial . . .as to make them a fair ground for. . .more deliberate investigation," Consumers has not shown that construction must continue during the remanded hearings.

Respectfully submitted,

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June 30, 1977

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
CONSUMERS POWER COMPANY	)	Docket Nos. 50-329
	)	50-330
(Midland Plant, Units 1 and 2)	)	

ERRATA SHEET

The following typographical errors in the Proposed Findings of Fact and Conclusions of Law submitted by Intervenors other than Dow Chemical Company should be corrected as shown below:

Page 35, line 19: "Board Exhibit 2" should read "Midland Intervenors' Exhibit 25".

Page 36, fifth line from bottom: "paragraph 77" should read "paragraph 70".

Page 49, line 4: "Exhibit 68" should read "Exhibit 67".

Page 58, footnote, lines 4-5: "paragraph 78" should read "paragraphs 79-80".

Page 76, line 13: "Exhibit 80" should read "Exhibit 81".

Page 92, last line: "Exhibit 83" should read "Exhibit 82".

Page 105, lines 13-14: "Tr." should read "Tr. 5779, 6119-20."