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UNITED STATES ATOMIC ENERGY COMMISSION

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IN THE MATTER OF:

THE TOLEDO EDISON COMPANY
AND THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

(Davis-Besse Nuclear Power Station) Docket No. 50-346

TOSM TO REGULATORY CENTRAL FILES
DOM 016

Place - Cleveland, Ohio

Date - July 24, 1973 Pages: 177 - 338

Telephone:
(Code 202) 547-6222

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UNITED STATES OF AMERICA

ATOMIC ENERGY COMMISSION

In the Matter of:

THE TOLEDO EDISON COMPANY and THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

(Davis-Besse Nuclear Power Station)

Docket No. 50-346

Anthony Celebrezzi Building
1248 East Ninth Street
Cleveland, Ohio

Tuesday, July 24, 1973

Hearing in the above entitled matter was reconvened, pursuant to adjournment, at 10:00 a.m.

BEFORE:

JOHN B. FARMAKIDES, Esq., Chairman,
Atomic Safety & Licensing Board

DR. CADET H. HAND, JR., Member

FREDERICK J. SHON, Member

Appearances:

GERALD CHARNOFF, Esq., and JAY E. SILBERG, Esq., Shaw, Pitman, Potts & Trowbridge, Washington, DC,

On behalf of the Applicants

FRANCIS X. DAVIS, Esq., and MYRON KARMAN, Esq.m Office of the General Counsel, U. S. Atomic Energy Commission, Washington, DC,

On behalf of the Regulatory Staff

RUSSELL Z. BARON, Esq., Brannon, Ticktin, Baron & Mancini, 930 Keith Bldg., Cleveland, Ohio,

On behalf of the Intervenors

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C O N T E N T S

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P R O C E E D I N G S

CHAIRMAN FARMAKIDES: Good morning, ladies and gentlemen. We are continuing the evidentiary hearing on the matter of Davis-Besse Nuclear Power Station. Since the construction permits for this facility were issued on March 24, 1971, the Atomic Energy Commission directed that the environmental considerations be reviewed pursuant to and in accordance with the National Environmental Policy Act of 1969 as implemented in Appendix D to 10 CFR Part 50 of the AEC regulations.

Yesterday, pursuant to agreement among the parties, approved by this Board, we began the hearing in Port Clinton, Ohio, to permit limited appearances to be made there of citizens living in that locality. We will continue with such limited appearance statements this morning before going to the issues before us.

For those members of the public who are unfamiliar with the concept of limited appearances as provided by the Atomic Energy Commission, let me note that under Section 2.715 of the AEC rules, a person who is not a party to this proceeding, but who has an interest in it may present his oral or written statements to this Board for its consideration. These statements are not evidence, but they are in the record and insofar as they raise questions which this Board wants answered, we will seek to have those questions answered.

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I don't think there is any need for me to go into any further statement of the issues before us at this time. I went into some detail yesterday.

Again, for those who were not here yesterday, to my left is Dr. Cadet Hand, Director of Bodega Laboratory, University of California.

To my right is Mr. Fred Shon, a nuclear physicist and an expert in nuclear reactor safety.

I am John Farmakides, an attorney.

Let me ask the parties to make their appearances before we go into limited appearances.

For the Applicant?

MR. CHARNOFF: Mr. Chairman, my name is Gerald Charnoff of the law firm, Shaw, Pitman, Potts & Trowbridge in Washington, DC.

On my right appearing with me on behalf of the Applicants is Mr. Jay E. Silberg, also with the same law firm.

CHAIRMAN FARMAKIDES: For the Staff?

MR. DAVIS: My name is Francis X. Davis. I am representing the Atomic Energy Commission's Regulatory Staff. The address is Atomic Energy Commission, Washington, DC 20545.

On my right is Mr. Myron Karman from the same office and the same address.

MR. BARON: I am Russell Baron of Brannon, Ticktin,

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Baron & Mancini for the Intervenors.

This is Mrs. Evelyn Stebbins, Chairman of the Coalition for Safe Electric Power.

CHAIRMAN FARMAKIDES: Thank you very much.

At this time, the Board will accept limited appearances of those people wishing to make same.

Would you please identify yourself and if you wish, you may stand at the front or to the side so that everyone can hear you.

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LIMITED APPEARANCE OF RUSSELL M. BIMBER.

MR. BIMBER: I am Russell M. Bimber of 10471 Prouty Road, Painesville, Ohio.

I am a chemist with a Master's Degree and 20 years experience related to pesticides, including a little work with radioactive materials. I have been involved, intermittently, in the chemical, biological, and radiological warfare aspects of civil defense for the past 15 years.

I oppose the Davis-Besse Nuclear Power Plant because of danger from radioactive fission products to be made there. It will produce radioactive material equivalent to that from 1000 Hiroshima bombs each year. After an initial period, the plant would contain radioactive wastes equivalent to 1500 such bombs. Small amounts of this dangerous waste will be released to the air and water around the plant, even in normal operation. Massive releases that might require abandonment of huge land areas are also possible.

I feel that the AEC, in its zeal to promote nuclear power, has fallen down on its responsibility to regulate its safety. Although it might test the ability of our best scientists to detect harmful effects from the routine releases of radioactive waste wafted away from a single plant like Davis-Besse, although Dr. Sternglass claims

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to have done so. But the cumulative, long-term effects of many such plants may have an enormous impact.

The risk to human life associated with massive releases of radioactive material from plants like Davis-Besse has not been defined; WASH 1250 and associated documents merely tell us the damage may be very large, but the probability is very small, and the risk "consists of some combination, such as the product" of these factors.

I am glad to see President Nixon's picture up there and I note that in his recent energy message he called for a separation of the regulatory and promotional aspects of nuclear power that are now creating the conflict of interest within the AEC.

I would also like to direct your attention to a curious fact I have observed in the AEC's quarterly lists of nuclear power plants for the past year, since I began to study them. In 1970, Southern California Edison announced plans for four additional nuclear power plants at San Clemente, California to be started up in 1976, 1977, and two in 1980. However, the AEC lists don't seem to show these plants.

The March 31, 1973 list is the latest I have. It includes 165 plants, but shows only two more planned for San Clemente, and they are the only ones without start-up dates. Can you tell me why?

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CHAIRMAN FARMAKIDES: No, Mr. Bimber, I can't tell you why. I haven't the faintest idea. I don't understand the relevancy of that question. But merely to give you the information, does the Staff know?

Mr. Davis, do you have any answer to the question?

MR. DAVIS: I can only say that applications for nuclear power plants that would be made by a company in California are certainly not within our jurisdiction to say when applications will come in for specific power plants.

CHAIRMAN FARMAKIDES: In other words, you are saying the applications have not yet been received and that is the only explanation I have.

MR. BIMBER: No, certainly the applications have been received. There have been some hearings held on two of the plants for San Clemente.

MR. CHARNOFF: Mr. Chairman, I am somewhat familiar with that situation. There were applications filed for two plants out there and there were questions raised by the AEC Staff with regard to the size and conditions of the site. As a result, the review has been extended for quite some time and schedule has been pushed off severely. I have no responsibility for the AEC documents, but I suspect the update of the documents simply reflects the fact that there is some question as to whether those plants will go ahead because of the question of the

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suitability of that site.

MR. BIMBER: I see. Thank you.

I think the matter is pertinent because it may relate to the question of safety of these plants.

Thank you.

CHAIRMAN FARMAKIDES: Any more?

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LIMITED APPEARANCES OF SEBA H. ESTILL.

MR. ESTILL: Mr. Chairman and members of the Board and ladies and gentlemen. My name is Seba H. Estill. I reside at 3577 Cummings Road, Cleveland Heights, Ohio.

The 1954 Atomic Energy Act charges the Atomic Energy Commission with "the development and utilization of atomic energy for peaceful purposes to the maximum extent consistent with the common defense and security, and with the health and safety of the public."

It would clearly be a violation of the 1954 act for the Atomic Energy Commission to permit the operation of the Davis-Besse Plant, as the projected emergency core cooling system -- ECCS -- proved to be a total failure in its six test runs. Also, no permanent, safe disposal method has ever been found for the burgeoning burden of highly toxic atomic wastes. Nor has any safe method been developed for the transportation of these wastes, or of atomic fuel.

Experts who advise the AEC have stated that the ECCS has not been established to be effective. Also, under the act, as well as its own regulations, the Commission has no authority to license the operation of a nuclear power plant or to permit a licensed plant to continue to operate under circumstances which fail to assure operation without danger to the public health and safety.

With their moves badly cramped by the 1954 act, the

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AEC proceeded to ignore this federal law and wrote their own law to suit their convenience. This statement of policy was promulgated on June 29, 1971, and was called the interim acceptance criteria -- IAC. This move presumes the effectiveness of an ECCS if it is constructed and analyzed in accordance with standards set forth in the IAC.

Notwithstanding the AEC's belief that compliance with the IAC provides assurance of the effectiveness of an ECCS, there is, in fact, no such assurance, and virtually all of the AEC's own scientific advisors have so concluded.

In August, 1971, following the adoption of IAC, the research group directed by George Brockett at Aerojet Nuclear Company, primarily responsible for ECCS research for the Commission, submitted to it a major status report on ECCS and its effectiveness. A summary table included in this report, in one vital area after another, information needed to establish the effectiveness of an ECCS is indicated to be inadequate, incomplete, preliminary, unverified, imprecise, and uncertain. And that is the type of safety facility that the Atomic Energy Commission relies on to protect the lives, the health and the welfare of American citizens.

The Advisory Committee on Reactor Safeguards, a statutory committee created especially by Congress to monitor and advise the Commission on nuclear safety, believes that compliance with IAC is an insufficient basis upon which to

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establish the acceptability of an ECCS. This committee has so notified the Commission pursuant to its statutory obligation, not only once, but several times, on January 7, September 15, and November 15, 1972, all subsequent to the adoption of the IAC.

Members of the Regulatory Staff of the Commission have stated that compliance with the IAC is insufficient to assure ECCS effectiveness and that the IAC is insupportable by reference to scientific or experimental data.

Dr. Morris Rosen, Technical Advisor to the Director of Nuclear Licensing, on April 12, 1972 -- concerning ECCS effectiveness -- confirmed that, "Present knowledge is not sufficiently adequate to make licensing decisions for the approximately 100 reactors now operating or under construction."

The AEC has been in such a frenzied rush to promote and proliferate nuclear fission plants that exceptionally serious problems have been bypassed, perhaps with hopes that these tough problems might be solved in the future. However, after the span of over a quarter of a century, no solution has been found. And, until a safe and satisfactory solution is found, there should be no nuclear fission power plants.

But progress must not be bothered with safety matters, and many enormous plants have been projected; some have been completed and many more are on the way. These

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activities took place before adequate experience had been accumulated, or proper technology developed for their operation.

Typical results of the above activities are the discredited ECCS, the build-up of highly toxic atomic wastes, with no permanent solution for their safe disposal. Lack of proper provision for the safe transport of atomic fuel and atomic wastes.

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At the last public hearing on the operating license for Maine's Yankee Plant, in December, 1972, the clash between the public's citizen interests and the special interests of the Atomic Energy Commission and the power companies, was sharply revealed when Rex Renfrow, counsel for the Atomic Energy Commission, remarked impatiently: "If public health and safety requirements are to be met, there could be no power -- that is, for the plant to operate at a level insuring public health and safety -- it couldn't operate economically."

The above examples, plus many, many more, show that promotion and proliferation of nuclear plants rules the roost; with public safety a matter to be taken up at some time in the sweet bye and bye.

The matter of common defense and security has emerged with a reverse english twist, whereby we have even saved a potential enemy the trouble and expense of providing his own intercontinental ballistic missiles for an attack upon our homeland. The Atomic Energy Commission has graciously provided a much more effective weapon for our enemy to utilize in the form of our static atomic reactors -- conveniently spotted throughout our land, and which, after a year's operation, contain stored-up radioactivity the equivalent of many thousands of atomic bombs such as destroyed Hiroshima. An aircraft or just a saboteur has only to

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place a proper charge of explosive to disrupt a reactor and diffuse its lethal store of radioactivity over hundreds or thousands of square miles. This could kill millions of people; injure many, many more; devastate and contaminate a wide area of our country, while rendering it wholly unfit for further use.

Many organizations and individuals who have been watching and studying potential effects of the proliferation of nuclear fission electric generating plants are convinced that there is presently no such thing as safe nuclear power from fission; and we are also of the firm opinion that there never can be safe nuclear power from fission, although it may come from fusion.

We believe that this current proliferation of nuclear plants represent, potentially, the most deadly serious threat to our country and to the entire world that we have ever been confronted with, at any time, and frfo from any source. Is this the kind of facility that we should unload, as an inheritance, upon thousands of future generations of Americans? We think not.

Any situation that could disperse the core of a nuclear reactor holds a damage potential practically beyond the conscious conception of man.

The hazard of fission products, for all practical purposes, is forever.

The two concepts above take nuclear power right out of the realm of technology and plank it down right smack into the sociopolitical sphere. The sad thing is that members of that sphere don't appreciate the responsibility that technology has handed them. So, the task of making our social and political leaders aware of their responsibility devolves upon John and Jennie Citizen, who possess sufficient public concern to have taken the time and the trouble to inform themselves regarding this so serious threat to Mother Earth and her inhabitants. My name is not John, but I am a much concerned citizen over this terrible threat that hangs over our heads like a modern sword of Damocles.

Finally, to expose our people to such potentially extreme hazards as are inherent in nuclear fission power plants is so fantastically foolhardy as to be entirely beyond description, and wholly unacceptable.

Perhaps for relief, we must wait for the terrible catastrophe that is bound to come. The only question is when and where? And by that time, we may be so completely dependent upon nuclear power as to require years to restore a safe source of alternate power.

But why wait for a holocaust? Why not impose an immediate moratorium on nuclear fission and start to build toward a safe power supply now?

State Senator Doug La Follette has introduced a

bill in the Wisconsin legislature to declare a moratorium on the construction of nuclear plants.

Also, the Pollution Control Agency of the State of Minnesota has introduced a bill calling for a six-year moratorim, but stipulates that even after six years nuclear plants may not be built until they can be proved to be safe; that liability insurance is obtained by the operators of the plants; the waste disposal problem is solved, and the transportation system is safe and secure.

On May 23, 1973, Mrs. Evelyn Stebbins received a call from Dr. Ernest J. Sternglass of the University of Pittsburgh; during their conversation, Dr. Sternglass informed Mrs. Stebbins that he had received a letter from a colleague in Sweden, who informed him that Sweden's Parliament has ordered a halt to all further licensing and construction of nuclear plants, until a wide-ranging investigation of their safety can be carried out.

Senator Mike Gravel has introduced in the United States Senate a bill, S. 1217, The Nuclear Moratorium Act of 1973. We strongly support this bill.

I thank you.

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CHAIRMAN FARMAKIDES: Thank you, sir.

Are there any other limited appearances? Sir, would you identify yourself and proceed.

LIMITED APPEARANCE OF EDWARD L. SOLEM ON BEHALF OF THE CITIZENS FOR CLEAN AIR AND WATER.

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MR. SOLEM: My name is Edward Solem. I live in Cleveland Heights.

This testimony was originally scheduled to appear in the main body of testimony before these hearings, but it has been preempted by prior decisions in Washington committees on this question, which is the transportation of irradiated fuel.

I wish to call attention to two main facts. First, that the Department of Transportation specifications, which are the specifications applying for the transportation of irradiated fuel, specify that the container must be able to withstand a fall of 30 feet.

The second fact I wish to draw attention to is that the -- I am not reading this exactly. I am improvising as I go along. I hope it doesn't matter.

Secondly, that there are a number of rivers between the reactor site and fuel reprocessing plants will be used, either the one in Illinois or the one in New York. Working from roadmaps, I have counted nine water courses large enough to be marked on these maps between the site and the

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Illinois plant and 16 between the site and the New York plant. Not all these rivers, water courses, will require a bridging of a drop of over 30 feet, but surely some of them will. Certainly it would seem foolhardy to transport this sort of danger, irradiated fuel in a container which is specified for only 30 feet over bridges which have a drop of more than 30 feet.

But looking in the AEC publication, Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants, dated December, 1972, the AEC never mentions it is the danger associated with crossing bridges except for the impact with bridge abutments.

As a matter of fact, the severity of an act is measured in this publication solely in terms of the speed of the vehicle at time of impact and the duration of the resultant fire.

This does not consider what may happen afterward in terms of a fall from a large height.

In the above report a lot of arithmetic is gone through to show that the frequency of occurrence of severe transportation accidents is only expected to be about one every 1000 years. This figure is for one reactor.

By the turn of the century, there are projected to be about 1000 reactors in this country and that means we can expect one accident every year. This is far from negligible

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It is also stated in the above publication that trained men are available to cope with any radiation released. If the radiation release is in association with a fall from a bridge, it may be quite difficult to get these men to the scene.

In the meantime the flowing water at the bottom will be providing a ready means of dispersal.

In summary, it is difficult to see how these local hearings can have much meaning when such grave questions have been decided, but nevertheless, left unanswered by a committee in Washington, DC, and are now out of reach of these local hearings.

Thank you.

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CHAIRMAN FARMAKIDES: Thank you.

We would like to have the Staff comments on the remarks of Mr. Solem after the limited appearances are finished.

Are there any additional limited appearances?

LIMITED APPEARANCE OF ALAN RHODES.

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MR. RHODES: My name is Alan Rhodes. I am an associate professor of chemistry at Cleveland State University.

I fully subscribe to the detailed exposition given by the speaker who preceded the last one.

I have a very short statement. I am convinced that we should have a moratorium on the construction of nuclear power plants because the hazard and probable debilitation of the health of this and future generations is not worth the temporary convenience of the power that will be supplied. The hazards are manifold:

(1) The mining of the uranium ore exposes miners to irradiation with resultant increased incidence of cancer and shortened life.

Secondly, reprocessing of spent fuel exposes workers in much the same way as in the mining operation.

Thirdly, storage of radioactive waste is apparently an insoluble problem. You will remember one of the suggestions made by the AEC people was to rocket it off to the sun. It

will almost certainly result in radioactive contamination of some of our water supplies. Fourthly, the nuclear power plant itself is a simmering core of radioactivity equivalent to thousands of Hiroshima bombs. If the engineering or opewration of a nuclear fission plant is faulty, this cauldron of radioactivity could spew over the land and wreak death, sickness and destruction upon thousands of people and thousands of square miles of land.

If nuclear power were really safe, the insurance companies would be willing to insure the power companies against possible lawsuits incurred by nuclear disasters. Instead the Price-Anderson Act exempts the power companies from adequate financial responsibility and supplies only token coverage for the loss that could be incurred in a serious act.

If the Price-Anderson Act were repealed and private insurance companies would really indicate enough confidence in the safety of nuclear power to invest their dollars, then and only then should the people of this community venture theirs; and, most importantly, the lives of their children and grandchildren in this new and largely experimental method of power production.

Thank you, sir.

CHAIRMAN FARMAKIDES: Thank you, sir.

Are there any further limited appearance

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statements or comments?

Seeing none, we will proceed.

I would like to have the Staff respond to the comments made by Mr. Solem.

Do you want to do so now or later?

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MR. DAVIS: Mr. Chairman, I see two possible ways to do it, during our presentation of testimony and, therafore, under oath, or now informally.

If the latter, we would prefer a short break first.

CHAIRMAN FARMAKIDES: Let's continue. I like to keep moving ahead. We don't need a break right at the moment. We will expect a response after the next recess, Mr. Davis.

MR. DAVIS: Thank you.

CHAIRMAN FARMAKIDES: I might say this: Many of the comments today go to the issue of whether or not there should be nuclear power. That issue has already been decided by the Congress. This Board functions and our authority is delegated to us from that act through the Atomic Energy Commission to this Board. The issue of whether or not there is nuclear power is not before the Board.

Let's proceed.

By motion dated July 13 and 16, 1973, the Applicants moved to strike the testimony of Dr. Ernest Sternglass, a witness for the Intervenors, on the ground that it was irrelevant and immaterial to Issues 6, 7, and 8 for which it was being offered, and furthermore, it has already been earlier decided.

They also moved to strike Issues 4, 5, 6, 7,

2mil 1 and 8, Issues 4 and 5 because no direct testimony had
2 been submitted and because the Intervenors failed to respond
3 to the interrogatories of the Applicant.
4 We had expected direct testimony from the
5 Intervenors because at the prehearing conference we had
6 understood Mrs. Stebbins to say that direct testimony would
7 be forthcoming.
8 However, we are not predisposed to strike the
9 issues on that ground.
10 The second ground stated by the Applicant,
11 however, with respect to the failure of Intervenors to
12 reply to the interrogatories, is a more substantial ground.
13 On July 16 Applicant filed a motion for summary
14 disposition with respect to Issues 2, 4, 6, 7, and a motion to
15 strike Issue 8.
16 The AEC Staff concurs with the action of the
17 Applicant.
18 On July 20 Intervenor filed a response to the
19 Applicant, the Applicant's motion for summary disposition,
20 stating -- and here we had some difficulty reading the
21 filings by the Intervenor, but we have fresh copies this
22 morning so that problem will be corrected -- but as we
23 understood it, the response of Intervenor went to
24 stating that there was a genuine material fact in dispute
25 as to Issues 2 and 6.

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However, before the Board gets either to the motion to strike testimony or the motion for summary disposition, we would like to express a very serious concern, quite serious, about an issue raised in Dr. Sternglass' testimony.

Apart from the question of whether this testimony is or is not relevant to Issues 6 and 7, we are very concerned with its allegation that the Davis-Besse facility has potentially serious and grave health, safety, and environmental implications.

We want the Intervenors to clarify this testimony and to relate it to an apparent new issue which is being raised affecting Davis-Besse.

We consider this new issue -- if in fact, it is a new issue -- far more important than the issues raised earlier by the Intervenor. We would be inclined to admit the new issue if there is any basis for it.

I have asked Mr. Shon, the nuclear physicist on our Board, to clarify this. We can either ask you, Mr. Baron, or Mrs. Stebbins, or both of you as a panel. Mr. Shon?

MR. SHON: What concerns the Board chiefly is, among other things Dr. Sternglass appears to be stating something different than he has said in other cases before, to the effect that at least one other pressurized water power

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reactor, Shippingport, and at least one other water-moderated test reactor, Plumbrook, located in the area very near here, have occasioned substantial dose rates and substantial contamination of their surroundings while releasing far less total radioactivity than Davis-Besse proposes to release.

He quotes from figures from rather recent publications last fall and early this spring which he says show that the contamination levels and the dose rates in particular are of the order of hundreds of thousands or even a million times as much as would be predicted by the techniques that relate Davis-Besse dose rates to releases.

Is that substantially correct? Do we understand what he is saying?

MR. BARON: You are asking me?

MR. SHON: Yes.

MR. BARON: Yes, that's correct.

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MR. SHON: It also appears that he is suggesting that the techniques the Staff used in the environmental statement for estimating contamination and dose rates from release ra... are substantially in error. Is that right?

MR. BARON: That's correct.

MR. SHON: We feel that this issue must be clarified by the Staff and by the Applicant to the extent that they can do so. We feel that the allegation implied in Dr. Sternglass' testimony that dose rates and contamination levels could be 100,000 or a million times as great as the Final Environmental Statement assumes they are is certainly of importanance to the environmental impact.

CHAIRMAN FARMAKIDES: Perhaps one way of proceeding here is to have the Intervenor clarify this any further, if he wishes.

Did you intend this as a new issue, Mr. Baron?

MR. BARON: Well, the testimony as submitted by Dr. Sternglass was submitted at the request of Mrs. Stebbins. She did not indicate to him any specific areas within which he should confine his testimony.

MS. STEBBINS: I did send him a copy of the issues.

MR. BARON: All right. Of course, he said what he felt he had to say with respect to this plant. If it can be narrowed down, if it can be -- from this wealth of

testimony that has been submitted can be gleaned specifics to apply to the issue you are now suggesting, of course, he will be more than happy to do so. We did not intend to limit it to what you are saying now. We are more than happy that you --

CHAIRMAN FARMAKIDES: The issue that you have posed is far more serious than the other issues that have been posed. I hope you all appreciate this and we want the basis for that statement. We are prepared to admit it as an issue even at this late date, and we will then ask the Applicant and the Staff to respond.

However, I would like to -- at this point for procedural purposes, it might be a wise idea for the parties to have a bench conference with the Board for purposes of deciding now to proceed. I think I will do it before I ask the Applicant and the Staff to respond to the matter that we have raised.

We will recess for 10 minutes, and during that recess I would like to see the counsel for the three parties.

(Recess.)

lmil 1 CHAIRMAN FARMAKIDES: We will reconvene.

2 During the bench conference during the recess,
3 we all agreed that we will delay asking for responses by the
4 Applicant and the Staff on the issues raised until after we
5 have completed the pending matters before the Board.
6 Therefore, it is -- go on to the next matter and that will
7 be the motion to strike --

8 MR. KARMAN: Mr. Chairman, could we possibly
9 at this time have Mr. Thompson reply to Mr. Solem's
10 limited appearance and get finished with that?

11 CHAIRMAN FARMAKIDES: I beg your pardon. Would
12 you proceed, sir?

13 MR. DAVIS: Mr. Chairman, this is Hugh L.
14 Thompson, Jr. He was the environmental project manager
15 for the Atomic Energy Commission's Regulatory Staff. His
16 duties include the preparation of the Final Environmental
17 Statement related to the construction of the Davis-Besse
18 Nuclear Power Station.

19 CHAIRMAN FARMAKIDES: Mr. Thompson?

20 MR. THOMPSON: Thank you, Mr. Chairman, and
21 members of the Board.

22 I would like to point out that this issue the
23 Board had ruled on and the committee in Washington was this
24 Board.

25 As far as Mr. Solem's concern, his major concern

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is the fall of a height of greater than 30 feet. Although that is the height that is specified, a package or cask designed to meet those requirements would be expected to survive without any damage, a fall of much greater height.

The reasons are as follows: The regulations require that the cask be so designed and constructed that there will be no more than a specified loss of contents or shielding if the cask is subjected to free fall from a height of 30 feet onto a flat, horizontal, essentially unyielding surface.

We have to look at what essentially unyielding means to be able to appreciate this regulation. It means that there must be no deformation or movement such that any content would be released or also that any additional movement of the cask after it falls would create any problems.

In order to achieve an unyielding surface for testing a 30-ton cask -- and that is the type of cask used with the Davis-Besse facility --the surface impacted must be equivalent to that presented by a thick steel plate, fixed rigidly to a solid mass in the order of 10 times the mass of the impacting object, or 300 tons of solid rigid material.

Ordinary surfaces really do not present this type of impacting object. Any surface which yields, concrete, the earth that it strikes, will not present this unyielding surface, and therefore falls from much greater heights will be presenting no problem to a cask.

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The likelihood of a cask being dropped onto a surface approaching any unyielding surface is extremely small. Any yielding reduces the impact on the cask. Crushing of the material, as well as interplay between the vehicle which might fall, and the cask itself -- in other words, if the cask were to hit a truck as it falls down, it would reduce the impact.

In an actual accident, the forces the package sustains will usually be mitigated by the angle of impact. That is, if the cask falls in any orientation other than that with the center of gravity directly above the point of impact, a rotational force will reduce the forces of impact.

To meet the standards present designs incorporate a margin of safety. For example, in recent tests of the cask which we used to ship, they have sustained falls from 270 feet onto an unyielding surface with no damage, no loss of content.

Now, Mr. Solem indicated that most of the falls that he was concerned with deal ith passages over bodies of water. The design of these casks must be such that they are leak-tight and capable of withstanding an external pressure of 25 pounds per square inch. This is equal to a depth of 45 feet of water. Therefore, if a cask were to be covered by water up to 45 feet, the design is such that there would be no loss of content.

4mil 1 Even in the event if the cask were dropped in
2 very deep water, such that the excessive water pressure
3 caused collapse of the cask, the pressure would be external
4 so that the material would not be forced out, but it would be
5 forced in.
6 Furthermore, the fuel elements which are part of
7 the reactor themselves are not soluble in water.
8 It is the Staff's opinion that because of the
9 regulatory requirements which must be met by the designs of
10 containers for shipping irradiated fuel or other large
11 quantities of material, the shipment of such material,
12 although required to pass over bridges greater than, say,
13 a 100-foot height, and subject to being immersed in water if
14 they were to fall off the bridge into the water, represent
15 no unusual risk to the environment.
16 Thank you.
17 CHAIRMAN FARMAKIDES: I might ask you, if you will,
18 to make yourself available to Mr. Solem in the event he
19 wishes to ask you questions.
20 MR. ESTILL: May I speak to that?
21 CHAIRMAN FARMAKIDES: No, sir, the issues that are
22 before us have already been decided and we will continue
23 with those issues.
24 Now let's go, then, to the motion to strike of
25 the Applicant dated July 13 and also there was another one

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dated July 16.

Mr. Baron, could you please respond to those two motions?

MR. BARON: With respect to the Applicant's motion to strike the issues and testimony that they filed on July 13, taking the first part, the motion to strike the testimony which refers to Issues 6 and 7, of course I cannot disagree with them. We have not submitted any specific testimony with regard to Issue 6.

It is Dr. Sternglass' testimony. They take issue with it, that it is irrelevant and immaterial and doesn't refer to the specific issue.

I am not going to debate the accuracy of their statements in their motion. That is a decision that the Board must make. The testimony is before the Board and the Board can equate it in light of their comments. I do want to make this observation, however. Even though the written testimony might be off base if the Applicant's position is extremely correct, there are provisions within the regulations and procedure whereby we can offer oral proof. So that if this testimony as it applies to Issue 6 is irrelevant, with the presence of Dr. Sternglass we can, perhaps, under the regulations, offer oral testimony from him which will be directly in point.

I am not sure as to the significance of the Board's

10mil 1 indicated feeling regarding this supposed new issue,
2 but if Issues 6 and 7 have irrelevant testimony being
3 offered to them by Dr. Sternglass, and if Issue 9 makes
4 its appearance here, it is entirely possible that this
5 testimony will become extremely relevant and pertinent.
6 CHAIRMAN FARMAKIDES: In other words, you are
7 suggesting that even if we might strike it as to 6 and 7,
8 we can retain it for any new issue?
9 MR. BARON: That's correct.
10 Also, of course, I am suggesting that if there is
11 a distinction between what Dr. Sternglass will offer for the
12 supposed Issue 9 and what he was attempting to offer to 6 --
13 if there is a distinction -- and what has been offered to
14 6 is deemed to be irrelevant, he still may be able to offer
15 testimony orally directly in point with Issue 6.
16 He is going to be here and there is a provision
17 within the code -- 2.743A -- which permits oral testimony.
18 Of course, the Board does have wide discretion
19 and latitude in this matter.
20 CHAIRMAN FARMAKIDES: All right, sir.
21 What about the motion to strike Issues 4, 5, 6,
22 and 7?
23 MR. BARON: That is the second part of
24 this motion of the 13th. Issues 4 and 5, let me address
25 myself to those two.

llmil 1 One is the -- Issue 4 is the higher fuel failure rate --

2 CHAIRMAN FARMAKIDES: Mr. Baron, excuse me. People

3 in the back are having a great deal of difficulty hearing you.

4 Could you speak up? I am sorry we have no public address

5 system. It is a problem.

6 MR. BARON: It seems that in this particular

7 motion, the Applicants are suggesting to the Board that the

8 Midland case gives the Board authority to strike these

9 contentions. I grant you that we have no testimony submitted

10 to either 4 or 5.

11 I do offer, however, the fact that we can perhaps

12 cross-examine witnesses. This was an issue allowed in.

13 I recognize the obligation that was imposed upon the

14 Intervenor to submit testimony on these issues. We were not

15 able to do so.

16 Again I would suggest that the Board does have

17 latitude to allow cross-examination, assuming that it would

18 not ramble and roam all over the place if it were in fact

19 limited to this specific issue.

20 I don't think that this Midland case is so directly

21 in point that you are mandated by it to strike these issues

22 because no evidence has been submitted.

23 The additional authority cited was this 2.707,

24 and again I am not quite clear as to the significance of

25 that as a mandate to the Board.

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CHAIRMAN FARMAKIDES: I think, Mr. Baron, the Applicant's position is that you have a burden of proceeding, a burden of going forward by producing a prima facie case as to the contention that you articulated.

MR. BARON: That's correct.

CHAIRMAN FARMAKIDES: And he says you have not made that showing.

MR. BARON: Give me one minute.

I cannot say anything further, Mr. Chairman. What you have just indicated to me is a fair statement and we just have to go back to the basic issue of whether or not the environmental impact statement has met all the requirements, whether these issues should be gone into further through cross-examination.

That is a decision the Board has to make. We have no testimony to present.

CHAIRMAN FARMAKIDES: Could you give us a reason why you failed to respond to the interrogatories of the Applicant?

MS. STEBBINS: With respect to failure to answer the interrogatories fully, I would call your attention to Intervenors' motion at the prehearing conference in which we requested financial aid from the AEC in order to be properly funded to provide money for witness fees and lawyers.

Intervenor's failure to answer properly has been

14mil 1 due to lack of proper financial backing to provide the
2 necessary witnesses. We have done the best that we can with
3 our limited resources.
4 CHAIRMAN FARMAKIDES: As I said earlier -- and
5 let me make it very clear -- this Board is not -- has no
6 relationship to the Atomic Energy Commission except that under
7 statute a hearing is required and this Board is appointed
8 as an entity, a wholly-separate entity, to consider this
9 matter before us right now. We have no funds. We cannot
10 make any such financial aid available.
11 As I said earlier, too, there are arrangements that
12 you possibly might make with the AEC Regulatory Staff.
13 That is between you and the Regulatory Staff. But as to this
14 Board, we have no such financial resources.
15 Let's continue on this motion to strike. Is
16 there anything further from the Applicant?
17 MR. CHARNOFF: On the motion to strike as
18 irrelevant, no, sir.
19 On the motion to strike Contentions 4, 5, 6, and
20 7 for failure of the testimony, we do believe, as we
21 indicated in our written filing, that under the Midland
22 ruling the Intervenors have the burden of going forward and
23 failed to do so. We would read that Midland ruling as
24 saying on that basis the contentions ought to be struck.
25 Perhaps more importantly, as the Board noted, is

15mil

the fact that there were two opportunities for the Intervenors to reply to interrogatories with respect to these contentions.

In both cases the response was that the responses will be in their testimony and there were no responses in the testimony, including the testimony that was submitted in the contex. of being relevant to 6 and 7.

I think that kind of default is sufficiently significant that the contention should be struck. I do want to point out, however, that as noted in the Staff's reply to our motion, that subsequent to the filing of our motion last week, sometime on July 17, the Appeal Board in ALAB-137 in the matter of Wisconsin Electric Power Company, Point Beach Nuclear Plant, Unit 2, on page 48 of that decision, made a statement that could be construed as being inconsistent with the Midland paragraph upon which we based our motion.

On page 48 the Appeal Board last week said that AEC rules did not preclude an Intervenor from building its case defensively on the basis of cross-examination. I don't read that quite the same way the Staff does, as being necessarily inconsistent with the Midland case.

As I understand the combined thrust of these two decisions, it is still that an Intervenor who has -- who advances a reason for denial of a license still has the burden

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of going forward with his case, even though the Applicants would have the burden of proof.

However, it is possible that the Intervenor could go forward with his case by calling either Regulatory Staff or Applicant witnesses as adverse witnesses, perhaps deposing them before the hearing, and stating the thrust of what would be presented.

So I think I would read those two as being consistent.

On the other hand, Mr. Chairman, there is sufficient ambiguity, it seems to me, between these two rulings, that insofar as our motion to strike was founded upon the Midland ruling along, that I think the appropriate procedure would be for the Board to deny that motion.

We would then take exception to that denial and raise that question on appeal to the Appeal Board, so that we can get some clarification of whatever it is the Appeal Board believes to be useful.

We, for our part in this hearing, would be prepared to proceed with testimony, subject to cross-examination --

CHAIRMAN FARMAKIDES: Testimony on what, sir?

MR. CHARNOFF: On 4, 5, 6, and 7, except to the extent that any or all of those contentions are struck either as a result of your motion -- of your consideration of our

17mil 1 motion for summary disposition --

2 CHAIRMAN FARMAKIDES: Excuse me, Mr. Charnoff.

3 I want to be sure I understand you.

4 Are you also including Issue 8 or is it 4, 5, 6,

5 and 7?

6 MR. CHARNOFF: We are prepared to proceed with

7 direct testimony on 4, 5, 6, 7, and 8 on the grounds of the

8 Board denying our motion to strike the contentions for lack

9 of direct testimony by the Intervenors, subject, however,

10 to the fact that we have other motions before the Board

11 such as the motion to strike for failure to reply to inter-

12 rogatories, subject to the motion to summarily dispose of

13 some of those contentions.

14 Therefore, I believe that you should grant those

15 motions and if you would, then we would still remain with

16 only some of those contentions, 4, 5, 6, 7, and 8, for

17 purpose of proceeding here today.

18 But I want to make it very clear that we would

19 expect the Board to deny our motion to strike on the basis

20 of the Midland ruling so that we can present an exception to

21 the Appeal Board and at least clarify this for future cases.

22 CHAIRMAN FARMAKIDES: Thank you, Mr. Charnoff.

23 That is a very forthright statement, and we appreciate it.

24 I don't necessarily agree that there is an inconsistency

25 between those two cases you mentioned. As a matter of fact,

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the latter case is very consistent with the rulings that we had in Kewaunee, which is another case I happened to be sitting on.

Also, on 123 it seems to me it boils down to a discretion of the Board as to whether or not to permit the Intervenor to proceed without any direct testimony and simply proceed by making his case on cross. I think 123 can be read in that light and I think 123 is consistent with 137.

The prima facie requirement enunciated by the Board was enunciated in 123 with respect to those situations where the Board felt there was no basis for the Intervenor proceeding strictly by cross alone.

Anyway, let's hear the Staff's response, if they care to do so. Mr. Davis?

MR. DAVIS: Mr. Chairman, I think that the Staff's pleading speaks for itself, to-wit, that the Staff believes that the motion to strike these contentions for the failure to go forward should be denied, the supporting ALAB-137 opinion for our reason.

CHAIRMAN FARMAKIDES: Let's go to the motions for summary disposition filed by the Applicant with respect to Contentions 2, 4, 6, and 7. Would you respond, Mr. Baron?

MR. BARON: With respect to Issue No. 2 which

deals with the storm damage and so on, to-wit plant and the structures, might be subjected, we have in fact submitted testimony.

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All parties concerned have copies of the written testimony of the various residents residing in close proximity, so I think it is a matter of weighing the evidence that the Board must have before it, and I think for that basic reason, there is an issue of fact that you must decide and that the motion should be denied with respect to that issue.

As to Issues 4 and 7, of course again I would reiterate what I have just said with respect to the first motion. We have no testimony, direct testimony.

If cross-examination can be the method by which we make a case, then of course for the same reason this motion for summary disposition should be denied.

Again, that is within the discretion of the Board.

With respect to Issue No. 6, which is the Sternglass testimony, again if oral testimony can be presented by Dr. Sternglass with respect to that issue, then I would submit that we will be able to present a direct case and sustain that burden. However, Issues 6 and 7 become melded into this new issue and 8 becomes melded into a new Issue 9. This may be a moot point. I don't know.

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CHAIRMAN FARMAKIDES: Mr. Baron, if the Board permits you to cross, would you be prepared to advise the Board prior to that time as to what you hope to show on cross?

MR. BARON: Of course.

CHAIRMAN FARMAKIDES: You would have a distinct purpose before the cross?

MR. BARON: Yes.

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CHAIRMAN FARMAKIDES: We do not want a fishing expedition that is going to consume a lot of time on cross.

MR. BARON: I said before that any cross-examination that I would conduct would not be rambling and roaming, but to the point. Assuming that Mrs. Stebbins, with the assistance of the people who are here from the Coalition, can provide me that confined area, I will cross-examine. Otherwise, I will not.

CHAIRMAN FARMAKIDES: Anything further, sir?

MR. BARON: No.

CHAIRMAN FARMAKIDES: The Applicant, Mr. Charnoff?

MR. CHARNOFF: I would like to make two observations, if I may. One which pertains to this matter and also pertains to the discussion a few moments ago on the other matter.

Mr. Baron has again raised the question of the possibility of oral testimony. It seems to me that clearly regulations favor written testimony. The procedure here calls for written direct testimony. At this point in time it seems to me that it would be unfortunate if the Board were to permit the introduction of oral direct testimony where there was no filing of any direct written testimony on any contention.

That would not preclude, as I understand it, Mr. Baron from conducting any relevant cross-examination.

With respect to the summary disposition motion, the first point that I would like to make is that the response by Intervenors to the motion for summary disposition clearly did not object to summary disposition of Contentions 4 and 7. The response filed by the Intervenors on Friday responded only in terms of Contentions 2 and 6. It seems to me that on that circumstance and given the response by the Staff which had no objection to the summary disposition of four of the contentions, the Board at this stage of the record has no alternative, really, but to dispose summarily of Contentions 4 and 7.

With regard to contentions 2 and 6, in our motion --

CHAIRMAN FARMAKIDES: Excuse me. I am sorry. We can't hear too well.

MR. CHARNOFF: In our motion for summary disposition, we listed in accordance with the motion a statement of the material facts as to which we submitted there was no genuine issue to be heard. The Intervenors responded, as I indicated, to Issues 2 and 6.

However, their responses did not respond to all of the statements of facts that we had set out as issues as to which there is no genuine issue to be heard.

I would submit, Mr. Chairman, therefore, that with respect to Contention 2, and addressing myself to the statement

of material facts as to which there is no genuine issue to be heard, and to the Intervenors' response, that the following facts are deemed admitted in accordance with the rule of Section 2.749:

Fact number 1, the first four lines.

Fact number 3, fact number 4, fact number 5--

CHAIRMAN FARMAKIDES: Slowly, sir.

MR. CHARNOFF: I will go back.

The first four lines of Fact No. 1. Fact No. 3, Fact No. 4, Fact No. 5, Fact No. 6, Fact No. 7, Fact No. 8, Fact No. 9.

Therefore, there is controversy assuming that the response was sufficient on all other grounds that we won't object on those grounds -- there is controversy with respect to the final three lines set forth in our proposed Fact No. 1 and Fact No. 2 which relates to the design of the wave protection dike.

With respect to Contention No. 6, again we submitted a statement of facts and the response of the Intervenors with respect to Issue No. 6 did not controvert Fact No. 1, nor did it controvert the first sentence of Fact No. 3. It did controvert Fact No. 2 and it did controvert the second sentence of Fact No. 3 in part insofar as there are representations there with respect to the adequacy of maintenance and repair being sufficient to take care of aging

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problems. So that Fact No. 1 and the first sentence of Fact No. 3 set forth in connection with Issue 6 have been deemed admitted.

It seems to me, therefore, that with that established we can proceed to hearing evidence with respect to certain portions, therefore, of Contention 2 and certain portions of Contention 6 and that the Board would deem admitted all the facts with respect to Contentions 4 and 7, and would strike those as further matters of contest in this proceeding.

CHAIRMAN FARMAKIDES: Thank you, Mr. Charnoff.

Mr. Davis?

MR. DAVIS: Again, as the Staff said in its reply of the 20th of July, we have no objection to the granting of the Applicant's motion for summary judgment on Issues 6 and 7 -- excuse me. Issues 4 and 7. At the time that we made our response we had not yet seen the Intervenors' response.

CHAIRMAN FARMAKIDES: You mean of July 20?

MR. DAVIS: Of July 20. To the extent, then, as the Applicant has just stated, that the Intervenors' statement of material facts as to which there is no genuine issue to be heard takes issue specifically with the Applicant's list of material facts, we also are prepared to go to hearing and to present evidence on those material

facts as to which there are issues to be heard.

In all other respects, on Issues 2 and 6, we again have no objection to the granting of the motion for summary judgment.

CHAIRMAN FARMAKIDES: Thank you.

Is there anything further on the motions to strike or the motions for summary disposition? The Board is going to take these under advisement. We are going to receive the record of the transcript tonight and we will consider, then, all the comments made this afternoon as well as the record, and we will rule tomorrow morning at the beginning of the session.

In the interim, this afternoon we will proceed with Issue No. 1 and we will receive evidence on Issue No. 1 this afternoon.

Are there any other preliminary matters that you want to raise?

MR. CHARNOFF: Yes, sir.

MR. DAVIS: Mr. Chairman, as far as Issue 1, the Atomic Energy Commission's Regulatory Staff proposes to introduce into evidence a document styled "Testimony of Dennis J. Nightingale of the Federal Power Comission before the Atomic Safety and Licensing Board, AEC Docket No. 50-346."

We, of course, have the prepared testimony of Mr. Nightingale. We would propose to introduce it into evidence

by stipulation of the parties.

CHAIRMAN FARMAKIDES: All right. Fine.

MR. DAVIS: But the stipulation has not yet been granted by the parties.

CHAIRMAN FARMAKIDES: You can work that out during the luncheon hour.

MR. DAVIS: Ceratinly. I would like to make it known that if Mr. Nightingale is to be here to sponsor his testimony, we, of course, would desire some flexibility as far as when we can put him into the schedule and have him available for cross-examination.

CHAIRMAN FARMAKIDES: Can the Applicant proceed on Issue 1 this afternoon?

MR. CHARNOFF: Yes, sir.

CHAIRMAN FARMAKIDES: I think we would have -- is your witness here or is he coming in?

MR. DAVIS: He is in Washington, D.C., and is available practically at a moment's notice, let's say on a half day's advance notice.

CHAIRMAN FARMAKIDES: How much time, Mr. Charnoff, would you need to proceed on Issue 1?

MR. CHARNOFF: Mr. Chairman, we submitted our testimony in writing.

CHAIRMAN FARMAKIDES: Yes.

MR. CHARNOFF: We have a few -- I would say no

more than 10 minutes of questions of Mr. Roe and Mr. Reynolds which would take no more than 10 minutes to place on the record.

Then it seems to me we would propose that with respect to the written testimony which has been given in advance to the parties and to the members of the Board, that that simply be incorporated into the record as if read. So we are prepared to proceed with that. We would like to request the opportunity of a lunch, Mr. Chairman, to discuss with the Board members the schedule for some of the other contentions. In particular we have two witnesses on Contention 8 beyond those whose written testimony has come in who will be here today and tomorrow, and we will give advance written copies of their testimony today. I would like to be able to accommodate their needs.

This testimony was written, as you may recognize -- Contention 8, suddenly a new paper appeared from Dr. Sternglass as it did in Contention 6 with respect to No. 8 on fish. We had to determine whether there might be available witnesses with regard to fish testimony. It is really in the form of rebuttal testimony rather than direct. But I would like to accommodate their testimony. We will have Professor Lauren Donaldson from the University of Washington who is here, and must leave by tomorrow night, and we will have Dr. Wilbur Hartman of the Fish and Wildlife

Department who will be here today and tomorrow as well. Apart from that, we can move the contentions around at your pleasure.

There is one other preliminary matter. There is our motion with respect to res judicata. As I understand the Board, the Board is saying that the testimony proposed to be submitted by Dr. Sternglass raises, in part at least, a new matter. I don't know whether by that the Board is inferentially saying that they would be denying that motion, but if so, we would like to have that on the record, if that is the case, when you are prepared to rule on that.

We are prepared to proceed with Contention 8 today or tomorrow.

CHAIRMAN FARMAKIDES: In raising a new matter, you understand, Mr. Charnoff, that res judicata has no relationship to that issue that we are raising.

MR. CHARNOFF: I understand except that our res judicata argument, without belaboring it, was that it was applicable to the methodology employed by Dr. Sternglass. It is our view that the methodology has been considered on four different occasions and that the same methodology has been employed with respect to papers that have been submitted here. You may wish to hear evidence with respect to that. I appreciate that. But I would submit to you that the thrust of the res judicata motion, somewhat novel in AEC

history, as I recall it, is nevertheless pertinent because of the fact that what we were addressing was the question of a particular scientific or unscientific method.

CHAIRMAN FARMAKIDES: Wouldn't you have to show, sir, that that is the methodology used here by Dr. Sternglass in order to further your res judicata argument?

MR. CHARNOFF: That is in our motion, sir. We indicated and attached a comparison of the references used by Dr. Sternglass in support of each of his papers and compared those with the other papers submitted in the four other proceedings that we have identified. We believe we have made that showing. Again I submit that we would be prepared to go to trial on Contention 8 and Contention 9 as we have been labeling or numbering the contention identified by Mr. Shon earlier today, but if that is the Board's wish and the Board is therefore denying the motion, we would appreciate it at the appropriate time for the Board to deny that motion.

CHAIRMAN FARMAKIDES: All right. I trust you can appreciate that we don't want to rule on these until we have had the opportunity of examining the record. We have made notes during the process of hearing your comments this morning, but we don't think that is sufficient, so we will then pursue the procedure that I mentioned earlier. We will

adjourn now --

MR. BARON: Mr. Chairman, I do have a preliminary item. It seems that this afternoon -- what time did the panel have in mind reconvening?

CHAIRMAN FARMAKIDES: It doesn't matter to us. 1:00, 1:30, 2:00. I will leave it to the discretion of the parties.

MR. BARON: As I take it from Mr.Charnoff, we will begin with Issue 1 and the testimony of Mr. Roe.

CHAIRMAN FARMAKIDES: That was my suggestion, sir.

MR. BARON: I then would assume that the Intervenors and the Staff will have opportunities for cross-examination.

CHAIRMAN FARMAKIDES: Right.

MR. BARON: My cross-examination of Mr. Roe and whomever else would be offered by the Applicant on Issue 1 might be lengthy. I don't know what time you would then have in mind for adjourning for the day. What I am getting at is, we have a witness for Issue No. 2 who cannot be available tomorrow when Issue No. 2 would be reached, obviously, but could come in this afternoon to give his testimony out of order, you might say.

MR. CHARNOFF: Is that one of the witnesses whose testimony has been submitted in writing?

MS. STEBBINS: Yes.

MR. BARON: Yes.

MR. CHARNOFF: One of the people who lives in the area?

MR. BARON: That's correct.

MR. CHARNOFF: Let me say for the Applicant, Mr. Chairman, we have reviewed the Intervenors' proposed testimony in writing which has been submitted with respect to Contention 2. We would have no objection to all of it being included in the record as if read and we would have no cross-examination of that person so he need not come and they need not come, as far as we are concerned.

MR. BARON: All right. That answers that.

CHAIRMAN FARMAKIDES: Of course, we really won't get to that issue, although this has been a fine accommodation between the Applicant and the Intervenor, until the Board has ruled whether or not 2 is in.

The Staff had something else.

MR. DAVIS: With the same condition upon the ruling that the Board makes on Issue 2, the Staff also has examined the proposed prepared testimony on Issue 2 and is ready to stipulate it into evidence without cross-examination.

CHAIRMAN FARMAKIDES: All right, fine, gentlemen. Then you three can get together on this stipulation as well as the stipulation you mentioned earlier, Mr. Davis.

MR. DAVIS: On the same issue, Issue No. 2, the

Staff has a witness, depending upon the ruling of the Board, who will be available tomorrow afternoon and not again until next week because of his other schedules.

CHAIRMAN FARMAKIDES: This is Issue 2?

MR. DAVIS: Yes, sir. We would like, depending upon what we can work out amongst the parties -- we would agree that our witness will be available for cross-examination tomorrow afternoon, depending upon the Board's ruling tomorrow morning.

CHAIRMAN FARMAKIDES: Surely. That makes good sense. I think the three of you could easily resolve the issue.

MR. DAVIS: Thank you.

CHAIRMAN FARMAKIDES: Mr. Charnoff, something else?

MR. CHARNOFF: Yes. I am sorry, too. You had indicated quite appropriately that you would not propose to rule on the various motions until tomorrow morning. We do have witnesses with respect to all of the contentions presently. We have witnesses specifically with respect to Contentions 4 and 7 who are from out of town. Since I do believe that the summary disposition motion, wholly apart from the other motions, as applicable to Contentions 4 and 7, is not very complicated in that in effect the response of the Intervenors consented to summary disposition of 4 and 7, if the Board would consider ruling on that

immediately after lunch, we could save the Toledo Edison Company and Cleveland Electric Illuminating Company those larger charges that result in high rates to consumers in this area by letting those people go home today. If that is convenient for you to consider during lunch, we would appreciate that very much.

CHAIRMAN FARMAKIDES: Let me ask a question here off the record.

(Discussion off the record.)

CHAIRMAN FARMAKIDES: Yes, we will consider that suggestion, Mr. Charnoff. We are predisposed, you might be alert, to grant the motion on 4 and 7 and strike those two. The reason is for the reasons that you gave this morning. But we have not yet decided firmly. I believe that the procedure we have articulated is the correct procedure and that will be that we will adjourn, return after lunch, continue with Issue 1. We will make our ruling as to 4 and 7 and continue with Issue 1.

Again, I must impress on the parties the Board is concerned about the new issue that we raised. We will tentatively call it Issue No. 9. I trust you will be examining this new issue in depth. I think we have articulated it in a manner that the Intervenor can use directly. It is also articulated in a way that the Board can use in exploring that issue. The question raised by Mr. Charnoff

on the methodology of Dr. Sternglass is, of course, a good one and we will be concerned with that problem.

Is there anything else, gentlemen?

MR. BARON: Mrs. Stebbins advises me that Mr. Richard Morgan is here. He is from Washington and he is -- we have submitted his testimony as part of Issue No. 1. Again, I don't know how the Board can accommodate all these people who wish to leave the city in one day, but if at all possible we would like to have his testimony presented and he can submit himself for cross-examination this afternoon.

CHAIRMAN FARMAKIDES: Mr. Baron, why don't you and Mr. Charnoff and Mr. Davis meet and see if you can't resolve these? Insofar as the Board is concerned, I will try to accommodate the time of the individual parties, but the time of the Board is pressing, too. Frankly, we will take the issues as they come up and we are going to proceed that way.

Let's adjourn until -- this will give you enough time.

(Whereupon, at 11:35 a.m., the hearing was recessed, to reconvene at 1:00 p.m., this same day.)

AFTERNOON SESSION

(1:30 p.m.)

CHAIRMAN FARMAKIDES: The afternoon session will come to order, please.

As the Board indicated before the luncheon recess, we will defer ruling until tomorrow morning on the motions of the Applicant to, A, strike the testimony of Dr. Sternglass on Issues 6, 7, and 8; B, strike issues 4, 5, 6, 7, and 8; and C, on the application for summary disposition as to Issues 2, 4, 6, and 7.

However, we also agreed to rule on the motions for summary disposition on Issues 4 and 7, since this motion for summary disposition was not answered by the Intervenor.

Moreover, based on the record to date, the Board sees no reason to continue these two issues.

Accordingly, the Board has concluded that there is no genuine issue of fact as to Issues 4 and 7, and therefore the motion for summary disposition by the Applicant as to these two issues is granted.

We will continue with the remaining issues, and again, as indicated this morning, we will now hear testimony on Issue 1.

MR. CHARNOFF: Mr. Chairman, at the lunch break, Mr. Baron and Mr. Davis and I agreed that, recognizing that Mr. Morgan, the Intervenors' witness, is from out of

town, as a matter of convenience to him, we would be prepared to have Mr. Morgan's testimony which has been distributed to us, ahead of time, considered first with limited cross-examination of Mr. Morgan so he might then be excused.

Then we will proceed with the Applicant's case on Contention 1. I am not sure what the disposition has been, Mr. Davis and Mr. Baron, with respect to whether the FPC witness need or need not appear.

MR. BARON: What Mr. Charnoff has said is correct as far as the conversation we had prior to the recess. At the recess I learned from Mr. Morgan that he will be available for several days in the Cleveland area so if we wish to revert to the normal order of procedure, we can. But I also indicated to Mr. Davis that their witnesse, Mr. Nightingale, should present himself here because we would anticipate cross-examining him.

CHAIRMAN FARMAKIDES: All right.

MR. KARMAN: Now might we ask, Mr. Chairman, at this time if we could have some idea as to when Mr. Nightingale's presence would be required? If we were to assume, as we did, that Mr. Morgan was going to start this afternoon, then we would certainly try to get Mr. Nightingale

CHAIRMAN FARMAKIDES: Is Mr. Morgan here now?

MR. BARON: Yes, right here.

CHAIRMAN FARMAKIDES: I understand from Mr. Baron

that he is going to take some time on cross-examination on Issue 1. It makes sense to me to go ahead with Mr. Morgan first, go on to Issue 1, have the cross-examination, adjourn after that, and expect Mr. Nightingale tomorrow.

MR. KARMAN: We called Mr. Nightingale's office, Mr. Chairman, and he was checking to see the earliest possible time he could get out. We will find out a little later this afternoon as to the exact timing of his trip from Washington to Cleveland.

CHAIRMAN FARMAKIDES: Could he be here by tomorrow morning?

MR. KARMAN: We don't know. We will find out.

CHAIRMAN FARMAKIDES: I know there are a lot of planes coming between Washington and Cleveland, but is he able to be here?

MR. KARMAN: This is what we are trying to ascertain and we will be able to advise the Board prior to adjournment this afternoon. That is the best we can do.

CHAIRMAN FARMAKIDES: All right.

Is there any other problem? Why don't we go on with the testimony of Mr. Morgan, continuing on Issue 1, and then have the cross on Issue 1? Is that all right?

MR. CHARNOFF: Yes.

MR. BARON: I would assume the Applicants will follow up with their own witnesses on those issues.

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CHAIRMAN FARMAKIDES: Yes.

MR. CHARNOFF: I am sorry, I missed that.

MR. BARON: That when Morgan has concluded his direct and you have concluded your cross-examination of him, then you will follow it up with Lowell Roe.

MR. CHARNOFF: Right.

CHAIRMAN FARMAKIDES: Again the thought comes to mind that all we are doing here is using up time today and tomorrow morning until the Staff can bring their man in. I see no reason why we can't continue the normal order of things and bring Mr. Morgan in following the cross-examination.

MR. BARON: That would be the normal procedure.

CHAIRMAN FARMAKIDES: That could be one way of proceeding. Another way that I have chosen to proceed as to have the Staff follow the Applicant and then Intervenor last, which gives an advantage to the Intervenor, or some advantage, but it is not really that germane.

MR. BARON: We would appreciate any we can get.

CHAIRMAN FARMAKIDES: Why don't we take, then, Issue 1 as it would ordinarily be taken, and then have Mr. Morgan after the cross-examination, Mr. Charnoff?

MR. CHARNOFF: May I ask that Mr. Reynolds and Mr. Roe take the stand and be sworn, please? Their testimony is submitted as a panel.

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CHAIRMAN FARMAKIDES: There will be no smoking in the room, please. I think I made that announcement. I would appreciate it very much. It is a very close room.

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Whereupon,

LOWELL ROE

and

REED REYNOLDS

were called as witnesses on behalf of the Applicant, and, having been first duly sworn, were examined and testified as follows:

DIRECT EXAMINATION

xxx

MR. CHARNOFF: Addressing my questions both to Mr. Reynolds and Mr. Roe, gentlemen, have you collectively prepared testimony for us in this proceeding?

WITNESS REYNOLDS: Yes, sir.

WITNESS ROE: We have.

MR. CHARNOFF: I would like to show you a document bearing the caption of this proceeding, entitled, "Testimony of Reed Reynolds and Lowell Roe Relating to Issue No. 1, July, 1973."

Is this the document you gentlemen have prepared as your testimony in this proceeding?

WITNESS ROE: Yes.

MR. CHARNOFF: With respect to Issue 1?

WITNESS ROE: Yes.

MR. CHARNOFF: Mr. Chairman, let me ask one other question.

Gentlemen, are the contents of this document true

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and correct to the best of your knowledge?

WITNESS ROE: Yes.

WITNESS REYNOLDS: Yes.

MR. CHARNOFF: Mr. Chairman, a copy of this document was provided to the Intervenors, the Regulatory Staff and the Licensing Board on July 17. I would like to propose that the document be incorporated into the record as if read. We will make 30 copies of it available to the reporter. The qualifications of Mr. Reynolds are attached to this document and Mr. Roe's qualifications were attached to his prepared testimony on Contention 2, which has also been previously provided to the Board members, and I proposed that we introduce that at that time.

If there is no objection, in lieu of having it read, I propose that it simply be incorporated into the record as if read at this time.

CHAIRMAN FARMAKIDES: Are you offering it at this time?

MR. CHARNOFF: Yes, sir.

CHAIRMAN FARMAKIDES: Any objection, Mr. Baron and Mr. Davis?

MR. BARON: No.

CHAIRMAN FARMAKIDES: It will be received as so offered and it will be incorporated into the transcript.

(The document follows.)

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
THE TOLEDO EDISON COMPANY	)	
and THE CLEVELAND ELECTRIC	)	Docket No. 50-346
ILLUMINATING COMPANY	)	
	)	
(Davis-Besse Nuclear Power	)	
Station)	)	

TESTIMONY OF

REED REYNOLDS AND LOWELL ROE

RELATING TO

ISSUE NO. 1

JULY 1973

TESTIMONY OF REED REYNOLDS AND LOWELL ROE

In the testimony below, we will discuss the relationship of electric rate increases to usage of power, area development activities, the effects of advertising on power sales, the energy conservation programs of the Applicants and Applicants' demand projections.

I. The Relationship of Rate Increases to Usage of Power.

Toledo Edison has had two significant increases in its rates in 1961 and 1962 and in 1972 and 1973. No discernible reduction in usage or growth in usage of power came about as a result of these rate increases. The rate increases in 1961 and 1962 were approximately 9% on average for residential customers and approximately 8% on average for commerical and small power customers. During the five year period ending in 1960, Toledo Edison's peak demand grew by 4.7% per year on average. The comparable average rate of gain in Toledo Edison's system peak demand for the five year period following these rate increases (1963 - 1968) was 8.7% per year. Growth in power usage is primarily a function of income, and rate increases do not alter growth in usage in any significant way.

A Rand Corporation study of the energy situation in California (California's Electricity Quandary, The Rand Corporation, September 1972) has been cited as evidence that recent and expected rate increases of Applicants "... will

certainly have a dampening effect on future power demands in the CAPCO region". The Rand Corporation study did not calculate demand elasticities that would relate to increases in power rates. The Rand Corporation does not have any studies available to support their use of coefficients of price elasticity of demand. The Rand Corporation study assumed a short-run (less than five years) coefficient of elasticity of -0.25 in the residential sector, but had no evidence to support the value of this coefficient:

> "Thus, a short-run price elasticity of -0.25 is assumed. This would produce a 16 percent decrease in electricity consumption per household for a 100 percent increase in electricity prices." (Vol. III, P. 114)

Even if The Rand Corporation's assumption is considered reasonable, this leads to the conclusion that Toledo Edison's recent increase in its residential rates of slightly over 8% will lead to a reduction in residential usage of a fraction over 1%. Since residential customers account for less than 25% of Toledo Edison's sales, this works out to be 1/4 of 1% reduction in Toledo Edison's sales resulting from its recent residential rate increase. Even if these assumptions are valid, it provides no insight into how these reductions will alter the peak demands. The peak demands are associated with very hot weather, and it is very doubtful that any of the 1/4 of 1% reduction in usage would occur at the time of the annual

system peak.

With respect to commercial and industrial demand, the Rand Corporation study recognizes that price increases for electricity will either result in a substitution of energy sources (i.e. gas or oil), or will cause industry to relocate. In either event, the effects of such rate increases would take place over a very long time:

> Policies aimed at lessening the demand for electricity by increasing its price are indicated to have only a modest effect upon residential electricity consumption, as many people simply adjust to paying a higher bill. Larger effects are expected in both the commercial and industrial sectors, where a wider set of choices is available. Commercial establishments may substitute other forms of energy (i.e., gas or oil) for electricity, and industry also has this option. Industry has one further option, which, although believed to be minor in California, must be very carefully assessed. Higher electricity prices could act to deter some forms of new industry from locating in California, and could act to influence relocation of some types of existing industries to out-of-state locations, if the price of electricity was lower elsewhere, if electricity was a reasonably important production ingredient, and if other factors did not force location in California. These effects would take place very slowly due to existing capital investments, but would still be observable over a 15 to 35 year span. (Vol. I, p.25)

Furthermore, the Rand Corporation study is contradictory on the matter of price elasticity of demand for power.

The following is quoted from Page 104 of Vol. III:

> "A tax large enough to have a strong impact upon electricity demand growth, say, 1 cent/kWh, would raise tremendous amounts of revenue. In 1970, 123 billion kWh were sold. Applied to sales of this magnitude, such a tax would raise $1.23 billion annually in state revenues, which could be used to provide relief in other forms of taxation and to finance energy conservation programs."

If a tax of this type were imposed, and the revenue to the State were as Rand calculates, the coefficient of elasticity for electric power must be equal to zero, for the tax would not have altered the usage of power in any way. Thus, the Rand study provides no basis for concluding that rate increases of Applicants would eliminate the need for the availability of power from the Davis-Besse plant.

In addition to the Rand study, there is another more recent study of the California energy situation that considers the price elasticity of demand, Meeting California's Energy Requirements, 1975-2000, the Stanford Research Institute, May 1973. The following provides a good summary of their findings with respect to the price elasticity of demand for residential consumers of power:

> Based on the residential price projections, market shares, and income projected in this study, Californians will on average spend 2.3% of their income in 1980-90 and 2.0% of their income in 2000 on residential energy purchases, compared with 2.0% in 1960 and 1.8% in 1968. It is difficult to believe that the price escalations

> estimated herein or even a more rapid escalation would have a marked effect on the growth in demand. Even a 100% tax would place California in the average expenditure position for the nation, and one could conclude that such a tax would have no effect on demand. (P. 202)

It is my opinion that Applicants' recent and expected rate increases will not alter projected peak demands for the Applicants or for CAPCO companies, which justified the investment in, and the need for the Davis-Besse plant in the mid-1970s.

It has been alleged that CAPCO companies have always structured rate schedules to provide low rates to large users while charging high rates to small users for the purpose of encouraging the use of power based on differences in the price elasticity of demand. The allegations have cited optional rates for space conditioning and all-electric service, and an assertion that CAPCO companies have always designed their rates "to elicit the greatest possible demand growth from their customers." Thus, it is alleged that: "... if the CAPCO companies were to make efforts towards equalizing their rate structures, some reduction in the 1977 CAPCO peak could be expected."

This line of reasoning contains two basic and vital flaws.

First, rates of electric companies, including all-

electric and other optional rates, are designed to follow costs of providing service. None of the CAPCO companies have the option to arbitrarily alter their rate structures so as not to track with costs of service, as has been suggested. Equalization of rates, which would alter or eliminate optional rates, would lead to unjustifiable discrimination, which is not allowed by law and would not be permitted by regulatory bodies.

Second, it is alleged that all CAPCO companies engage in "promotional pricing", with low rates to customers having elastic demands for power and high rates for customers with inelastic demands for power. With respect to optional residential rates, any effort to equalize rates by Applicants within the limits allowed by regulatory bodies would not alter Applicants' projections of annual system peak demands. For example, the average rates per kilowatt-hour from all-electric customers of Toledo Edison in 1972 was just slightly less than Toledo Edison's average revenue per kilowatt-hour from all customers.

There is one type of customer that has significant price elasticity of demand for electric power. This is the very large industrial customer whose usage is great enough to support its own power plant, if power rates from the local electric utility reach a high enough level to economically justify constructing such a plant. This situation would

reduce the peak demand and sales of the electric utility, but would reduce neither kilowatts nor kilowatt-hours consumed in the service area. In addition, the relatively small generating facility built by an industrial customer would be less efficient economically and environmentally. Another possibility is that some industrial customers may choose to relocate if inter-regional and inter-area power rates become very significant. If this should occur, total power production and consumption would not be altered. During the last three years, Toledo Edison's industrial customers have been faced with rate increases of approximately 20% (including fuel recovery), which has produced no discernible change in usage patterns.

II. Area Development Activities

Toledo Edison and Cleveland Electric have Area Development Departments, the functions of which are to encourage economic development within their respective service areas.

Over the years the activities of these departments have continued because of a concern within the companies and the areas they serve regarding a lack of job opportunities. For example, during the decade ending in the middle sixties, the Toledo area experienced a significant amount of out-migration of its population due to a lack of job opportunities. In 1952, manufacturing employment stood at about 77,000 persons in Lucas County. From that year, manufacturing employment

stood at about 77,000 persons in Lucas County. From that year, manufacturing employment fell to a low of about 55,000 in 1961. In September 1972, manufacturing employment stood at only 60,900, 21% below the levels twenty years earlier.

It was a concern over the lack of job opportunities and the erosion of the economic base of the Toledo and Cleveland areas that brought about an aggressive area development program.

Throughout rural Northwest Ohio, Toledo Edison's area development activities have received especially strong support from the communities served. This support arises from the understandable concern over a loss of job opportunities and population that characterize smaller, agriculturally oriented cities.

From the social point of view, the overall net gain of area development activities nationally is probably near zero. That is, total employment in the U.S. economy is probably not influenced by area development activities. In prior years, families left the Toledo and Cleveland areas to find employment at other locations. Area development activities at Toledo Edison and Cleveland Electric are intended to provide job opportunities in its area, the result of which is that workers are not displaced, and problems of unemployment are lessened.

III. <u>The Effects of Advertising on Power Sales</u>

A. Toledo Edison's Power Advertising Policy.

Toledo Edison's product advertising is limited to three

areas, namely advertising of ways to use power more efficiently, how to build for electric heat and the advantages of private outdoor lighting.

A booklet entitled "50 Ways to Save on Your Electric Bill" has been actively promoted within Toledo's service area through mass media advertising. The booklet is intended to show Toledo Edison's customers how to use electric power more efficiently. It is the policy of Toledo Edison to advertise the efficient use of electric power.

At the present time, no natural gas is available for new construction in the Toledo area. As a result, home builders have turned more and more toward electric heat as a fuel source. During the first four months of 1973, the ratio of new residential electric heating customers to new residential customers was .48 for Toledo Edison. For the year 1972 the comparable ratio was .29. This increasing reliance on electric power as a heating source, which is due to a large extent to the unavailability of natural gas, explains Toledo Edison's concern for insuring that its customers live in adequately insulated homes, so that energy is not wasted. It is the policy of Toledo Edison to advertise proper insulation to home owners and home builders to prepare properly for electric heating installations.

Toledo Edison promotes the use of private outdoor (security) lighting. The lighting installations are installed and owned by the Company, for which there is a monthly charge. These security lights are very popular in unlighted rural areas, parking lots and other poorly lighted areas where security presents problems. Security lighting is a relatively new service provided by Toledo Edison, and it is apparent that it is a much needed service. It is the policy of Toledo Edison to promote this service to its customers.

B. Product Advertising Does Not Increase The Peak Demand.

Product advertising at Toledo Edison can in no way add to the annual peak demand. The peak demand occurs in the summer months, and Toledo Edison's forecasts call for a summer peak for the next 15 years. The summer peak occurs in the afternoon on a weekday. Clearly, security lighting in no way can add to this peak, inasmuch as the security light is energized by darkness. Homes that are all-electric have a peak demand that occurs in the winter months.

These facts, coupled with the Company's advertising campaign to reduce usage of power leads to the conclusion that Toledo Edison's product advertising tends to reduce the annual system peak demand.

C. Cleveland Electric's Product Advertising Policy.

Cleveland Electric's advertising program is the same as Toledo Edison's, with two exceptions. Cleveland Electric

currently promotes the use of electric dryers and ranges. The incremental peak demands to be placed on Cleveland Electric's system from such new appliances are insignificant because of the diversity factor.

D. The Effect of Advertising On Sales.

Toledo Edison has conducted extensive research into the question of what factors are significant in determining the level of residential usage of electric power in Ohio. These studies were in the form of multiple linear regression analyses with logarithmic transformations, so the slope coefficients are coefficients of elasticity.

Among the explanatory variables found statistically significant were 1) household income, 2) the price of natural gas, 3) the population growth rate of the city, 4) electric power rates (E_d = .2 to .35 on a cross section basis) 5) ethnicity of population.

The explanatory variable found to be not statistically significant was the level of expenditure on advertising. During the years under study, there were significant differences in inter-city and inter-company expenditures per customer for advertising, but these differences were not found to be a satisfactory explanation of inter-city and inter-company differences in per-customer usage. Stated differently the effect of product advertising by Ohio electric companies,

if there is any at all, is so slight that it defies specification.

IV. Energy Conservation Programs of Applicants

Applicants do have an energy conservation program that is intended to aid its residential, commerical and industrial customers in improving the efficiency of their usage of electrical power and to reduce line losses of electrical energy.

Applicants each have residential services departments which provide residential builders with technology related to proper insulation in electrically heated homes. Applicants do encourage proper construction so that energy will not be wasted.

Applicants each have commercial services and industrial services departments that promote efficient use of electrical power among their commercial and industrial customers.

Applicants each continue to upgrade their transmission and distribution systems. By moving to higher voltages and applying new technology to their electrical systems, energy is conserved.

Applicants promote the efficient use of electrical power among their residential customers. Each actively promotes a booklet describing how customers can reduce their electric bills by using less power. This booklet shows how

to save energy by adding insulation in any home, which is contrary to Intervenor's contentions regarding insulation.

Applicants do have energy conservation programs. No claims are made with respect to the effectiveness of these programs, but Applicants' customers are encouraged to use electrical power more efficiently.

The Rand Corporation study on the California energy situation proposes several methods whereby power can be conserved significantly by the year 2000. The two most significant of these proposals, in terms of savings, are the following:

1. Substitution of gas for electricity for four appliances: space heating, cooking, water heating and clothes drying (the additional gas required would come from unneeded power plants that burn gas in California).

2. Using solar energy for 70 percent of water heating, space heating and central air conditioning, and substituting gas for electricity in air conditioning and refrigeration.

Neither of these proposals is applicable to the CAPCO area. There is already a scarcity of natural gas, and if gas were used as proposed in the Rand study, no gas would be freed from CAPCO power plants, for this is not a fuel used in CAPCO baseload plants. Solar energy technology merits exploration, but is not likely to be a substitute for electrical power for a long while. One recent study on this topic draws the following

conclusions:

> A substantial development program can achieve the necessary technical and economic objectives by the year 2020. Then solar energy could economically provide up to (1) 35% of the total building heating and cooling load; (2) 30% of the Nation's gaseous fuel; (3) 10% of the liquid fuel; and (4) 20% of the electric energy requirements.
>
> If solar development programs are successful, building heating could reach public use within 5 years, building cooling in 6 to 10 years, synthetic fuels from organic materials in 5 to 8 years, and electricity production in 10 to 15 years. Solar Energy as a National Energy Resource, NSF/NASA Solar Energy Panel, Dec. 1972 (emphasis added).

It is our opinion that the Rand study, although of perhaps useful value for the energy situation in California over the next few decades, is not particularly applicable in the CAPCO area over the next two to four years.

V. Forecasting

The demand for electrical power has been constantly increasing since the birth of the electric utility industry. This long-term growth has experienced short-term setbacks over short periods of years (such as during the depression of the 1930's), but the overall trend has been increasing in general correlation with the overall economic level and the standard of living.

The ability of the electric utility industry to meet this increasing demand depends upon its capability to install additional generating capacity with sufficient lead time to have the capacity available when the demand is imposed. To avoid undue economic penalty, this new generating capacity should be added just prior to the time when it is required. These requirements, and the need to know anticipated sales of electricity for corporate planning, require forecasting of long range and short range consumer demands and energy requirements. Toledo Edison and Cleveland Electric forecasting methodology is set forth in Attachments A and B hereto.

Prior to the formation of CAPCO, the long range forecasting of its member companies was used to plan capacity additions. Long range (10 years) was used for general planning and was modified annually to determine specific timing of new units. Small generating units (100-300 MW in size) and corresponding short load times (3 years or less) provided flexibility in the long range program, permitting

near-term modification to adjust to the variables affecting the peak load forecast. An example of Toledo Edison's long term (10 year) planning was included in the Environmental Report Supplement, Figure 10-1, to snow the validity of the long range trend.

Prior to the formation of CAPCO, each company installed new generating capacity to meet its own needs, generally with some consideration of emergency support capability from others. With unit sizes being relatively small, and generally less than 10% of the system peak demand, forced outage considerations were generally not critical. In Toledo Edison's case, forced outage considerations were more important because the size of new units in relation to its peak demand was relatively large - about 25-30%. Prior to the formation of CAPCO, capacity was installed on an individual company basis to provide a reserve for planned maintenance outages and to provide reasonable assurance against forced outages during peak periods. The FPC uses a generalized reserve percentage of 20% to account for these factors.

The principle reason for the formation of CAPCO by its members was to gain the benefit of economies afforded by installation of large generating units (lower unit cost) and bulk power supplies supported by extra high voltage transmission. This has required joint forecasting of loads by CAPCO companies and coordinated installation of generating capability.

CAPCO planning is based upon a comprehesive computer program to provide judgment of reliability that could not be done before. In this program, on a week by week basis for future years, the peak demands, generating capacity, seasonal factors, forced outage rates (reliability of capacity), planned maintenance outages and other variables are considered. The program provides a uniform basis of reliability and schedules long term capacity additions to meet this established reliability criteria.

Major capacity units currently require commitment 5 to 10 years ahead of need. Many factors make scheduling of these units somewhat uncertain. Not the least of these factors are the licensing and regulatory requirements, including public hearings for nuclear and now for fossil units. Modifications to the long range plans are required to meet changes brought about by changes in load requirements, unexpected retirement of existing units and slippage of construction schedules of large units. Such a change occurred in the CAPCO plans between the 1972 and 1973 ECAR report. The Beaver Valley Unit No.1 in-service date was changed from 1974 to 1975 as a result of construction delays. In addition some capacity was retired. To provide generating capability to maintain as close as possible the established reliability criteria, short lead time capability of 515 MW (net summer capability) was committed for; a major portion of this capacity is now installed. These are the primary reasons for the changes in the load-capacity situation between the 1972 and 1973 ECAR reporting period.

Even though these changes make the 1975 capacity situation appear more favorable by per cent reserve, and in fact gives a better reliability index than CAPCO standard, they assume that the Davis-Besse plant, Beaver Valley Unit No.1 and the Mansfield Unit No.1 will be in operation to meet the peak demands. All of these units are subject to construction and licensing considerations, and not having any one of these units available during the peak load periods will leave the CAPCO system below its reliability criteria. In addition, regulatory requirements for existing fossil fueled generating stations are still somewhat uncertain during this time period. Considering these factors, a better than standard capacity situation is prudent for this period. In any case, the most optimistic combination of completion of plant construction, lower-than-projected demand and favorable regulatory action on existing units would only warrant deferring the Davis-Besse unit for a short period of time.

Toledo Edison does not have interruptible type customers and although Cleveland Electric does, capacity is not added to meet the demand from this class of customer. CAPCO planning excludes the demand from interruptables in determining the requirements to satisfy the reliability requirement.

VI. Peak Demand

Toledo Edison, Cleveland Electric and the other CAPCO

companies experience summer peak loads. These peak loads are not necessarily coincident and the CAPCO program takes this into account by summing each system's weekly forecast demand.

The values of kilowatt demand reported to the Federal Power Commission in FPC Form 1, Annual Report, page 431, for 1970, 1971, 1972 and 1973 are as required by the description of this column which reads:

> "Monthly peak col. (b) should be respondent's maximum kw. load as measured by the sum of its coincidental net generation and purchases plus or minus net interchange, minus temporary deliveries (not interchange) of emergency power to another system. Monthly peak <u>including</u> such emergency deliveries should be shown in a footnote with a brief explanation as to the nature of the emergency."

These peak loads include short term sales or receipts from other utilities which are not included or factored into any of the capacity planning programs and which are in addition to system ("native load") requirements.

System peak loads ("native loads") are reported to the Federal Power Commission in FPC Form 12, Annual Power System Statement, page (25) for 1970, 1971 and 1973 which are attached thereto as Attachments C, D and E respectively. The Toledo Edison system peak load periods from 1966 to date, together with the corresponding winter peak, are as follows:

	System Peak		Winter Peak	
Year	Month	MW	Date	MW
1966	Dec	716	12/66	716
1967	June	768	2/68	762
1968	Aug	860	12/68	823
1969	Aug	897	1/70	885
1970	July	939	2/71	911
1971	June	1054	1/72	995
1972	July	1096	12/72	1070
1973	June	1155	-	-

These figures illustrate the change from a winter to a summer peak which occurred in 1967. The two megawatt difference in the peak system demand for years 1970, 1971 and 1972 as reported in FPC 12, page (25) and the figures above, is due to the FPC required exclusion of demand from a municipal system having its own generating capability and purchasing from Toledo Edison.

ATTACHMENT A

TOLEDO EDISON COMPANY
FORECASTING METHODOLOGY

SALES FORECASTING

The Corporate Economist prepares an annual economic forecast. It is based on information gathered from forecasting services and personal study of the history and characteristics of our service area. Certain components of his economic forecast are used in the preparation of the sales forecast.

Residential Sales

The residential sales forecast is the product of the projected number of customers and projected annual use per customer. The forecast of customer growth is based on the population and customer growth rates projected nationally as we feel it relates to our service area. The economic outlook for our service area is an important factor in determining the impact of migration patterns on customer growth. The near term forecast reflects our intimate knowledge of construction activity, availability of local financing and other related factors. Annual average use per customer is projected based on expected trends in appliance usage, particularly the major energy consumers, as well as by giving weight to the availability of other fuel sources.

Commercial Sales

The near term forecast is based heavily on known, planned commercial development in the service area. Beyond the near term, the growth pattern is predicated on historical growth patterns adjusted to reflect the forecast of the service area economy and commercial building cycles.

Industrial Sales

The industrial sales forecast is prepared in two parts. The consumption of major industrial customers is forecast individually based on interviews with knowledgeable company representatives who indicate known and planned specific additions and modifications. Our industrial representatives review past consumption history and our forecast of economic components with the customer during the interview as background information for the forecasts.

The consumption for the remainder of the industrial customers is forecast similar to the commercial customers but with strong emphasis on the relationship to the FRB Index. Economic slowdowns are known to impact this category, so any economic slowdown indicated in the economic forecast is reflected in the industrial forecast.

PEAK LOAD FORECASTING

Toledo Edison's method of projecting annual peak loads involves two stages of analysis. The first stage is a projection of base load, which is the non-weather sensitive component of total peak demand. The other stage involves an analysis of the relationship of weather to demands on the electrical system.

Projections of base load involve analyses of known and probable major customer capacity additions and their contributions to future peaks, regression analyses of the base load against national economic variables and extrapolations of historical data.

Projections of the weather component of the annual peak demand focus primarily on the changing historical relationship between summer weather and associated peaks and probability analysis of weather conditions. Weather components of the peak demand are forecast by month, which have shown consistently that the summer component will be dominant throughout the next fifteen years.

Summing the base and weather components provides the forecasts of peak demands.

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ATTACHMENT B

CLEVELAND ELECTRIC ILLUMINATING COMPANY

FORECASTING METHODOLOGY

A significant factor affecting CEI sales of electricity is the weather. In the past 40 years, there has been an average of one day per year on which the temperature was -5°F or colder, and on the average, there were 1.7 days per year on which the temperature was 95°F or higher. The use of electricity for heating in the winter and for air conditioning in the summer have, in the past, and are continuing to contribute to the growth in use of electricity in the area.

Because the area served is heavily industrialized, sales forecasts are related to a forecast of the national economy. These economic forecasts are prepared by the Company's Staff Economist, who periodically meets and consults with locally - and nationally - known economists. The basic economic forecast is expressed in terms of the Federal Reserve Board Index of Industrial Production. Forecasts of other economic factors, such as U.S. Housing Starts and Gross National Product, are also developed and are compatible with the forecast of Industrial Production. Inherent in all economic forecasts are two significant basic assumptions: beyond the immediate short-term period, no forecasts are made of war or other national disasters or of national labor strikes in major industries.

The basic sales forecast is for the current year plus the next five years. This intermediate-term forecast is the basis for all long-range forecasts. Because of inability to predict unexpected changes over a long period of time, long-range forecasts are essentially extrapolations of the intermediate-term forecast and of the basic assumptions included therein.

The Residential Sales forecast is the product of the number of customers and average use per customer. Customer gain provides the basis for estimating future customers. It is predicated on the general economic outlook, anticipated changes in mortgage rates, expected housing starts as determined by surveying local homes builders, population trends, recent trends of apartment and single home construction, and expected demolitions for highways, urban renewal and other uses. Average use per customer is predicated on recent and expected trends in appliance sales, especially space heating, central air conditioning, and water heaters, and anticipated expansion of availability of natural gas in the service area.

The basic forecast of Commercial Sales is expressed as a growth based on recent trends. The growth rate is modified in certain years, up or down, based on the Commercial Sales

Department's estimate of Estimated Annual Revenues (EAR). This estimate of EAR is developed from knowledge of specific plans for commercial development in the area. It includes shopping center, office, educational, hospital, and other construction plans, as well as possible temporary loss of business resulting from demolition of existing businesses.

The EAR includes new projects on the basis of the probability that they will materialize, i.e., "Certain" if a service contract has been signed or a customer has formally authorized the construction. Expected loads which have not achieved this degree of finality but which are an integral part of the prospective customer's formal planning are classified as "Probable." These loads are included in the EAR at a 50 percent realization factor on the assumption that of all the loads in this category, half of them will be realized. "Possible" loads are those for which related plans are in some stage of formal consideration by a competent authority and which indicate a highly favorable possibility that construction will be started. These loads are included in the EAR at a 25 percent realization.

Sales for the Industrial class are forecast in three parts. The first is an estimate of basic industrial sales, excluding sales to certain large customers (Specifics and Interruptibles). These sales are correlated directly with the FRB Index as included in the economic assumptions.

The next major part of the industrial forecast is the "Specifics" estimate. Specifics are customers having demands of 10 MW or more, but may include some smaller customers having unusual load characteristics. These loads are forecast on the basis of data obtained from the individual customers as to their specific plans. These data are obtained by the CEI Marketing Specialists. The Certain, Probable, and Possible categories are also used.

The third grouping of industrial customers is the "interruptibles." These are a special group, a portion of whose load is supplied by generating capacity being operated for spinning reserve and by contract which may be interrupted without notice. The Certain, Probable, and Possible classifications are used. The total industrial sales is also correlated with the FRB Index as a basis for a check on the reasonableness of the overall forecast results. The Industrial Sales Department estimate of EAR is also used as a further check.

Street Lighting sales are developed from existing agreements and anticipated changes in

street lighting requirements for individual municipalities. These are determined by the CEI Municipal Department.

Sales to all Other Customers are based on specific contracts or agreements, as developed from time to time.

The summation of all of the above sales classifications results in "Total Sales." To this is added estimates of "Company Use" and "Lost and Unaccounted For," in order to arrive at a forecast of total service area requirements. Projections are made for Company Use and "Lost and Unaccounted For" energy. Company Use is energy used by the electric and steam heating departments for their own use, exclusive of station use. Lost and Unaccounted For includes line losses, transformer losses and other energy unaccounted for, such as variations in sales resulting from peculiarities in the calendar. "Total Sales, Company Use, and Lost and Unaccounted For" are combined for the net energy requirements for the service area.

Forecasts of peak load are developed from the forecast of sales, using a load factor based on the December maximum load. December is used because it is more predictable than peaks in the summer period. The forecast December peaks include average weather effects, since the sales forecast is based on average weather. The effects of average weather are then removed from the forecast maximum to obtain an estimate of December no-weather peaks. The growth from one December to the next is assumed to be linear, except for known large load increases. Seasonal factors are then applied to the growth trend between the December no-weather peaks to obtain comparable peaks for each of the other months. Weather effect is added to these peaks, based on the probability of certain weather occurring (Heating Degree Days (HDD) in winter and Cumulative Cooling Degree Days (CCDD) in summer) and the effect of given weather on the peak (MW per HDD and MW per CCDD). Adding weather effect to the monthly no-weather peaks results in a forecast of monthly peaks under given weather conditions. The resulting annual peak is checked for reasonableness by calculating an annual load factor. The standard five-year forecast is based on a weather level which has a probability of 50 percent of being exceeded, but peaks are also estimated on the basis of extreme weather conditions.

The factors used in determining weather effect (MW per HDD and MW per CCDD) are

re-evaluated at the end of each year to keep abreast of changes in the effects of weather. In addition, reporting of space heating and central air conditioning installations provides the basis for judging short-term variations from trend of the weather effect.

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ATTACHMENT C

Schedule 14

NET GENERATION, ENERGY RECEIVED AND DELIVERED, AND SYSTEM PEAKS BY MONTHS FOR THE YEAR

1. In column 2, show the total net generation of system plants by months for the year. The entry on line 13 of this column should agree with the entry on line 36, column 8, of schedule 1.

2. In columns 3, 4, 5 and 6, show the monthly distribution of the energy transfers reported in schedule 8, parts A and B. The totals shown on line 13 should agree with the totals reported in schedule 8.

3. In column 8 the entry on line 26 should agree with the entry on line 7 of schedule 9.

4. In column 10, show the maximum kilowatt load on the system for each month of the year. Load data in this column should be the maximum integrated demand of the energy tabulated in column 9 for 60-minute clock-hour intervals. Where integrated demands for 60-minute clock-hour intervals are not available, it is desired that available data be adjusted to approximate such intervals. Adjustments made should be explained in footnotes. Where such adjustments cannot be made, load data should be furnished in the form available. The entry on line 26 of column 10 should agree with the entry on line 23 of schedule 13.

Month	System Net Generation (Kilowatt-hours)	ENERGY TRANSFERS FROM SCHEDULE 8				
		Part B (Page 21)		Part A (Page 20)		
		Received (Col. 5) (Kilowatt-hours)	Delivered (Col. 6) (Kilowatt-hours)	Received (Col. 5) (Kilowatt-hours)	Delivered (Col. 6) (Kilowatt-hours)	
(1)	(2)	(3)	(4)	(5)	(6)	
Jan.	469,798,096	126,498,000	107,948,000	-	19,166,700	1
Feb.	398,331,038	126,408,000	90,034,000	-	18,118,700	2
Mar.	385,527,866	160,940,000	86,785,000	-	18,453,400	3
Apr.	351,106,065	167,313,000	82,683,000	-	17,668,400	4
May	372,367,869	144,529,000	71,303,000	-	17,140,600	5
June	399,580,636	131,156,000	62,646,000	-	20,227,400	6
July	404,784,267	166,542,000	88,199,000	-	20,179,700	7
Aug.	382,663,514	175,063,000	64,262,000	-	20,448,100	8
Sept.	352,883,843	192,485,000	88,024,000	-	19,339,500	9
Oct.	355,525,433	155,403,000	74,142,000	-	18,802,000	10
Nov.	341,571,592	156,553,000	70,537,000	-	18,819,100	11
Dec.	389,502,057	172,361,000	75,645,000	-	18,932,300	12
Total	4,603,642,276	1,875,251,000	962,208,000	-	227,295,700	13

Month	Net Energy for System (Col. 2 plus col. 3 minus col. 4 plus col. 5 minus col. 6) (Kilowatt-hours)	LOAD DATA				
		Net Energy for Load (Col. 2 plus col. 3 minus col. 4) (Kilowatt-hours)	Peak Load 60 min. integrated Demand Interval (Kilowatts)	(Date)	(Clock-hour ending)	Load Factor (From cols. 9 and 10) (Percent)
(7)	(8)	(9)	(10)	(11)	(12)	(13)	
Jan.	469,181,396	488,348,096	877,000	8	7 p.m.	74.8	14
Feb.	416,586,338	434,705,038	854,000	3	7 p.m.	75.7	15
Mar.	441,229,466	459,682,866	816,000	23	11 a.m.	75.7	16
Apr.	418,067,655	435,736,065	821,000	13	12 noon	73.7	17
May	428,453,269	445,593,869	850,000	22	2 p.m.	70.5	18
June	447,863,326	468,090,636	922,000	17	3 p.m.	70.5	19
July	462,947,567	483,127,267	937,000	1	2 p.m.	69.3	20
Aug.	473,016,414	493,464,514	910,000	27	3 p.m.	72.9	21
Sept.	438,005,343	457,344,843	891,000	8	3 p.m.	71.3	22
Oct.	417,984,433	436,786,433	764,000	9	2 p.m.	76.8	23
Nov.	408,768,592	427,587,592	838,000	23	7 p.m.	70.9	24
Dec.	467,285,957	486,218,057	893,000	14	7 p.m.	73.2	25
Year	5,289,389,756	5,516,685,276	937,000	July 1	2 p.m.	67.2	26

Report Minimum Hourly Load Experienced During the Month

Month (14)	(Kilowatts) (15)	Month (16)	(Kilowatts) (17)	
Jan.	402,000	July	356,000	27
Feb.	407,000	Aug.	394,000	28
Mar.	381,000	Sept.	379,000	29
Apr.	356,000	Oct.	371,000	30
May	371,000	Nov.	372,000	31
June	370,000	Dec.	422,000	32

Percent load factor = $\frac{\text{Net energy for load (Col. 9) x 100}}{\text{Peak load (Col. 10) x hours in month (or year)}}$

Calculate the load factor to the nearest tenth of one percent. If hours used in calculating the load factor for a month differ from the calendar hours in that month, report the number of hours used in calculating the load factor.

Schedule 14 ATTACHMENT D

NET GENERATION, ENERGY RECEIVED AND DELIVERED, AND SYSTEM PEAKS BY MONTHS FOR THE YEAR

1. In column 2, show the total net generation of system plants by months for the year. The entry on line 13 of this column should agree with the entry on line 36, column 8, of schedule 1.

2. In columns 3, 4, 5 and 6, show the monthly distribution of the energy transfers reported in schedule 8, parts A and B. The totals shown on line 13 should agree with the totals reported in schedule 8.

3. In column 8 the entry on line 26 should agree with the entry on line 7 of schedule 9.

4. In column 10, show the maximum kilowatt load on the system for each month of the year. Load data in this column should be the maximum integrated demand of the energy tabulated in column 9 for 60-minute clock hour intervals. Where integrated demands for 60 minute clock-hour intervals are not available, it is desired that available data be adjusted to approximate such intervals. Adjustments made should be explained in footnotes. Where such adjustments cannot be made, load data should be furnished in the form available. The entry on line 26 of column 10 should agree with the entry on line 23 of schedule 13.

Month (1)	System Net Generation (Kilowatt-hours) (2)	ENERGY TRANSFERS FROM SCHEDULE A: Part B (Page 21) Received (Col. 5) (Kilowatt-hours) (3)	Part B (Page 21) Delivered (Col. 6) (Kilowatt-hours) (4)	Part A (Page 20) Received (Col. 5) (Kilowatt-hours) (5)	Part A (Page 20) Delivered (Col. 6) (Kilowatt-hours) (6)	
Jan	404,897,191	190,436,000	92,142,000	-	18,495,900	1
Feb.	412,649,852	147,224,000	99,592,000	-	19,759,000	2
Mar.	433,481,643	161,756,000	96,701,000	-	20,184,400	3
Apr.	378,184,260	158,696,000	86,940,000	-	17,916,800	4
May	373,898,802	171,604,000	86,544,000	-	17,208,800	5
June	431,952,871	175,279,000	85,944,000	-	21,371,900	6
July	417,993,243	161,331,000	82,489,000	-	20,097,000	7
Aug	414,473,476	180,446,000	76,174,000	-	20,556,400	8
Sept	426,377,872	165,586,000	82,872,000	-	19,926,000	9
Oct	347,890,632	239,772,000	82,262,000	-	20,112,000	10
Nov.	341,124,311	233,145,000	80,216,000	-	20,364,000	11
Dec	461,840,012	153,167,000	90,864,000	-	19,504,800	12
Total	4,844,759,165	2,138,442,000	1,042,740,000	-	235,517,000	13

Month (7)	Net Energy for System (Col. 2 plus col. 3 minus col. 4 plus col. 5 minus col. 6) (Kilowatt-hours) (8)	LOAD DATA: Net Energy for Load (Col. 2 plus col. 3 minus col. 4) (Kilowatt-hours) (9)	Peak Load 60 min. integrated Demand (Kilowatts) (10)	(Date) (11)	(Clock hour ending) (12)	Load Factor (Col. 9 and 10) (Percent) (13)	
Jan.	484,765,291	503,191,191	903,000	26	7 p.m.	74.9	14
Feb.	440,522,852	460,281,852	909,000	22	12 noon	75.4	15
Mar.	478,352,243	498,536,643	871,000	8	11 a.m.	76.9	16
Apr.	432,023,460	449,940,260	825,000	5	11 a.m.	75.7	17
May	441,750,002	458,958,802	861,000	19	2 p.m.	71.6	18
June	499,915,971	521,287,871	1,052,000	28	1 p.m.	68.8	19
July	476,738,243	496,835,243	974,000	9	3 p.m.	68.6	20
Aug.	498,189,076	518,745,476	1,023,000	10	2 p.m.	68.2	21
Sept.	489,160,872	509,086,872	1,021,000	8	4 p.m.	69.3	22
Oct	485,288,632	505,400,632	925,000	1	3 p.m.	73.4	23
Nov.	473,689,311	494,053,311	914,000	29	12 noon	75.1	24
Dec	504,548,212	524,143,012	963,000	21	7 p.m.	73.2	25
Year	5,704,944,165	5,940,461,165	1,052,000	June 28	1 p.m.	64.5	26

Report Minimum Hourly Load Experienced During the Month

Month (14)	(Kilowatts) (15)	Month (16)	(Kilowatts) (17)	
Jan	413,000	July	399,000	27
Feb.	434,000	Aug.	395,000	28
Mar.	405,000	Sept	427,000	29
Apr.	389,000	Oct	413,000	30
May	371,000	Nov.	427,000	31
June	440,000	Dec	403,000	32

Percent load factor = Net energy for load (Col. 9) (kwh) / Peak load (Col. 10) (kw) × hours in month (or year)

Calculate the load factor to the nearest tenth of one percent. If hours used in calculating the load factor for a month differ from the calendar hours in that month, report the number of hours used in calculating the load factor.

Schedule 14 ATTACHMENT E

NET GENERATION, ENERGY RECEIVED AND DELIVERED, AND SYSTEM PEAKS BY MONTHS FOR THE YEAR

1. In column 2, show the total net generation of system plants by months for the year. The entry on line 13 of this column should agree with the entry on line 36, column 8, of schedule 1.

2 In columns 3, 4, 5 and 6, show the monthly distribution of the energy transfers reported in schedule 8, parts A and B. The totals shown on line 13 should agree with the totals reported in schedule 8

3 In column 8 the entry on line 26 should agree with the entry on line 7 of schedule 9

4. In column 10, show the maximum kilowatt load on the system for each month of the year. Load data in this column should be the maximum integrated demand of the energy tabulated in column 9 for 60-minute clock-hour intervals. Where integrated demands for 60-minute clock-hour intervals are not available, it is desired that available data be adjusted to approximate such intervals. Adjustments made should be explained in footnotes. Where such adjustments cannot be made, load data should be furnished in the form available. The entry on line 26 of column 10 should agree with the entry on line 23 of schedule 13

Month	System Net Generation (Kilowatt-hours)	ENERGY TRANSFERS FROM SCHEDULE 8				
		Part B (Page 21)		Part A (Page 20)		
		Received (Col. 5) (Kilowatt-hours)	Delivered (Col. 6) (Kilowatt-hours)	Received (Col. 5) (Kilowatt-hours)	Delivered (Col. 6) (Kilowatt-hours)	
(1)	(2)	(3)	(4)	(5)	(6)	
Jan	498,815,727	152,125,000	102,966,000	-	22,057,600	1
Feb.	445,916,137	170,103,000	95,778,000	-	20,701,000	2
Mar.	447,277,855	189,801,000	97,262,000	-	19,987,400	3
Apr.	384,368,847	208,254,000	91,733,000	-	19,000,200	4
May	371,324,165	220,192,000	69,062,200	-	21,280,000	5
June	393,081,800	194,615,000	62,543,000	-	19,844,200	6
July	402,625,884	212,367,000	74,149,000	-	22,429,400	7
Aug	440,363,281	217,808,000	74,778,000	-	22,542,600	8
Sept	389,287,133	232,751,000	81,553,000	-	20,513,000	9
Oct.	413,460,003	250,926,000	102,658,000	-	22,457,000	10
Nov	422,906,381	246,445,000	104,828,000	-	21,807,865	11
Dec.	426,373,522	327,465,000	171,522,000	-	21,649,200	12
Total	5,035,800,735	2,622,852,000	1,128,852,200	-	254,269,465	13

Month	Net Energy for System (Col. 2 plus col. 3 minus col. 4 plus col. 5 minus col. 6) (Kilowatt-hours)	LOAD DATA					
		Net Energy for Load (Col. 2 plus col. 3 minus col. 4) (Kilowatt-hours)	Peak Load Demand Interval 60 Min. Integrated			Load Factor (From cols. 9 and 10) (Percent)	
			(Kilowatts)	(Date)	(Clock hour ending)		
(7)	(8)	(9)	(10)	(11)	(12)	(13)	
Jan	525,917,127	547,974,727	993,000	31	11 a.m.	74.2	14
Feb	499,540,137	520,241,137	961,000	7	11 a.m.	77.8	15
Mar.	519,829,455	539,816,855	962,000	13	12 noon	75.4	16
Apr.	481,889,647	500,889,847	938,000	7	11 a.m.	74.2	17
May	501,173,965	522,453,965	963,000	24	2 p.m.	72.9	18
June	505,309,600	525,153,600	1,026,000	14	2 p.m.	71.1	19
July	518,414,484	540,843,884	1,094,000	21	2 p.m.	66.4	20
Aug	560,850,681	583,393,281	1,083,000	14	3 p.m.	72.4	21
Sept	519,972,133	540,485,133	1,030,000	1	2 p.m.	72.9	22
Oct.	539,271,003	561,728,003	983,000	31	11 a.m.	76.8	23
Nov.	542,715,516	564,523,381	1,025,000	27	6 p.m.	76.5	24
Dec	560,667,322	582,316,522	1,068,000	11	7 p.m.	73.3	25
Year	6,275,551,070	6,529,820,535	1,094,000	July 21	2 p.m.	68.0	26

Report Minimum Hourly Load Experienced During the Month

Months (14)	(Kilowatts) (15)	Months (16)	(Kilowatts) (17)	
Jan.	430,000	July	430,000	27
Feb	465,000	Aug	450,000	28
Mar.	440,000	Sept.	425,000	29
Apr.	440,000	Oct	475,000	30
May	405,000	Nov.	490,000	31
June	425,000	Dec	465,000	32

$$\text{Percent load factor} = \frac{\text{Net energy for load (Col. 9)} \times 100}{\text{Peak load (Col. 10)} \times \text{hours in month (or year)}}$$

Calculate the load factor to the nearest tenth of one percent. If hours used in calculating the load factor for a month differ from the calendar hours in that month, report the number of hours used in calculating the load factor

Educational and Professional Qualifications
Reed S. Reynolds
Corporate Planning Economist
The Toledo Edison Company

1. My name is Reed S. Reynolds. I reside at 2100 Bodette, Toledo, Ohio. I am employed by The Toledo Edison Company, Toledo, Ohio, as Corporate Planning Economist.

2. My employment with The Toledo Ecompany commenced in 1952. I have been employed by the Toledo Edison Company since with the exception of a military leave of absence from 1954 to 1956.

3. During the years 1952 to 1965 I held a variety of positions with The Toledo Edison Company, working in various sections of the Electrical Engineering Department and the Claims and Real Estate Department. In 1965 I began employment as the Corporate Planning Economist, the position I currently hold.

4. In 1963 I received the degree of Bachelor of Arts in economics from The University of Toledo. In 1968 I received the Master of Arts degree in economics from the same university. My Master of Arts Thesis was entitled A Cross-Section Analysis of the Residential Demand for Electric Power in Selected Ohio Cities: 1963.

5. Since 1964, I have also been employed by the University of Toledo. My current position is Instructor in Economics.

6. My work as Corporate Planning Economist involves a variety of assignments, including economic forecasting, forecasting of future demands for energy generally and electric power specifically, estimation of demand elasticities for electricity, population forecasting and the relationship of economic and income growth to electrical energy requirements.

7. I am a member of the American Economic Association, the National Association of Business Economists and Pi Gamma Mu (National social science honor society).

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MR. CHARNOFF: I also have a very few questions to ask each of these gentlemen supplementing the prepared testimony.

First addressing myself, Mr. Rowe, to you, and asking you to examine pages 4 and 5 of the document entitled "Testimony of Richard E. Morgan which has been provided to the Applicants and to the Regulatory Staff and the Board members, pursuant to the Licensing Board schedule, which presumably will be introduced into evidence later, specifically there is a paragraph in that statement on pages 4 and 5 which reads as follows:

"Furthermore, the CAPCO Companies, themselves, apparently do not feel that a 20 percent reserve margin is a requirement. The CAPCO reserves, based on native load as shown in the 1973 ECAR report indicate that CAPCO is predicting reserves below 20 percent for eight of the next ten years. If the CAPCO Companies were worried about the 15.8 percent reserve predicted for 1978, surely they would take measures designed to limit the growth in power demands. Perhaps a 16 percent reserve margin would be a more appropriate guideline in determining the need for power plants in CAPCO region."

Mr. Roe, addressing yourself to the suggestion here that CAPCO is satisfied with a 15.8 or a 16 percent reserve margin and addressing yourself to the ECAR 1973 report which Mr. Morgan's data in Appendix A is taken, in that

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report was there any ECAR or CAPCO comment which would relate to the contentment with which ECAR or CAPCO would view a reserve of 15.8 or 16 percent?

WITNESS ROE: Yes. In Section 3 of the 1973 CAPCO report there is a footnote one which reads, and I quote, "Additional capacity requirements have been identified for 1973, 1974, as well as for 1977 and the years following. Studies of additional capacity are underway."

MR. CHARNOFF: Did that footnote appear elsewhere in Mr. Morgan's prepared testimony, Mr. Roe?

WITNESS ROE: Yes. It is contained in Appendix D of his testimony which is the part of Section IF of the 197 CAPCO report and is the same material that I was reading from

MR. CHARNOFF: In your judgment, does that report demonstrate that CAPCO is satisfied with the reserve of capacity shown in that appendix for these years?

WITNESS ROE: It indicates that CAPCO is not satisfied with the capacity situation.

MR. CHARNOFF: What is CAPCO now doing about this situation?

WITNESS ROE: CAPCO is considering at this time an additional large unit for a service date of 1978 and additional units in the 1980s.

MR. CHARNOFF: The report also shows a low reserve in 1977. What is CAPCO doing about 1977, Mr. Roe?

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WITNESS ROE: There is not sufficient lead time now for installation of a coal-fired unit or a nuclear unit. Oil-fired units, as well as oil-fuel combustion turbine units, are being considered, but unavailability of oil to burn in such units has prevented any additional commitment to this type generation at this time.

MR. CHARNOFF: Mr. Reynolds, you are an economist, is that correct?

WITNESS REYNOLDS: Yes, sir.

MR. CHARNOFF: And you have a graduate degree in economics?

WITNESS REYNOLDS: Yes, sir.

MR. CHARNOFF: Mr. Reynolds, what are the determinants of price inelasticity of demand?

WITNESS REYNOLDS: Consumer inelasticity of demand, or price inelasticity of demand as it relates to a product, comes about primarily because of two criteria. One is the product we are talking about is a small percentage of the family budget or family income.

The second is that there is a poor substitute availability for the subject product.

MR. CHARNOFF: Addressing yourself then to those two components of a definition of inelasticity of demand, the first, I believe, was related to the question of how expensive or inexpensive the particular good is, or the

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matter that is being purchased.

To your knowledge, is the cost of electrical power a small or a large percentage of a typical family budget, and similarly, is it a small or a large percentage of the cost of operation for commercial and industrial customers?

WITNESS REYNOLDS: First, as far as residential customers, nationally, a typical family is spending approximately 1.57 percant of its household income on electric power.

In answer to your questions relating to commercial and industrial --

CHAIRMAN FARMAKIDES: Would you kindly speak up and speak in this direction so we can get your words?

WITNESS REYNOLDS: Nationally, based on U. S. median family income and what families naturally are paying on average for electric power, they are spending 1.57 percent of that median family income for residential electric power.

To answer the question with respect to commercial and industrial power, I took the electric industry's revenue from its commercial and industrial customers, and related it to gross national product. Gross national product is a measure of the total production of goods and services and I am using here the amount of electric power used to produce

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these goods and services. In 1972 commercial and industrial revenue for the entire electric utility industry was 1.41 percent of GNP.

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MR. CHARNOFF: Is that, in your opinion, the cost of electric power, being the good that we are talking about as being subject to purchase at this time, could be characterized as being relatively inexpensive, is that correct?

WITNESS REYNOLDS: Yes, sir.

MR. CHARNOFF: With regard to the second exponent or determinant of inelasticity of demand, namely the question of availability of substitutes, would you comment, Mr. Reynolds, on the availability of good substitutes for residential use and for commercial and industrial use for electric power?

WITNESS REYNOLDS: Yes, sir, the substitute that comes to mind as being the best would be natural gas. There are several appliances that could use either natural gas or electric power for heat. However, we have a problem of natural gas supply. In the Toledo area, the Columbia Gas Company, which serves the great bulk of it, is not making new connections for any new construction. They are not permitting any additional industrial customers to be connected. No residential customers are being provided natural gas for service.

In the Cleveland area, the situation is not quite as acute. In Cleveland, itself, natural gas is still available for residential customers, but not for industrial customers. In the western end of Cleveland Electric

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Illuminating service area, no natural gas is available for new customers.

MR. CHARNOFF: Apart from natural gas as an energy source, how would you characterize the availability of other substitutes for electric power?

WITNESS REYNOLDS: For space heating, oil could be used. However, there are problems with supply of oil. It is uncertain as to whether the supply will be there and it is uncertain as to what the cost will be.

Aside from that, I can think of no other important substitutes for the electric power.

MR. CHARNOFF: So is it your general judgment that there is not a ready availability of substitutes for electric power in any large amounts for residential and commercial and industrial use?

WITNESS REYNOLDS: Generally speaking, that is true. I would like to add, however, there is propane gas available, but it is relatively expensive and there is a question about its acceptance on a widespread basis as far as space heating fuels. So generally, my conclusion is that there are poor substitutes for electric power. The closest substitute, natural gas, is not available generally.

MR. CHARNOFF: Then in summary how would you characterize the elasticity of demand for -- the price inelasticity of demand for electric power, as being elastic

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or inelastic?

WITNESS REYNOLDS: The price inelasticity of demand for electric power has to be very inelastic.

MR. CHARNOFF: Thank you.

I have no further questions for these gentlemen and they are available for cross-examination by the Applicant -- by the Regulatory Staff and the Intervenors.

CHAIRMAN FARMAKIDES: Thank you.

Mr. Davis?

MR. DAVIS: The Staff has no cross-examination questions.

CHAIRMAN FARMAKIDES: Mr. Baron?

MR. BARON: Yes.

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CROSS-EXAMINATION

MR. BARON: Mr. Reynolds, you are an employee of the Toledo Edison Company, is that correct?

WITNESS REYNOLDS: Yes, sir.

MR. BARON: And have been for how many years?

WITNESS REYNOLDS: Approximately 21.

MR. BARON: Have you participated at any time up to the present in anticipating demands and calculating future demands of electrical power?

WITNESS REYNOLDS: I have been involved in this area.

MR. BARON: To what extent?

WITNESS REYNOLDS: Approximately one year ago our company installed a new peak and sales forecasting system. This was a joint effort that included four or five members of my company in conjunction with Arthur Anderson & Company, Consultants.

MR. BARON: Where was the system that you worked on?

WITNESS REYNOLDS: It is an in-house forecasting system for our needs.

MR. BARON: I see.

What was your role in doing that?

WITNESS REYNOLDS: My role was split between economist and I gave them statistical advice. It involved regression analysis which I am familiar with, and this is what they relied upon me for.

MR. BARON: So you might say you were one individual among several who participated in the preparation of this projection, this method of making a projection of future demands?

WITNESS REYNOLDS: If I recall correctly, there were four Toledo Edison Company employees that participated in developing this system.

MR. BARON: How many people were there altogether?

WITNESS REYNOLDS: No more than six professional people.

MR. BARON: Is that the extent, then, of your, shall we say, professional involvement in the development of a method by which to project future electrical needs?

WITNESS REYNOLDS: I am not quite sure I understand your question. I am continually looking at the relationship of, for example, the index of industrial production from the Federal Reserve Board and the need for industrial electric power in our area, the relation of GNP to electrical power requirements, and I furnish economic input to the forecasting system on a continuing basis. So I am not the single person who does the forecasting for the company. I am involved in it on a continuing basis.

MR. BARON: As an economist, you have indicated that inelasticity of electrical supply depends upon its low cost and also whether there are alternatives or substitutes available for it available to the consumer.

WITNESS REYNOLDS: Yes, and to add something to clarify this, table salt is usually the textbook example. If the price goes from 10 to 15 cents a pound, there is not a good substitute for it. The quantity consumed will not be reduced appreciably because of that 50 percent increase in price.

MR. BARON: In your analyses of these kinds of items, to what extent do you consider conservation of the item?

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To what extent, for example, did you consider conservation of existing electrical supplies in projecting future demands?

WITNESS REYNOLDS: With respect to the price elasticity of demand?

MR. BARON: Let's take that first.

WITNESS REYNOLDS: As indicated in my earlier testimony, it is my belief that the price inelasticity or elasticity of demand has a coefficient of near zero. Therefore, any rate increases that we are talking about that could be construed as being conservation-oriented would have no effect on the peak demand in future years.

MR. CHARNOFF: Mr. Reynolds, try to project your voice a little louder. I think the people in the back of the room have difficult hearing, as well as the reporter.

MR. BARON: Let's shift from the rate structure to the actual conservation of electrical supply that now exists by way of far more in telling usage of it by the consumer. More in telling us, turning off a light as you walk out of a room, as a basic example. To what extent do your projections for the future supply or future needs of electrical supply take that kind of thing into consideration?

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WITNESS REYNOLDS: It is not taken into consideration either implicitly or explicitly.

MR. BARON: Why not?

WITNESS REYNOLDS: We have no basis for calculating how this would affect our future peaks. We have no evidence to support a contention that a conservation program would in fact reduce our projections in peak demands.

MR. BARON: You say you have no evidence of that. Has any effort been made by the CAPCO Companies to take the initial onus off Toledo or -- has any effort been made by any of them to look into that, to find out if there is evidence that the conservation and more intelligent usage of power supplies might avoid these peak demands we have been projected without the necessity of creating newer reactors?

WITNESS REYNOLDS: I am not in a position to speak for the other four member companies of CAPCO. I am not with our conservation program with Toledo Edison and a comparable program at CEI.

MR. BARON: Perhaps, Mr. Roe, you can help him answer the question.

WITNESS ROE: I am not qualified in this area.

MR. BARON: The conservation program of Toledo, then, you indicate you are familiar with that.

WITNESS REYNOLDS: Yes, sir.

MR. BARON: You are not with CEI?

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WITNESS REYNOLDS: Yes, sir, I am somewhat familiar with it. We have discussed it with them.

MR. BARON: You indicated they have a conservation program, meaning, I assume, how to save electricity.

WITNESS REYNOLDS: Yes, sir.

MR. BARON: To what extent are you familiar with it? Can you describe the program as you know it?

WITNESS REYNOLDS: Yes. This was submitted in the written testimony and if I may refer to it, if necessary, I would request that I be allowed to do so.

MR. BARON: Certainly.

WITNESS REYNOLDS: First, we actively promote and advertise -- this is part of our advertising program -- a booklet entitled, "Fifty Ways to Save on your Electric Bill." That adequately describes the contents of it.

I might note that several pages, perhaps 10 or 12, are devoted to insulation of all kinds of housing. We are updating the voltage and the quality in our transmission systems. The result of this is to reduce line losses which can amount to five to seven percent in the power that is generated. We want to avoid that as best we can. We have an industrial service department, as does CEI, who have for years been working with our industrial customers to aid them in installing more efficient systems. We have a commercial service department that works with our commercial customers

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continually to aid them in installing more efficient electrical systems in the commercial area.

We have a residential services department whose primary function now is to work with the home builders. I mentioned in the earlier testimony in the absence of natural gas in our service area, it has resulted in a very rapid growth in the interest in space heating among the residential construction industry within our service area.

The ratio of new all-electric customers to all customers is increasing rapidly and we don't want unhappy people living in our all-electric homes, so we do have special insulation requirements and we do attempt to communicate these to the builders and get them to insulate these homes properly.

MR. BARON: How long has this program been going on as far as Toledo is concerned?

WITNESS REYNOLDS: Which piece, sir?

MR. BARON: Any of these. These are all mixed together. One wasn't started independently of the other. I assume this is a broad-based program.

WITNESS REYNOLDS: The industrial service department has been there for the period of time that I have been with the company, which is 21 years. The commercial service department has been there the same length of time. Residential services used to be active in other

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areas. As I mentioned earlier, their primary consideration is the all-electric home now and they shifted into high gear in this area approximately 10 years ago. We have always had upgrading of the facilities to reduce line losses. The booklet, "How to Save on your Electric Bill," is a booklet of recent vintage, perhaps one to two years ago that it was brought out.

MR. BARON: That booklet, do you happen to have a copy of it handy?

MR. CHARNOFF: Mr. Chairman, may I just, for purposes of the record, have Mr. Reynolds identify this document and then we might introduce it as an exhibit.

CHAIRMAN FARMAKIDES: All right, fine.

MR. CHARNOFF: Mr. Reynolds, I show you a document entitled, "Don't Waste a Good Thing. Fifty Ways to Save on Your Electric Bill." Is this the document you were referring to?

WITNESS REYNOLDS: Yes, it is.

MR. CHARNOFF: I would like this marked as Applicant's Exhibit No. 1, and I will hand copies to the Intervenors and the Regulatory Staff.

CHAIRMAN FARMAKIDES: Any objection?

MR. BARON: No. What was the number?

CHAIRMAN FARMAKIDES: Applicant's Exhibit 1. We will number the exhibits consecutively regardless of the

6mil 1 issues.

(The document referred to was marked Applicant's Exhibit 1, for identification.)

MR. CHARNOFF: Fine. May I suggest that it be received in evidence?

CHAIRMAN FARMAKIDES: Any objection?

MR. BARON: No objection.

CHAIRMAN FARMAKIDES: It will be received.

(The document referred to, heretofore marked Applicant's Exhibit 1, for identification, was received in evidence.)

MR. BARON: Mr. Reynolds, with respect to this Exhibit 1, do you know how many copies of this were printed?

WITNESS REYNOLDS: I can't give a precise number. It is in the thousands.

MR. BARON: That is quite imprecise. Are you saying 10,000?

WITNESS REYNOLDS: I am sorry, I have no answer to that question.

MR. BARON: How were they circulated?

WITNESS REYNOLDS: There was a coupon circulated in the local newspapers for customers to fill out and mail in. I recall this simply because I saw girls

7mil 1 typing day after day after day, envelopes to stuff this into
2 and mail to the people who had responded to the coupon.
3 MR. BARON: Did this take place one time, this
4 effort at conservation?
5 WITNESS REYNOLDS: I can't answer that.
6 MR. BARON: Mr. Roe, do you know?
7 WITNESS ROE: No.
8 MR. BARON: Mr. Reynolds, did you see the answers
9 submitted to the interrogatories that were filed by the
10 Intervenors? Have you had an opportunity to look at them?
11 They were signed by Mr. Roe.
12 WITNESS REYNOLDS: Interrogatories filed by the
13 Intervenors?
14 MR. BARON: Yes, the answers of Toledo and CEI.
15 WITNESS REYNOLDS: Yes, sir.
16 MR. BARON. You did see them?
17 WITNESS REYNOLDS: Yes, I have seen them.
18 CHAIRMAN FARMAKIDES: While you are looking for
19 that, I would like to find out: What is the date of this
20 document, Mr. Charnoff, do you know?
21 MR. CHARNOFF: Mr. Reynolds, could you answer
22 that question?
23 CHAIRMAN FARMAKIDES: There is no date on it and
24 I am curious.
25 WITNESS REYNOLDS: No, sir, I don't have a date.

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CHAIRMAN FARMAKIDES: Could you find out?

MR. CHARNOFF: The answer is we can find out and we will.

WITNESS REYNOLDS: I might add that this, as I understand it, was prepared by a southern electric company and it was so well received, it spread throughout the country. It is not our original work.

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MR. BARON: Do you have the answers?

WITNESS REYNOLDS: I have the answers and the questions.

MR. BARON: One of the questions, or the answer to it, has attached to the Exhibit 1-D, which is the Toledo Edison Company summary of advertising expenses, et cetera, from '68 to '73.

CHAIRMAN FARMAKIDES: Mr. Baron, could you again locate for the Board what you are referring to?

MR. BARON: Well, it is called Exhibit 1-D and is attached to the Applicant's answers to the interrogatories of the Intervenors for Issue No. 1. I believe that was attached in response to -- to help answering question 15. It is actually on the page that will be sideways. Exhibit 1-D is sideways on the page.

CHAIRMAN FARMAKIDES: All right, you can go ahead.

MR. BARON: Mr. Reynolds, do you have that before you now?

WITNESS REYNOLDS: Yes, sir.

MR. BARON: You will note under the column for the year 1972 an expenditure -- total expenditure by Toledo Edison for sales promotion of approximately $1,600,000. Further up in the first row, a total expenditure for advertising, both institutional and noninstitutional of

approximately $480,000 in a year. You haven't any idea as to what portion of those budgets -- even though I know what answer was given in the written portion -- what portion of these amounts were spent on conservation efforts by Toledo Edison?

WITNESS REYNOLDS: I doubt very much if certain aspects of the conservation program that I discussed earlier are included in these numbers. For example, tha --

MR. BARON: Mr. Roe, if you have a better answer --

WITNESS REYNOLDS: No, actually he doesn't.

MR. CHARNOFF: Let me also say, Mr. Baron and Mr. Chairman, that these numbers were prepared for Mr. Roe by the marketing people in Toledo Edison and I would assume, subject to confirmation by Mr. Roe, that if we are to get into details of the components of these numbers, we probably would have to call upon persons who are now in Toledo or in Cleveland. I am not sure I understand where Mr. Baron is going with his line of questioning.

MR. BARON: The line of questioning is intended to point out, if at all possible, the fact that exorbitant amounts of money are being spent to promote the sale and use of electricity. That is the obvious direction in which we are going. Even though a gesture is made in the form of a pamphlet on which there is not even a date toward conservation of electric power, the sums of money spent in

that direction might be quite insignificant.

Mr. Reynolds, as an economist, when something is scarce, I would have presumed that an intelligent economist, with a small "E", would conserve what he has available and not promote the further use of it, so as to create an actual shortage. Is that a fair statement?

WITNESS REYNOLDS: It may be a fair statement. It is my understanding that our promotion does not lead to contributions to the peak demand.

MR. BARON: But it does lead to the consumption perhaps additional consumption of electricity, whereas without that promotional effort in your company's case to the tune of $1,600,000 -- without that, I would presume that far less electricity would have been consumed in the year 1972 by the customers of Toledo Edison.

WITNESS REYNOLDS: I don't believe that is a fair assumption, sir.

MR. BARON: All right, tell me why.

WITNESS REYNOLDS: At one time Toledo Edison and other Ohio electric companies engaged in much different types of promotion than they do today because of our awareness of the capacity problems. At one time we did encourage use to a much greater extent than we do now and in a different sense. I attempted at one time to measure the impact of advertising on electric power usage in homes. At that time I

conducted a number of regression analyses on consumer usage, household usage, of electric power. I was moderately successful in isolating several variables that did affect the level of usage of electrical power. I was searching very diligently for the effect of advertising on the use of electrical power in the home, and I couldn't find anything -- my conclusion is if there is anything there, it is insignificant. The advertising that affects residential consumption comes from the appliance manufacturers. This is more significant than utility advertising.

MR. BARON: The advertisements of, let's say, General Electric or Tappan or any of those companies which use electrical power to operate -- you are saying that the promotion of the sale and purchase of the appliance is what creates the demand for electricity?

WITNESS REYNOLDS: No, sir, I didn't say that. I said that in my opinion that type of advertising is more effective than utility advertising.

MR. BARON: As far as causing the consumption of electrical power?

WITNESS REYNOLDS: The decision to buy or not buy an electrical appliance is primarily a function of the household income. Advertising is there. I doubt if it is too significant, certainly not in the case of electric companies.

MR. BARON: Are you familiar with CEI's advertising efforts in this area?

WITNESS REYNOLDS: Yes, sir.

MR. BARON: I am because I live in Cleveland and CEI is here. For example, have you noticed the commercials on television which they have? I don't know if you have comparable ones in Toledo, to live better electrically. You see an animated man, woman and child smiling out at you and very happy because they are living electrically. That is not from an appliance company. That is from a utility company.

WITNESS REYNOLDS: I have not seen their ads on television. I have discussed their advertising program with respect to specific appliances.

MR. BARON: Does Toledo Edison have anything comparable to that on your local TV?

WITNESS REYNOLDS: Now I am basing this on casual empiricism. I am not involved in this aspect of it professionally. I do watch television occasionally, the 11:00 o'clock news, and we do have some advertising that I would classify as more public relations than sales promotion. I frankly don't think we have a sales promotion advertising program at this time.

MR. BARON: That is with respect to Toledo?

WITNESS REYNOLDS: Yes, sir.

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MR. BARON: You have no similar observation with respect to CEI, do you?

WITNESS REYNOLDS: CEI continues to promote electric water heaters and electric ranges. They no longer promote electric -- pardon me, I have to back up. They do continue to promote electric dryers and electric ranges, but they have ceased promotion of the electric water heaters.

MR. BARON: Are you aware of the amount of money that CEI indicates in Exhibit 1-E of the answers to the interrogatories that they spent in 1972 for sales promotion? You might want to flip the page, if you haven't already.

WITNESS REYNOLDS: I see it here.

MR. BARON: Were you aware of that figure before?

WITNESS REYNOLDS: No, sir, I wasn't.

MR. BARON: Over $2,300,000 a year. I should say for the year 1972, doing sales promotion.

WITNESS REYNOLDS: I can't comment on this. I don't know the composition of that number.

MR. BARON: The words "sales promotion," I assume,can't have too many interpretations except to sell electrical power.

WITNESS REYNOLDS: I don't know what they are including in this item, sir.

MR. BARON: Mr. Chairman, it seems unfair to the witness for me to pursue cross-examination of him when he really

has no knowledge with respect to CEI's involvement in this. By his own statement, he really doesn't know.

MR. CHARNOFF: Mr. Chairman, we could arrange to have a CEI witness brought in to talk to the details of the components of the numbers in some of these areas, if that is what you and Mr. Baron wish. I think the numbers speak for themselves. I think there has been a characterization of the nature of the advertising programs in the direct testimony. But if Mr. Baron would like to probe to define breakdowns of what that is, we could arrange for a CEI witness to be present. We obviously had no knowledge of what Mr. Baron would be interested in cross-examining on based upon what we had received prior to the hearing, but we can arrange for personnel to be called here, if that is the Board's wish and Mr. Baron's request.

CHAIRMAN FARMAKIDES: It is the Board's wish. I think the thrust of Mr. Baron's questions is very obvious. Frankly, his points are not being substantiated with this witness, and he is looking to see what CEI can proffer. So I would suggest, then, that perhaps we can move on to another line of questioning, and in the interim, if you can arrange to have a CEI witness here, I would appreciate it, Mr. Charnoff.

MR. CHARNOFF: What I would propose is that he continue with all cross-examination of these gentlemen with

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respect to Toledo Edison.

CHAIRMAN FARMAKIDES: Yes, that is what he intends to do.

MR. BARON: Yes.

CHAIRMAN FARMAKIDES: The line of questioning that you are exploring, Mr. Baron, as I understand it, is the amounts being used to promots the use of electricity by CEI.

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MR. BARON: Also with respect to LED, of course.

CHAIRMAN FARMAKIDES: I am thinking now in terms of the witness that is going to be brought in by Mr. Charnoff. You are, I hope, going to complete your cross-examination as to this issue of Toledo Edison?

MR. BARON: As it applies to them, yes.

CHAIRMAN FARMAKIDES: So all we would have left would be this issue as it relates to Cleveland Electric Illuminating. Okay, Mr. Charnoff?

MR. CHARNOFF: Yes, we are going to find out if that person might be available today or tomorrow morning.

CHAIRMAN FARMAKIDES: Fine.

MR. BARON: I would address my questions, then, to some of the responses elicited to the interrogatories. You have them in front of you now so we can go to those.

Again, part of the projection, the justification for the construction of this plant or any other plant, is the forecast that you have assisted in preparing of future electric demand?

WITNESS REYNOLDS: Yes, sir.

MR. BARON: And these forecasts are arrived at through a melding of the brainpower, if you will, of people -- economists and so forth -- to project forward what the peak demand will be. Really I am just sort of getting this straight in my head now. The bases for such a projection

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have been past experience, obviously, population increases. Is that so?

WITNESS REYNOLDS: We do consider past experience, but not to a large extent.

MR. BARON: It was indicated in the answer to Question 5, which question read, "What specific industries, housing developments, electric homes or other users are there to justify the increased need for electricity?" and on page 1-3 at the top of the page, it is indicated that, "We would expect that based upon discussions with large industrial users this same pattern will continue."

Perhaps Mr. Rowe could answer my question better. What large industrial users in the area serviced by Toledo Edison might you be referring to in that answer?

WITNESS REYNOLDS: Annually industrial services representatives contact the plant managers or the corporate president, whoever is in charge of that industrial customer, and ask them, "What major expansions do you anticipate? What is the outlook for power requirements for the next one to five years? Is your corporation going to expand in the Toledo area, and if so, where? If it is going to expand, could you give us some insight into your power requirements?" We require this for power plant requirements.

MR. BARON: So this is done, then, in a very

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systematized, formal way? You apparently solicit from these companies a formal statement. Maybe not a formal statement, but some kind of a written projection of their own needs, so that you can study it?

WITNESS REYNOLDS: We ask them for their opinion as to what they will be requiring in future time periods.

MR. BARON: But they present to you a very, very detailed report, I assume, or a statement, so that you can sit down with your own projection people and look at this to determine exactly how much more you are going to need to service these needs as presented to you?

WITNESS REYNOLDS: I am not sure it is a detailed statement. It could be a very casual conversation over a cup of coffee, that, "We plan to expand our production 50 percent next year," by way of example, and our representatives can convert this into capacity requirements.

MR. BARON: I know, but I would hope that there were few of the over-coffee comments upon which your company relied in making these projections for the future years and there would be more of the definitive kind of proposals from these companies and that is what I am asking.

How many really came in with detailed projections for their own future needs upon which your company based its statement that it must increase electrical power for this area?

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WITNESS REYNOLDS: Looking into the short run, the next year or two, our large industrial customers are today aware of what their requirements will be in the next one to three years because of the lead times involved in putting together a new facility on the part of the customer. We are attempting to pick up known additions that should be incorporated in our forecasting procedure.

That is the reason for these new views.

MR. BARON: So this is done in a formalized way, an interview and a discussion with the people from the company?

WITNESS REYNOLDS: Yes, sir.

MR. BARON: And their thoughts are passed on to your people?

WITNESS REYNOLDS: Yes, sir.

MR. BARON: And digested down into what is the forecast for the demands upon us for electrical supply?

WITNESS REYNOLDS: That becomes a part of our overall forecast, yes, sir.

MR. BARON: How many companies would be involved, would you say?

WITNESS REYNOLDS: The 30 largest industrial customers that we have.

MR. BARON: In that area.

Also it has been indicated in the second

5mil 1 paragraph on page 1-3 that 1500 homes, apartments,
2 et cetera, are presently under construction or scheduled
3 for construction in housing developments and so forth?
4 WITNESS REYNOLDS: Yes, sir.
5 MR. BARON: Do you have any concept as to -- if
6 it is possible to measure. I don't know. I am asking you.
7 To measure the amount of electricity that would be needed
8 to supply those 1500 homes and apartments. What is the signi-
9 ficance of that without just saying in a general way that
10 you have to increase electrical supply? To what extent
11 must it be increased? Is there some measurement unit you
12 can give me?
13 WITNESS REYNOLDS: A point of clarification.
14 That answer relates to Cleveland Electric Illuminating.
15 If you want to ask me how --
16 MR. BARON: I thought it was your system. It
17 does say Cleveland. I beg your pardon. Is there anything
18 similar in Toledo?
19 WITNESS REYNOLDS: We did not approach the
20 problem of forecasting residential consumption as they
21 apparently do. We have a forecast of a number of households
22 and households equate with electric power customers.
23 So we do have a forecast of the number of households in our
24 service area and this is related back to power requirements
25 within the residential sector.

MR. BARON: How many households are involved?

6mil WITNESS REYNOLDS: We have 200,000-plus and are growing at the rate of about two percent per year. The forecast within Toledo calls for a growth rate in the number of residential customers of approximately two percent per year over the next 10 years.

MR. BARON: Two percent of two million? Or what was the figure?

WITNESS REYNOLDS: We are starting off with -- I would have to check the annual report. 220,000 residential customers, approximately.

MR. BARON: In your projection, then, using these new constructions as one of the items you feed into it, do you envision these new homes as being all electric, electric heat, that everybody will have a washer, a dryer, a freezer, a TV, and full house air conditioning, or do you take the minimum electric consumption for each unit?

WITNESS REYNOLDS: The additional customers that we acquire are allocated on the basis of the type of customer they will be. For example, at the present time, approximately 50 percent of our new residential customers are all electric. We project saturations, which is an industry term, of other major appliances. Our sales forecast is built up by the pieces, by the types of customers we are talking about that make up our total residential customer class.

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MR. BARON: Does Toledo still promote the sale of electrical power to the consumer or has that program been discontinued?

WITNESS REYNOLDS: We are promoting what we call security lighting. This is a lamp on a post that is owned by the company, but installed in the customer's back yard or in a parking lot or what-have-you, for which there is a monthly charge. This does encourage the use of electrical power.

MR. BARON: But beyond that, Toledo Edison has no promotional policy?

WITNESS REYNOLDS: We have a promotional policy with respect to all electric homes.

MR. BARON: In what form is that promotional policy manifested in the area of Toledo?

WITNESS REYNOLDS: The thrust of it is to build your home so it will conserve the use of electrical energy.

MR. BARON: That is presuming that you should use electrical power.

WITNESS REYNOLDS: We don't need to promote electrical energy for space heating any longer with Columbia Gas out of the picture. Currently half of the new homes in our area are all-electric and our projections call for that ratio to increase to 70 percent in a few years.

MR. BARON: Because of the total absence of the

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alternative fuel sources?

WITNESS REYNOLDS: Yes, sir. Essentially that is it.

MR. BARON: Some of the questions which I had intended to propound really now are directed to CEI, so I will have to go through and sort them out.

In Question 19, which deals with the presumption that there is a shortage of electricity --

WITNESS REYNOLDS: I am sorry, Question 19?

MR. BARON: 19. The question is to the effect of why is so much money being spent for advertising, the use of more electricity, if a shortage in fact exists. I assume you would agree that there is a shortage of electricity. Otherwise we wouldn't be here.

MR. CHARNOFF: Are you talking about a shortage today or a projected shortage?

MR. BARON: Projected. There have been brownouts in this area.

WITNESS REYNOLDS: There has been no problem in this area.

MR. BARON: But there will be a shortage anticipated of electrical power, which has been the projection of your company and CEI, if the Davis-Besse Plant is not built?

WITNESS REYNOLDS: Yes, sir.

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MR. BARON: And the point that is gotten at in Question 19 is with respect to the advertising -- I guess this is not fair to you again. This really applies to CEI. The answer that has been given here, advertising is not intended to, nor does it add to the peak demand for electrical energy. The peak demand takes place, I assume, at 2:00 o'clock on a hot summer afternoon?

WITNESS REYNOLDS: Yes, sir.

MR. BARON: When everybody has his refrigerator going and keeps opening his refrigerator for another cold beer or something like that?

WITNESS REYNOLDS: Precisely.

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MR. BARON: Is that when Toledo Edison has its peak demands?

WITNESS REYNOLDS: Our system peak demand comes about in the summertime and it is the result of a combination of a high level of industrial activity coupled with air conditioning demands and other --

MR. BARON: At that time of day?

WITNESS REYNOLDS: Yes. After two or three hot days in the summertime, when industrial activity is at a high level, then we will have our peak, our system peak.

MR. BARON: Was there something in the recent history of Toledo Edison's range of peak demands, something that you submitted to -- you had a peak demand according to -- what do you call this -- the Federal Power Commission Form 1 for the year ended December, 1972?

WITNESS ROE: I will answer that.

MR. BARON: All right. It is indicated --

WITNESS ROE: On page 20 of our prepared testimony?

MR. BARON: Yes. No, no.

WITNESS ROE: Mr. Morgan's paper?

MR. BARON: Yes. Let's refer to him because his testimony is handy. Mr. Morgan's testimony, just as an exhibit -- it is the submittal of Toledo Edison's annual report to the FPC.

CHAIRMAN FARMAKIDES: That is for the year ended

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December 31, 1970?

MR. BARON: 1972. Well, there are three pages in a row, Mr. Chairman, '70, '71 and '72. It is Appendix B. Now, looking at the one for the year ending December, 1970, it seems that the peak was for the month of January in the amount of 1,094,000 kilowatts. January 20 at 2:00 p.m., which is in the dead of winter.

WITNESS ROE: Yes.

MR. BARON: The next page would be for the year ending December, 1971. It seems that the peak occurred for that year on February 22 at 2:00 p.m., again in the middle of -- I would suggest in the middle of the winter.

WITNESS ROE: Yes.

MR. BARON: Then for the year ending December, 1972, the peak occurred on December 4:00 at 7:00 p.m.

WITNESS ROE: Yes.

MR. BARON: What I am getting at is obviously an explanation as to how that jibes with what has been indicated to be the peak on a hot summer day at 2:00 p.m.

WITNESS ROE: On that you would have to read the footnote which is above those figures. I believe the footnote for column B there reads -- and all of this was covered in our prepared testimony. I will read it. It is the monthly peak column, paren B. "Should be respondent's maximum kilowatt load as measured by the sum of its

coincidental net generation and purchases plus or minus, not interchange minus temporary deliveries of emergency power to another system."

There is some more to it, but that is principally it. As we go on to say in our testimony, these peak loads include short-term sales or receipts --

MR. CHARNOFF: Mr. Roe, you are reading from the prepared testimony which was introduced. Could you identify the page?

WITNESS ROE: It is page 196, our jointly sponsored, prepared testimony. It says that "these peak loads include short-term sales or receipts from other utilities which are not included or factored in to any of the capacity planning programs and which are in addition to the system or native load requirements."

We go on to say, then, that in FPC Form 12, the annual power system statement is the correct system native peak loads and as to when they occur and for these three years, we have included those as attachments C, D, and E, respectively on page 20 of your jointly sponsored testimony.

We have listed system peak loads, annual peak load, for the years 1966 through '73, June to date, with the corresponding winter peak load and the date of the winter peak load on which it occurred. This also shows that in 1967 we transitioned from a winter load to a summer peak load,

which has been consistent ever since.

MR. CHARNOFF: Mr. Baron, may I interrupt you for a moment?

Mr. Roe --

CHAIRMAN FARMAKIDES: Mr. Charnoff --

MR. CHARNOFF: It is a typographical error that I think might best be corrected now. In looking at page 196 of your prepared testimony, in the bottom paragraph where you referred to FPC Form 12, you say for 1970, 1971, and 1973. The attachments are for 1970, 1971, and '72. So that 1973 is a typographical error?

WITNESS ROE: It is a typographical error.

MR. CHARNOFF: I am sorry, Mr. Farmakides.

CHAIRMAN FARMAKIDES: Okay, proceed, Mr. Baron. Excuse us.

MR. BARON: What measure of reserve power would have been available to Toledo Edison in January -- January 20 at 2:00 p.m. and December -- in the year 1970? We are talking about being able to maintain a certain reserve at all times. It is my understanding it is recommended by the Federal Power Commission that you have a 20 percent reserve. Is that correct?

WITNESS ROE: FPC uses a generalized 20 percent, or maybe 20 to 25 percent, yes, sir.

MR. BARON: As I understand the thrust of most

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of the testimony that was submitted by you in writing, it is that at no time have you been anywhere near there and that is one of the reasons that we need an increase in facility, to be able to keep up with that suggested reserve. So what I am getting at now, in January of 1970, when you had the peak on January 20 at 2:00 p.m., how much reserve power was available at that time?

WITNESS ROE: For the Toledo Edison system, I couldn't tell you without looking at some rather extensive records as to what units were in service, what units might have been out for maintenance, what our short-term deliveries evidently we did have a short-term delivery at that time, which is arranged on a day-to-day or overnight basis or week to week to another utility.

I just don't have the records here to say what the actual reserve would have been with the equipment that would have been available for generation.

MR. BARON: Then your answer would be the same for the year 1971 and the year 1972?

WITNESS ROE: Yes. You are referring to a specific day and a specific hour within that day, and you have to take into account what units are physically on the line or physically capable of being started within the 15 minutes or so to meet the reserve requirement.

MR. BARON: Has there ever been a brownout or whatever you want to call it, in the Toledo area?

WITNESS ROE: Yes. On two occasions -- and I am sorry I can't give you the dates -- the Toledo Edison system was completely shut down and was disconnected from a rather weak interconnection system at that time.

MR. BARON: What was the cause?

WITNESS ROE: Both resulted from -- during a -- not excessively high, but a reasonable peak load or a load period when we had a major outage, a forced major outage -- and this is a sudden outage -- of one of our larger generating units which tripped off the line and our relatively poor interconnection system at that time was not capable of providing the deficiency created by this unit tripping off.

I must add that Toledo Edison is one of the -- is the smallest of the CAPCO, disregarding Penn Power. Our history of unit additions has been to put in large units in relation to our peak demand. We had units go in -- several of them -- that there would be 25 to 30 percent of the total peak load on the system. If you lose that large a unit in relation to your system peak and you do not have transmission capability to back it up, you do have problems, and on two occasions we indeed did have problems. This has been some time ago, and I don't believe within the last 15

years. I could get these dates.

MR. BARON: So what you are saying, then, is that the brownouts occurred not so much because the consumers just used up all available electrical supply, but because one of your units broke down or there was a mechanical failure of some kind?

WITNESS ROE: We had a --

MR. BARON: And secondarily, you were not able to tie in with some of the other companies in the CAPCO setup to draw power from them?

WITNESS ROE: We were not a part of CAPCO or a power pooling system. This is one of the reasons we did join the CAPCO group.

MR. BARON: So the failure was due to the mechanical failure of the machinery as distinguished from the overconsumption by the public of electrical supply?

WITNESS ROE: Yes. I would characterize this also as having a failure that took a large unit out instantaneously without adequate transmission backup.

MR. BARON: Do you have any personal knowledge about any similar occurrences in CEI, with the CEI Company?

WITNESS ROE: I have no personal knowledge of an occurrence one way or the other with CEI.

MR. BARON: So that type of thing, Mr. Reynolds, would that enter into a projection for future demands, the

failure of a piece of equipment?

WITNESS REYNOLDS: Mr. Roe should answer that.

WITNESS ROE: Yes. This example that I did state is a good example as to one of the components that makes up the total generating capacity addition program of the CAPCO and each individual system, and we are principally speaking of CAPCO now. In the capacity addition plans, you make long-range forecasts of peak loads and then you match that with projected installation times of major units to see how reliable your system is. It is an extensive computer program where you input your unit sizes, their probability of having a forced outage, their planned maintenance schedule and other variables, so that with this capacity planning program you can determine what your probability of having such an occasions or a dependence upon outside generation would be, and you can add capacity on a long-range basis to suit an established criteria.

MR. BARON: Turning now to question 22 of these interrogatories, we will go into the area of the rate system -- changes in the rate systems. The answer given to that particular question appears on page 1-6. It starts off that it is doubtful that a flat rate structure would have any significant effect upon usage.

Mr. Reynolds, I would assume that this would go back to what you said at the beginning, the inelasticity of

the item we are dealing with.

WITNESS REYNOLDS: Yes, sir, this was a difficult question to answer because of its ambiguity. I attempted to structure an answer that would be satisfactory. But if you care to be more specific, I can be more specific with my answer.

MR. BARON: I am not as familiar as you probably are with this Rand Corporation study. There is some discussion in that study, I understand, with respect to rates so as to control the amount of electricity consumed. What are your observations on that?

WITNESS REYNOLDS: That report assumes a coefficient of elasticity of minus .25 in the short run for residential customers. They go on to say that a 25 percent increase in rates would result in a 16 percent reduction in usage based on their assumption. First the coefficient inelasticity of minus .25 was an assumption and just that. They have no basis for that assumption. They are saying that provided the assumptions are reasonable, then this will be the result, you see. I don't agree that that is a reasonable assumption. There is a report that followed the Rand report, and that is a little more recent, the Stanford Research Institute report on the California energy situation that discusses elasticity of demand,and they come in with coefficients that are somewhat lower or near zero, I should say.

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Yes, I am familiar with the Rand report.

MR. BARON: You are just taking an opposite view of their suppositions? This whole thing is conjecture, isn't it?

WITNESS REYNOLDS: It is conjecture, although I don't think their assumption with respect to the coefficient of elasticity is preposterous. I would be surprised if there is that much elasticity, let's put it that way.

MR. BARON: You say in Section B of that same answer that the results of applying an inverted rate structure would be difficult to approximate.

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WITNESS REYNOLDS: Yes, sir.

MR. BARON: That conceivably could mean that it would have the kind of result that the Intervenors or the proponents of such a proposal have in mind just as much as it could have the opposite effect. It is difficult to know which way it is going to go, by this answer.

WITNESS REYNOLDS: Based on my studies and my opinions with respect to elasticity, I don't think it would have a significant result on the usage of power which is a function of household income. But I must add I have never seen an inverted rate, so I can't tell you what the probable result would be.

I am familiar with the concept, but I am not sure to what extent the environmentalists would choose to go with the structuring of the rate.

MR. BARON: The next question, of course, mentions the discussion -- mentions articles which have discussed this very subject.

WITNESS REYNOLDS: Yes, sir.

MR. BARON: Have you read them?

WITNESS REYNOLDS: I authored one. I authored two.

MR. CHARNOFF: You offered or authored?

CHAIRMAN FARMAKIDES: Authored.

WITNESS REYNOLDS: Authored. Yes, sir, I reviewed

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those sections of the Rand Corporation report that dealt with reductions in the use of electrical energy. I am familiar with the Office of Emergency Preparedness report as it relates to electric power. I am not familiar with those aspects that relate to transportation and so forth. I am very familiar with the Fisher and Keysen report. I wrote a critique on that document in my master of arts thesis. Yes, sir, I am familiar with the Stanford Research Institute report on the California power supply.

MR. BARON: Would you say, then, that all of those that you have read and so on agree with your comments as far as a rate structure, that it would have really no impact upon the consumption of electricity?

MR. CHARNOFF: I am sorry. I think that question needs clarification.

MR. BARON: I will rephrase it.

CHAIRMAN FARMAKIDES: Mr. Charnoff, if you want to object, fine. Otherwise, please restrain yourself until your redirect.

MR. CHARNOFF: Then I object. I think the question is unclear. The question was --

CHAIRMAN FARMAKIDES: Is the question unclear to you, sir?

WITNESS REYNOLDS: It is very unclear. I didn't understand it.

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CHAIRMAN FARMAKIDES: Would you rephrase your question, Mr. Baron?

MR. BARON: All right. The five or six items that are mentioned here as being studies relating to prices for power and the use of power -- you have indicated you have reviewed them, you have read them, you are familiar with them. Do they all agree with your position?

WITNESS REYNOLDS: Number 1 and number 2 clearly --

MR. BARON: I am glad you said that.

CHAIRMAN FARMAKIDES: The reason for the laughter, for those of you who don't have the testimony, is that these are the ones offered by the witness.

WITNESS REYNOLDS: Certain aspects of the Rand Corporation report, I disagree with, but keep in mind they apply to California and not Northern Ohio. Some of the conclusions they draw may be valid. I don't know. But they again apply to the California situation. The Rand report is a respectable report, but with respect to elasticity of demand, we must focus our attention on that specific area. They made assumptions. They have no studies to base these assumptions on. It is merely input for the study that they made. As far as short-run price elasticity of demand, I am not in substantial disagreement with the Rand report assumptions.

MR. BARON: How about numbers 4 and 5?

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WITNESS REYNOLDS: May I add with respect to the Rand report, in our written testimony there is a discussion of applying the elasticity of demands assumed in the Rand report to the Toledo Edison situation and I show the results as far as the rate increases, and I bring it down to the effect on peak demand which happens to be zero, as you will see in my written testimony.

Number 4, the report on energy conservation from the Office of Emergency Preparedness. There is only one thing that is significant in there as it relates to the electrical power industry, and that has to do with insulation.

I am in agreement with that and Toledo Edison does encourage better insulation of homes.

Number 5, the Fisher and Keysen study, I can't really say much positive about it. It is a mixture of many things. There is a rather extensive review of the problems of the Fisher and Keysen report in my master of arts thesis which you had asked for in the interrogatories. It was furnished.

I don't know if you reviewed my discussions in the case. I had a lot of problems with Fisher and Keysen. They have positive and negative price elasticities of demand in that book which are inconsistent one with the other. I don't rely on the Fisher and Keysen report.

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The Stanford Research Institute report on the California power supply is a highly regarded study, yet parallels the Rand report on the California energy situation.

MR. BARON: Then you would say they are accurate, but applicability is limited to the California area?

WITNESS REYNOLDS: As in the prepared testimony. They are assuming that solar energy will be one of the bases for reducing power requirements in the future years in California, out to the year 2000, and so forth. Solar energy technology which they are assuming is not developed at this time.

We have a report here, Solar Energy as a National Energy Resource, by the National Science Foundation-NASA Solar Energy Panel, and they discuss in here the approximate number of years before various types of solar energy applications might come about.

It would be several years before you could get any benefits from solar energy in California and I don't know what the situation would be in Ohio, whether you could apply solar energy technology or not. The climates are quite different.

The other point in the Rand report was that they relied on reducing the usage of electric power in the homes for cooking, space heating, and water heating. They suggest in the short run we can replace this with gas which would be

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more efficiant. They recognize that there is a shortage of natural gas, but they say this natural gas that would be required could be supplied by the electric power stations in California which burn gas.

That has little relevance in northern Ohio. We do not burn natural gas in our power plants except for some rather minor peaking units that are fired with gas.

So I conclude that the Rand report is highly regarded, but it is of limited relevance to us in Ohio.

MR. BARON: Going back for the moment to efforts on the part of the utility company to, shall we say, persuade the consumer to save electricity, there is a program, "Save a Watt." Are you familiar with that?

WITNESS REYNOLDS: Yes, sir.

MR. BARON: That is located where?

WITNESS REYNOLDS: New York City, Consolidated Edison Company being the power company.

MR. BARON: Do you have any information with respect to that program?

WITNESS REYNOLDS: I don't have it with me. It is contained in their annual report. Their estimated reductions in the peak demands come about through a combination of appeals to customers and voltage reductions. So if you examine the annual report they will show the reductions in peak demands based on their calculations that

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are unverified and it will state that this is their estimate of the reduction in the peak demand that came about from a combination of their energy conservation program and voltage reductions.

Additionally, they have had a long history of power problems, blackouts, brownouts, along the Eastern Seaboard, and what they are estimating today is the result of years of exposure to power shortages. They do not differentiate as to how much of this reduction came from the energy conservation program and voltage reductions. We don't have an answer to that.

MR. BARON: How long has the program been in effect, this "Save a Watt" campaign, if you want to call it that?

WITNESS REYNOLDS: If you are including appeals to the public, it has been in effect for a long time. The formalized program has been in effect, I believe, two years, approximately.

MR. BARON: Do you have any idea of the method by which the formalized program works? Is it through advertisements in the newspapers, is it through advertisements on the local television channel?

WITNESS REYNOLDS: They do not promote the reduced demand of electrical power through billboards and so forth. I have heard it by word of mouth. I have not been

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in New York personally for a number of years. I am not familiar with it personally.

MR. BARON: What does it mean to reduce wattage?

WITNESS REYNOLDS: Voltage.

MR. BARON: What does that actually mean to the consumer?

WITNESS REYNOLDS: I suppose I could answer that. I think Lowell Roe could give a better answer.

MR. BARON: Then let's let Lowell Roe do it.

WITNESS ROE: I am chief mechanical engineer, not chief electrical engineer. I will attempt it. Normally your system operation is to maintain a regulated voltage, which also controls the flow of power from one system to another. You also, by control means in our sub transformation where you get power down to the industrial or residencial usage, try to maintain a reasonably constant voltage for which your electrical equipment was designed to operate.

If you in fact do reduce this voltage by two or three percent or in some cases more, at the consumer level, your equipment does use less power in kilowatts. However, it is not the best operation for your electrical equipment. You could tend to be overheating motors and burning them out or something like that.

In effect, what you do is try to reduce the

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voltage to the customers and thereby reduce their demand somewhat during these critical periods.

MR. BARON: That would be an involuntary response, of course, of the consumer, where there is just no power to power his appliance. Whereas the active campaign of advertising to conserve is a voluntary thing, a reaction by the consumer, something he has to do?

WITNESS ROE: That was not quite correct. It is the voltage reduction -- it does not really cut off power usage. It cuts off slightly the demand, such as if your air conditioning was drawing at a certain level, it would reduce its demand level by maybe several percent. But it would not cut it off completely.

MR. BARON: But it reduces its efficiency, wouldn't you say?

WITNESS ROE: Yes.

MR. BARON: But neither of the two of you have any knowledge as to what significant effect this campaign had with respect to the conservation of electrical power in that area? Do you have any knowledge as to what percentage of electrical power was concerned, shall we say, as a result of that campaign?

WITNESS REYNOLDS: I am relying on an unreliable memory.

MR. BARON: It has been pretty good so far.

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WITNESS REYNOLDS: Thank you. If you have the annual report, could you help me?

MR. BARON: I don't have it. Is it available to you somewhere nearby?

WITNESS REYNOLDS: No, the public library has it. I had best not answer the percentage they mentioned in our annual report.

CHAIRMAN FARMAKIDES: Come again? What is the answer? Would you reread the question, sir?

(Whereupon, the reporter read the record, as requested.)

WITNESS REYNOLDS: I don't have the annual report before me. It is a combination of voltage and reduction and -- it is not specified how much of the reduction is related to that and I doubt if Con Ed knows themselves.

MR. BARON: Do you have any knowledge as to whether they are still pursuing this program of conservation?

WITNESS REYNOLDS: I assume they are, but I don't have any personal knowledge that they are doing it at the current time.

MR. BARON: Let's return to these interrogatories. Something with respect to the industrial development department at Toledo Edison is in Question 26 of the interrogatories and in the answers given it indicates there are approximately four people in the department and it has

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been a consistent number from 58 to the present time. Also that the annual budget has varied between $70,000 and $90,000 and this last year was close to $90,000.

WITNESS REYNOLDS: Yes, sir.

MR. BARON: What is the function of such a department?

WITNESS REYNOLDS: The function of this department is to promote area economic development. Particularly in the rural regions we have had significant out-migration of population over the years. In fact, in the decade ending in 1965, approximately, the Toledo metropolitan area had very significant out-migration of population.

Job opportunities were not in the Toledo area. It was simply not Boomtown USA. It suffered a population loss to the south and west. Corporations were leaving. We had a severe unemployment problem.

Of course, we are related to this economic problem that we were experiencing in our service area. It is because of this experience during this period of time that we continued our -- actually expanded our area development program.

MR. BARON: Is the function of that department to keep people in the area so they don't move away from Toledo, shall we say, and to assist these companies which are having difficulties in modernizing their equipment and in directly

12mil 1 making use of more electrical power?

2 WITNESS REYNOLDS: Essentially that is it. We
3 provide them technical advice with respect to locating in
4 Northwestern Ohio, facilities that are available. We try to
5 match up the supply and the demand for structures, what-have-
6 you.

7 We do encourage economic development in our
8 service area.

9 MR. BARON: These could be companies which had
10 already been customers of Toledo Edison, wouldn't they?

11 WITNESS REYNOLDS: Not necessarily.

12 MR. BARON: But whom you would hope to promote
13 as future customers of Toledo Edison?

14 WITNESS REYNOLDS: Yes, sir.

15 MR. BARON: I would assume that implicit in the
16 efforts of these four people in that department
17 is to see to it that these new companies or old companies
18 which you might help relocate, plug into Toledo Edison's sup-
19 ply?

20 WITNESS REYNOLDS: Yes, sir, we promote on a
21 national basis, as do most other power companies. Area
22 development is a national program, the net effect of which
23 is probably zero. It is a defense mechanism to an extent.
24 I say the net social effect is probably near zero
25 because everyone is doing it. Every state is engaged in

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this in one form or another and there are probably no new jobs created on a national basis. But we got into this and stayed with it because of our concern over the loss of jobs and population from our service area.

So if we are successful in landing an insurance company, which we would love to have, it would increase employment and population or keep it from being reduced as rapidly.

MR. BARON: And, of course, that insurance company would probably sign a lease -- and I am just suggesting this -- for the construction of a large office building which would be all electric powered, wouldn't it?

WITNESS REYNOLDS: I can't answer that. It could be steam, which we can sell them, too.

MR. BARON: In this department, this the one which has a site service, is that the idea? Do you give community profiles of the particular community?

WITNESS REYNOLDS: Community profiles are distributed by Toledo Edison, yes, sir. These are the rural communities where our efforts are particularly well received. These rural --

MR.BARON: Where there is room for expansion and development?

WITNESS REYNOLDS: There is room for improvement with respect to out-migration of their young. The young people

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graduate from high school, jobs are not available, and they leave the area. This is one of the things that brings on this concern.

MR. BARON: Would the existence of a new plant that can supply electrical power be one of the selling points for industrial development, economic development?

WITNESS REYNOLDS: An industry would not want to locate where there is not power available, for obvious reasons.

MR. BARON: So that with the projected construction and completion of the Davis-Besse Plant in an area which, I assume you will agree, is at this moment pretty wide open and unpopulated, there might be room for Toledo Edison to go out and solicit development and construction by companies now that we have the source of electrical power?

MR. SILBERG: Mr. Chairman, I would object to that question. Mr. Baron wishes to get into questions of population growth in a largely agricultural area and I think that matter has been resolved in this hearing.

CHAIRMAN FARMAKIDES: Mr. Baron, what is the purpose of your question, sir, in light of Mr. Silberg's objection?

MR. BARON: The sale of electric power, Mr. Chairman, and all the methods by which it happens -- the sale of electrical power when it is being indicated that there is a shortage of it, that the projections are that there will be

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a shortage of it. I think by the same token we have to look at what might be in the wind in those years ahead on the opposite side, what will be done or what is being done, what is being contemplated to sell electricity, so as to justify the statements that there will be a shortage and, therefore, we need this plant.

CHAIRMAN FARMAKIDES: You are framing your question from that viewpoint?

MR. BARON: Yes, sir.

CHAIRMAN FARMAKIDES: Answer it, sir.

(Whereupon, the reporter read the record, as requested.)

CHAIRMAN FARMAKIDES: Mr. Baron, rephrase your question, sir.

We will take a 10-minute recess and come back. In the meantime, rephrase your question.

(Recess.)

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MR. KARMAN: We can start, Mr. Chairman.

CHAIRMAN FARMAKIDES: All right.

MR. CHARNOFF: Mr. Chairman, two related minor procedural matters.

We will have a representative from the Cleveland Electric Illuminating Company advertising department here tomorrow morning to respond to the cross-examination related to CEI, and with respect to the inquiry about the Exhibit No. 1, the 50 ways to save, we have received the following information:

The Edison Company purchased 11,500 copies from the Theodore Davison's, Inc., in North Carolina. They purchased 7500 in May of 1972 and 4000 additional in March of 1973. It was originally published in June of 1971 by the Carolina Power & Light Company. The advertisements with respect to the document inviting members of the public to request copies of it were published in July and August, 1972 in five newspapers. The Toledo Blade three times in July, and three times in August. The Toledo Times three times in July and three times in August. The Bronze Roven, Aron News, and the Toledo Jewish News, and we do not have the number of times they were published in those available.

There were also a series in 1972 of TV and radio advertising the availability of the document. It is

still available on request. 9500 of the 11,500 copies have been distributed.

CHAIRMAN FARMAKIDES: Thank you, Mr. Charnoff.

Mr. Baron, does that answer the question you posed earlier? We can have that testified to.

MR. BARON: I am willing to accept it as testimony.

CHAIRMAN FARMAKIDES: Would you then continue, sir, with your questions?

MR. BARON: Yes.

We were talking about this area of industrial development department of the Toledo Edison. I have several publications, as I would call them, obviously printed by Toledo Edison which we can offer as exhibits, and then we will ask the witness to look at them.

CHAIRMAN FARMAKIDES: Could you mark them, sir?

MR. BARON: Do you want me to mark them?

CHAIRMAN FARMAKIDES: Yes. How are you offering them?

MR. BARON: This one will be known as the Toledo site service. We will call this Intervenors' No. 1.

MR. CHARNOFF: I am sorry. I thought we were doing it without any appellation as to whose exhibits they were, and we would just take it as Exhibit 1, 2, 3, and 4.

CHAIRMAN FARMAKIDES: No, excuse me. I was saying that each of the parties would identify their own

particular exhibits, but we would not distinguish between issues.

MR. BARON: So then I will mark this Intervenors' Exhibit 1.

What I will mark as Intervenors' Exhibit 2 is entitled "A Community Profile, Defiance, Ohio."

CHAIRMAN FARMAKIDES: We need three copies of those.

MR. BARON: I am sorry, I don't have them

CHAIRMAN FARMAKIDES: The Board has to have copies of those. Otherwise we can't see them. Can the Applicant get them?

MR. CHARNOFF: I am sure we can get them, hopefully this week, and we will make them available to the Board and the other parties.

CHAIRMAN FARMAKIDES: That is an offer that you can accept, Mr. Baron.

MR. BARON: I do.

CHAIRMAN FARMAKIDES: But we are looking to you, sir, for three copies for this Board. That copy will go to the public proceedings and the reporter will please send them as part of the package to public proceedings.

MR. BARON: For purposes of the hearing now, he can use them. Intervenors' No. 3 is entitled "The Location with the Winning Combination, Northwestern Ohio."

Intervenors' Exhibit No. 4 is entitled "Northwestern Ohio, Land of Good Living."

(The documents referred to were marked Intervenors' Exhibits Nos. 1 thru 4, for identification.)

MR. BARON: Mr. Reynolds, I would like you, if you would, to take a look at these items.

Mr. Chairman, the reason we didn't have more copies available is that this is all that were made available in response to the interrogatory.

CHAIRMAN PARMAKIDES: But you understand our position. It is very difficult for us to --

WITNESS ROE: Mr. Chairman, may I clarify that? These were given to Mrs. Stebbins due to a visit at the offices of Cleveland Electrical Illuminating where she had requested these documents we had listed be made available. She had asked for a copy of this material, and this is what we supplied to her, was a copy.

CHAIRMAN PARMAKIDES: All right. Fine.

MR. BARON: Mr. Reynolds, these are publications of Toledo Edison, is that correct?

WITNESS REYNOLDS: Yes, sir.

MR. BARON: And these are publications that really are coming out of the industrial development department?

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WITNESS REYNOLDS: A point of clarification. It is the area development department. It is not limited in scope to industrial development.

MR. BARON: Okay. Do you have any personal involvement with these publications?

WITNESS REYNOLDS: Very little. I am sometimes asked for population data, and I furnish these as input to the community profiles. This other information you have provided, I have had nothing to do with.

CHAIRMAN FARMAKIDES: Excuse me. What information are you identifying that you have had nothing to do with? For the purposes of the record, please speak clearly.

WITNESS REYNOLDS: Intervenors' Exhibit No. 1, Exhibit No. 3, and Exhibit No. 4.

CHAIRMAN FARMAKIDES: You have not had anything to do with?

WITNESS REYNOLDS: I have had nothing to do with these three items.

MR. BARON: You have, then, by way of omission, had something to do with No. 2?

WITNESS REYNOLDS: Yes, sir. I sometimes furnish the area development department economic and social data on the communities that we serve.

MR. BARON: Mr. Roe, do you have any familiarity with these?

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WITNESS ROE: Only very generally in that I recognize what they are. I have had nothing to do with their preparation or their contents.

MR. BARON: May I ask you, then, either one of you, in your opinion as employees of Toledo Edison, what are the purposes of those brochures?

WITNESS ROE: I can offer an opinion. It is essentially information sheets concerning, in the case of Exhibits 1 and 2, a specific area within our service area, and Exhibit 1 is more related to the available industrial property of the Defiance area. Exhibits 3 and 4 are general information pamphlets on Northwestern Ohio, which is essentially our service area.

MR. BARON: Would you agree that they are also, shall we say, a subtle solicitation to industries and developers of homesites to look at this area that is available, "We have water, power, rail lines, roads"?

MR. CHARNOFF: Mr. Chairman, objection. The witness has testified that he has not prepared these documents. They speak for themselves and we are perfectly prepared to have these documents received and let the Intervenors express whatever characterizations they wish.

CHAIRMAN FARMAKIDES: That's correct.

MR. BARON: I would like to offer those as exhibits.

CHAIRMAN FARMAKIDES: Any objections?

MR. CHARNOFF: No.

MR. DAVIS: No objection.

CHAIRMAN FARMAKIDES: They will be received as Intervenors' Exhibits 1, 2, 3, and 4.

(The documents heretofore marked Intervenors' Exhibits 1 thru 4, for identification, were received in evidence.)

MR. BARON: Is it possible, Mr. Chairman, that some representative of Toledo Edison could be made available to go into this area? Again I submit to the Board that the direction that I am going in is to indicate efforts on the part of Toledo Edison and perhaps on the part of CEI to sell electrical power, to make obvious efforts to do so. Those exhibits which are now admitted have maps not just of a city, for example, Toledo, but a wide geographic area, explaining to possible customers the facilities we have. They are luring people in, you might say.

We are taking the position that this is encouraging the consumption of electrical power as distinguished from conserving what is available, that this is creating a market for a product that these utility companies have to sell, and they are going further by saying that our projections for future demands indicate that we will need a greater

producing facility to meet these demands.

I am just wondering to what degree will this kind of effort increase that demand. It is an active solicitation of customers. It can't be interpreted to be anything else but that.

lmil 1 CHAIRMAN FARMAKIDES: Assuming you have made the
2 point, sir, and assuming that point is in the record, why
3 would you need additional people to confirm it?
4 MR. BARON: So that I wouldn't have to assume it,
5 so that I could elicit testimony directly in point.
6 MR. CHARNOFF: I will stipulate to the fact that
7 the Toledo Edison Company and Cleveland Electric
8 Illuminating Company have area development programs, that the
9 area development activities might cause a change in location
10 of one industrial establishment or commercial establishment
11 from one location to another.
12 There already is testimony in the record from Mr.
13 Reynolds with respect to whether or not nationally speaking
14 there is any particular net gain as a response to area
15 development activities. To my knowledge there is no law,
16 policy, regulation or any other restriction on such activities,
17 but I am perfectly prepared to accept into the record and
18 stipulate that both of the owners of the Davis-Besse Plant
19 do conduct area development activities.
20 CHAIRMAN FARMAKIDES: Does that suffice, Mr.
21 Baron?
22 MR. BARON: No, Mr. Chairman, because I personally
23 would like to know -- I think it is germane -- the dollars
24 spent on this effort and the success with which their efforts
25 have been met, the kinds of companies they have been able to

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bring in.

CHAIRMAN FARMAKIDES: Mr. Baron, you are really asking this Board to locate witnesses for you, sir, through the Applicant.

MR. BARON: Well, of course.

CHAIRMAN FARMAKIDES: These will be your witnesses, as I understand you. You are not asking this Board to advise the Applicant on how to proceed in his direct case, I hope.

MR. BARON: I am proceeding with cross-examination with respect to one of the interrogatories to which answers were given. They have indicated in these answers that they have a budget. They have indicated that the budget amounts to so much, what the employees do. They have given us the brochures. One of the questions is how many contacts were made by the department for each of the following years.

CHAIRMAN FARMAKIDES: They have responded to your questions.

MR. BARON: To the best of his ability.

CHAIRMAN FARMAKIDES: Are you then saying that the responses are insufficient?

MR. BARON: Of course.

CHAIRMAN FARMAKIDES: Then once you have made that statement, you are also saying that you want someone to come here and respond to your questions in an adequate way?

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had a bench conference and by reason of that the Applicant will stipulate to certain facts.

Mr. Charnoff?

MR. CHARNOFF: As I understand it, the line of inquiry would be terminated if we stipulate to certain facts. One of them relates to the number of contacts that have been made with -- by the area development department during certain years with members of industry.

In answer to that inquiry, we filed a written response indicating that in 1968 Toledo Edison Company made 990 contacts. In 1969 Toledo Edison Company made 514 contacts. In 1970 Toledo Edison Company made 380 such contacts. In 1971 462 contacts were made. In 1972 525 contacts were made.

Cleveland Electric Company responded to that inquiry by stating that the total calls made during the year 1972, which was a typical year, were 9170 such contacts.

We are prepared to stipulate that those facts are true.

In addition to that, we are prepared to stipulate into evidence as -- I believe they ought to be Intervenors' Exhibits 5 and 6 -- Intervenors' Exhibit 5 is a document entitled Exhibit 1-D, Toledo Edison Company Summary of Advertising Sales Promotion and Public Relations expenses, 1968 through 1973. Intervenor's Exhibit 6 is a document

5mil 1 entitled Exhibit 1-E, the Cleveland Electric Illuminating
2 Company, Summary of Advertising, Sales Promotion, and Public
3 Relations Expenses, 1968 through 1973. The references as
4 to Exhibit 1-D and 1-E are to exhibits that were appended
5 to Applicant's Responses to Intervenors interrogatories
6 and we will reproduce copies of those for the Board and
7 for the reporter.
8 I am sorry, the Board has already received copies
9 of those and I will give the reporter three extra copies
10 of those documents, and, of course, the Regulatory Staff
11 and the Intervenors have long since received them.
12 (The documents referred to were
13 marked Intervenor's Exhibits 5
14 and 6, for identification.)
15 MR. CHARNOFF: We will stipulate to their intro-
16 duction into evidence.
17 CHAIRMAN FARMAKIDES: I take it the Intervenor has
18 no objection to them being marked as Intervenor's Exhibit
19 5 and 6?
20 MR. BARON: No objection.
21 CHAIRMAN FARMAKIDES: Are there any objections
22 from the Staff?
23 MR. DAVIS: None.
24 CHAIRMAN FARMAKIDES: We will receive them and
25 we will approve the stipulation as stated.

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(The documents referred to, heretofore marked Intervenor's Exhibits 5 and 6, for identification, were received in evidence.)

MR. BARON: Mr. Chairman, may I proceed?

CHAIRMAN FARMAKIDES: Mr. Baron.

MR. BARON: I have a few questions here which Mrs. Stebbins has given me. I think they are pertinent. Again, they are in the same general direction we have been going. They are directed to either of the two gentlemen.

Can you indicate to us what percent of your electrical power supply is for lighting purposes as distinguished from operating machines and that kind of appliance? Is there any statistic on that?

WITNESS REYNOLDS: Yes, sir. Approximately 25 percent of our sales go to residential customers, if this is what you had in mind.

MR. BARON: Of course that would be for lighting and appliance use and so on?

WITNESS REYNOLDS: Total residential usage is approximately 25 percent of total sales.

CHAIRMAN FARMAKIDES: Let's be clear about that because I am a little confused. Mr. Baron, you asked the question what is the percentage of electrical power used for lighting.

7mil 1 Now, Mr. Reynolds, you replied that 25 percent
2 of electrical power is used for residential purposes.
3 That is not necessarily lighting.
4 WITNESS REYNOLDS: Sometimes they are used
5 synonymously.
6 MR. BARON: I did mean lighting as lighting.
7 MR. CHARNOFF: Including lighting in industrial
8 establishments and so on?
9 WITNESS REYNOLDS: Street lighting.
10 MR. BARON: Lighting.
11 CHAIRMAN FARMAKIDES: Would there be any break-
12 down?
13 WITNESS REYNOLDS: There is no breakdown.
14 MR. BARON: In the field of lighting, in the
15 signs of lighting, is there such a thing as footcandles?
16 Do you measure it in so many footcandles of illumination
17 coming forth out of a little bulb or something?
18 WITNESS REYNOLDS: That is a measure.
19 MR. BARON: Is that something that is controllable,
20 the amount of footcandle power that is to be given off for
21 illumination purposes?
22 WITNESS REYNOLDS: Once the lighting installation
23 is made there is no control. Either it is footcandles
24 of its output or you turn the switch off.
25 MR. BARON: How do you then determine the

8mil 1 footcandles -- what device is it that the footcandle
2 measurement applies to? Is it the bulb, the amount of power
3 supply into a building or facility --
4 WITNESS REYNOLDS: It is in output in terms of
5 footcandles from the bulb. The bulb gives output in foot-
6 candles also.
7 MR. BARON: Is that related to the wattage that you
8 see imprinted on a bulk, for example?
9 WITNESS REYNOLDS: Yes, sir.
10 MR. BARON: Is there some method by which that
11 can be controlled or in which the consuming public can be
12 educated on how to use bulbs?
13 WITNESS REYNOLDS: Yes, sir, this is described
14 in our booklet.
15 MR. BARON: The one of which there were 9500
16 copies distributed?
17 WITNESS REYNOLDS: Yes, sir.
18 MR. BARON: In an area of how many thousand
19 population?
20 WITNESS REYNOLDS: We have residential customers
21 of approximately 201,000.
22 MR. BARON: Does the electrical industry, your
23 industry, have any basic recommendations as to proper foot-
24 power or candle-power that should be used?
25 WITNESS REYNOLDS: I am not aware of any

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standards. Perhaps technical advice is furnished, but this is not my area.

MR. BARON: I see.

Are you familiar with an organization known as the Illuminating Engineering Society?

WITNESS REYNOLDS: I am not.

WITNESS ROE: I believe I am aware that it exists and that is as far as it goes.

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MR. BARON: In the area development department, is one of the functions to recommend to a prospective user of electrical power the amount of candle power they should use? You have consultants for that function?

WITNESS REYNOLDS: Which department are you referring to, sir?

MR. BARON: Any department of Toledo. Do you have a consultant who will be able to advise a prospective user of electricity on how much candle power he should use?

WITNESS REYNOLDS: I am aware that our commercial service department will provide lighting data to commercial customers. Beyond that, I cannot speak for their activities.

MR. BARON: Mr. Chairman, I think the regulations provide that counsel can be assisted by a person who has some expertise in the area to do some of the cross-examination?

CHAIRMAN FARMAKIDES: Yes. You have got to qualify him. Who is the person, sir, and what are you talking about?

MR. BARON: Mr. Morgan.

CHAIRMAN FARMAKIDES: In what area?

MR. BARON: This same area we are now in, because his direct testimony is on Issue 1.

CHAIRMAN FARMAKIDES: He is going to be functioning as a witness.

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MR. BARON: Yes.

CHAIRMAN FARMAKIDES: You are going to --

MR. BARON: Stretch a point.

CHAIRMAN FARMAKIDES: Yes, you are, and also you are going to be biasing his testimony as a witness, Mr. Baron.

MR. BARON: Pardon me?

CHAIRMAN FARMAKIDES: You are possibly biasing his testimony as a witness he if is going to be the interrogator of these witnesses. I don't know that you or the Board would be well advised to do that. I think his testimony as a witness would be far preferable than his functioning as an interrogator.

MR. BARON: It was just to really make it a little bit easier for everyone here. He has several questions on which he has been making notes from their comments, and he would really be funneling them through me. I thought it would be more simple if he asked them himself.

CHAIRMAN FARMAKIDES: I think it would be better if he would do it through you. We may take a recess if you wish. How much time do you need, sir? Five minutes? We will reconvene at 3:40.

(Recess.)

CHAIRMAN FARMAKIDES: Let's go back on the record. Mr. Baron, as I understand it, you have no further

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questions at this time of the two witnesses, so we will excuse them until tomorrow morning, at which time we will complete the cross-examination of these two witnesses.

MR. BARON: That's correct.

CHAIRMAN FARMAKIDES: Redirect then will take place tomorrow morning.

The Staff, I understand, has no cross-examination of these two witnesses.

MR. KARMAN: That's correct.

CHAIRMAN FARMAKIDES: Then tomorrow we will have redirect. We will complete the cross-examination by the Intervenor and have redirect, and then we will go on to Issues 8 and 2, or 2 and 8. We will not finish Issue 1 until Thursday because the Staff's witness on Issue 1 can't make it until Thursday. We will accommodate that desire of the Staff.

Also we will be ruling tomorrow morning as to all the issues, and perhaps Issues 2 and 8 will no longer be before us. We just don't know at this time.

Is there anything else we can accomplish right now before we turn to Mr. Morgan's testimony?

Gentlemen, you are excused for the moment. We will see you tomorrow morning.

(Witnesses Reynolds and Roe excused.)

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CHAIRMAN FARMAKIDES: Mr. Morgan?

Mr. Baron, you may proceed.

We are now, in fact, going to the direct testimony of the Intervenor before proceeding further on Issue 1.

Whereupon,

RICHARD E. MORGAN

was called as a witness on behalf of the Intervenors, and having been first duly sworn upon oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BARON:

Q State your full name and address for the record.

A My name is Richard Earl Morgan. My address is 1815 Lamont Street Northwest, Washington, D.C.

Q You have supplied copies of written testimony which you wish to give on behalf of the Intervenors in this action?

A Yes, I have.

Q Do you have a copy before you?

A Yes, I do.

Q Would you please look that over and see to it that that is a copy as originally submitted by you?

A Yes, it is.

Q Are there any comments or additions which you

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wish to make at this time which would supplement that testimony?

A Yes, two comments. Shall I go ahead?

Q Yes, please.

A First of all, I mentioned in my prepared testimony that Consolidated Edison Company of New York's Save a Watt Program or campaign in 1971 resulted in an estimated 2 percent reduction in their summer peak. It has since come to my attention that this same program in 1972 resulted in a reduction of -- an estimate of 4 to 5 percent of the peak, which is much -- a much greater reduction, a much greater conservation of electric power than I was aware of at first. This illustrates a greater potential for savings through energy conservation efforts.

The other comment is in relation to the testimony of the two gentlemen from Toledo Edison this afternoon regarding reserve requirements. I did state in my testimony that the CAPCO companies were apparently satisfied with a 16 percent reserve margin. I did not see the note in the ECAR report which they referred to, and I would like to correct myself and say that they apparently are not satisfied. That doesn't mean I am satisfied.

CHAIRMAN PARMAKIDES: Could you be more specific, sir? Excuse me, Mr. Baron. Could you be more specific, sir, and tell us where you are correcting your testimony?

THE WITNESS: Okay, let me find it here. On page 4, the bottom paragraph, "Furthermore, the CAPCO companies themselves apparently do not feel that 20 percent reserve margin is a requirement." This section here -- I would not say that they don't feel that way. Apparently they do feel that a 20 percent reserve margin is a requirement. However, I still think there is plenty of room to question this 20 percent reserve margin in light of the economic and environmental costs of having that kind of margin, that it is possible that there could be reasons why a 16 percent margin might be sufficient.

BY MR. BARON:

Q You also mentioned in your written testimony -- you made reference to the Rand Corporation's report.

A Yes.

Q Do you have any comments with respect to that in light of some of the comments you have heard here this afternoon?

A Perhaps one comment that Mr. Reynolds made this afternoon was that California -- that the Rand Corporation mentioned that in California the companies -- the problem of a gas shortage could be eliminated since a lot of the electricity in California is generated by natural gas and that therefore if you slow down the growth in demand for power, you would eliminate the need for some natural gas

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and make that available for gas appliances. He is correct that that is not possible in Ohio since very little electricity is generated in Ohio that way. However, perhaps improvements in insulation in Ohio in homes that are heated by natural gas would make it possible for a certain amount of substitution of other appliances in Northern Ohio and Western Pennsylvania to be used with natural gas rather than electricity.

DR. HAND: Is that the Rand report or the SRI report?

THE WITNESS: I am referring to the Rand report.

CHAIRMAN FARMAKIDES: Can we get this into evidence, Mr. Baron?

21

MR. BARON: Yes.

CHAIRMAN FARMAKIDES: Are you going to be moving this into evidence?

MR. BARON: Yes. In fact, I will do that right now. I will move that the testimony of Mr. Morgan be accepted for his testimony.

CHAIRMAN FARMAKIDES: We will mark it as your Exhibit 7, Intervenors' Exhibit 7.

MR. CHARNOFF: Mr. Chairman, may I suggest that since it is testimony, it be incorporated in the transcript as if read, and then we will have all the testimony in the transcript?

CHAIRMAN FARMAKIDES: Do you agree, Mr. Baron?

MR. BARON: Yes, sir.

CHAIRMAN FARMAKIDES: Do you have any objections?

MR. DAVIS: None. I will point out that the reporter requires extra copies.

CHAIRMAN FARMAKIDES: 30 copies, as I understand it. Do you have 30 copies of this?

MS. STEBBINS: No. We didn't know that we needed 30 copies.

CHAIRMAN FARMAKIDES: Can anyone make available 30 copies?

MR. CHARNOFF: Unless the reporter retypes it as if it were read.

CHAIRMAN FARMAKIDES: How many pages is it? I think we will have to reconsider your suggestion, Mr. Charnoff. There are so many tables in here that cannot be retyped. I think we will have to admit it as an exhibit.

MR. CHARNOFF: We can Xerox it, if you would like, Mr. Chairman. I think Little Orphan Annie will come out better on the Xerox.

CHAIRMAN FARMAKIDES: Since the Applicant has made the offer, I assume you accept, Mr. Baron?

(Discussion off the record.)

CHAIRMAN FARMAKIDES: Let's go back on the record.

There are no objections to the admission of the testimony of Mr. Richard E. Morgan. We will accept it into

the evidence. It will be bound into the transcript as if read. 30 copies will be made available to the reporter.

(The document follows.)

Item 1

UNITED STATES OF AMERICA ATOMIC ENERGY COMMISSION

In the Matter of	)	
TOLEDO EDISON COMPANY AND	)	
CLEVELAND ELECTRIC ILLUMINATING COMPANY	)	Docket No. 50-346
(Davis-Besse Nuclear Power Station)	)	

TESTIMONY OF RICHARD E. MORGAN

My name is Richard Morgan. I am the Energy Research Director for the Environmental Action Foundation in Washington, D.C. I would like to bring to your attention a number of facts regarding the need for the Davis-Besse plant. These facts show that the future power demands and available generating capacity in Northern Ohio and Western Pennsylvania may differ significantly from the estimates used by the Applicants and the Atomic Energy Commission (AEC) staff in determining the need for the Davis-Besse plant. It is very likely that Davis-Besse will not be needed in the foreseeable future.

In order to determine the need for the Davis-Besse plant, it is important that one consider the demands and generating capacity not only within the service territories of the two Applicants, Toledo Edison Company (TEC) and Cleveland Electric Illuminating Company (CEI), but also within the service territories of three other companies with which the Applicants are interconnected. These other companies are Duquesne Light Company (DLC), Ohio Edison Company (OEC), and Pennsylvania Power Company (PPC). These five companies are the members of the Central Area Power Coordination Group (CAPCO), through which they provide for common reliability and for the planning of future generating and transmission facilities. In determining the need for the Davis-Besse plant, the Applicants and the AEC staff considered the estimates of power demand and available generating capacity

in the entire CAPCO region. The statistics used were taken from the East Central Area Reliability Coordination Agreement (ECAR) report which was filed with the Federal Power Commission in April, 1972. The AEC indicates in Table 8.3 on page 8-6 of its Final Environmental Statement of March 1973 that the CAPCO system would have reserve margins of 9.6% in 1975 and 4.3% in 1977 if the Davis-Besse plant is not utilized. These reserve margins would be far below the FPC's recommended reserve of 20%. Assuming the figures contained in the 1972 ECAR report are correct, there would be a serious threat of power shortages in the CAPCO region by 1977 if the plant is not utilized.

Soon after the Final Environmental Statement was issued by the AEC, ECAR submitted its 1973 report to the FPC. The projected power demands for CAPCO were essentially the same, but the estimates of available generating capacity were drastically revised. A comparison of the two reports shows that several plants will be operating much sooner than had been indicated by the 1972 report. As might be expected, the projected CAPCO reserve margins for the 1970's now appear much better than they did in the 1972 report (See Appendix B).

Another error made in the Final Environmental Statement is that the reserve margins are based on "internal load", rather than "native load". The former includes interruptible loads,

while the latter does not. Since interruptible loads may be eliminated during times of power shortages, native load provides a more realistic measure of a company's reserve situation.

The CAPCO reserve figures based on native load found in the 1973 ECAR report are much higher than the reserve figures used by the AEC staff when determining the need for the Davis-Besse plant. For example, the AEC staff predicts a 17.0% reserve in 1975 with Davis-Besse, and 9.6% without. My own computations based on the more current figures show that the reserve margins in 1975 will be 25.4% with Davis-Besse and 17.6% without (See Appendix A). Here I am assuming that Davis-Besse would have a capacity of 906 MW, since this is the figure cited for the plant in the ECAR report. I have further calculated that in order to achieve the FPC's recommended reserve margin of 20% in 1975, CAPCO would need only 234 MW of the Davis-Besse plant's 906 MW capacity. The full capacity of Davis-Besse would not be needed until the summer of 1977. These estimates assume that CAPCO demand projections are correct and that no energy conservation efforts are undertaken.

There are a number of reasons to believe that the demand projections of the Applicants and CAPCO are exaggerated. For example, the AEC staff states on page 8-3 of its Final Environ-

mental Statement that "both companies experience peak loads in summer." This assertion is untrue. Toledo Edison has in fact had a winter peak for several years, as reported on page 431 of its Annual Report to the Federal Power Commission (See Appendix B). TEC's statements on FPC Form 12 show that for the past three years, TEC has been predicting summer peaks, and has been wrong every time.(See Appendix C). Since the TEC system peak does not coincide with the peaks of the other CAPCO companies, the projected CAPCO demands may be overstated.

Another assumption of the AEC staff which must be questioned is the required reserve margin. The Federal Power Commission recommends a reserve margin of 20% to insure the reliability of a power system. Such a margin is certainly desirable, and a 30% margin would be even better. However, larger reserve margins imply greater costs, both financially and environmentally. The AEC staff should consider that perhaps 20% should not be the recommended reserve margin when environmental effects and safety hazards are considered.

Furthermore, the CAPCO companies themselves apparently do not feel that a 20% reserve margin is a requirement. The CAPCO reserves based on native load as shown in the 1973 ECAR report indicate that CAPCO is predicting reserves below 20% for eight of the next ten years. If the CAPCO companies were worried about

the 15.8% reserve predicted for 1978, surely they would take measures designed to limit the growth in power demands. Perhaps a 16% reserve margin would be a more appropriate guideline in determining the need for power plants in the CAPCO region.

Using the native load figures from the 1973 ECAR report, it still appears that CAPCO reserve margins could dip below 10% in 1977 and 1978 if the Davis-Besse plant is not utilized. Thus, unless the actual demands in the CAPCO region are less than those assumed by the Applicants and the AEC, there could be serious power shortages by 1977. However, there is ample evidence to indicate that these projected demands may be grossly overstated. There are a number of factors tending to slow down the growth in demand for power in the CAPCO region. There is also a great potential for lessening peak demands through energy conservation efforts which could be promoted by the CAPCO companies and other institutions. None of these possibilities were considered by the Applicants or the AEC staff when determining the need for the Davis-Besse plant.

The magnitude of the reduction in peak demands necessary in order to obviate the need for Davis-Besse plant is not very large. In order to achieve a 20% reserve margin in 1975 without Davis-Besse, CAPCO needs a reduction in peak demand of only 2% (See Appendix A). Assuming a 16% reserve margin in 1975, there

need be no demand reduction at all. A much greater need for energy conservation would occur in 1977, when the CAPCO system peak must be reduced by 8.9% in order to allow for a 20% reserve margin. However, if a 16% margin is judged adequate, a reduction of only 5.7% of CAPCO's projected peak would be necessary. 1977 appears to be the year with the most serious reserve situation for CAPCO following the scheduled operation of Davis-Besse. It is assumed that if the peak demand for 1977 can be reduced to levels allowing sufficient reserve margins, that the reserves for all other years from 1975 to 1982 will also have sufficient margins.

The projections for future demand by CEI and TEC are little more than an extrapolation of past demand. I analyzed the demand projections provided to the Intervenor by the Applicants and compared the predicted growth rates to the companies actual growth rates since 1965. I found that CEI is predicting an average annual growth rate in peak demand of 5.9% between 1973 and 1982. This compares to CEI's average annual growth rate of 5.8% since 1965. Toledo Edison is expecting its peaks to grow an average of 7.1% per year between 1973 and 1982. TEC's average growth rate since 1965 was 7.7%. Thus, the Applicants are expecting the growth in peak demands to continue at approximately the same rate as in the past.

The possibility of inaccuracy in the Applicant's demand projections was noted on page 8-7 of the Final Environmental Statement. Here the AEC staff states that Toledo Edison's projections for peak demand "were from 13.9% to 8.3% above actual experienced demand." These poor projections are shown graphically in Figure 10-1 of the Applicant's Supplement to Environmental Report, Volume 2.

One factor which will certainly have a downward effect on future peak demands in the CAPCO region is changes in the rates charged by the CAPCO companies. Some significant changes have already taken place and more are expected in the near future. For example, Toledo Edison has recently received a large rate increase, and CEI has a large rate increase pending before the Public Utilities Commission of Ohio (PUCO) at this time. Large increases in the price of electricity will certainly have a dampening effect on future power demands in the CAPCO region. The magnitude of this effect is unknown and should be studied. In a study conducted in California, the Rand Corporation predicted that expected increases in the price of electricity between 1970 and 1975 would reduce 1975 demand by about 4% below utility projections.* Thus it appears likely that rate increases in the CAPCO region could reduce the 1977 peak demand by a few percentage points. If so, this factor could eliminate the need for most of Davis-Besse's capacity. A much greater reduction in the projected peak demand would take place in later years, since

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* California's Electricity Quandary, The Rand Corporation, September, 1972.

consumers respond slowly to changes in electric rates.

There is also a possibility of demand reductions due to changes in rate structure. The five CAPCO companies have always structured rate schedules so as to elicit the greatest possible demand growth from their customers. This promotional pricing involves charging low rates to large users, such as industries, with relatively elastic demands for power, while charging high rates to small users with relatively inelastic demands. While some price discrimination is justified based on cost of service, there is substantial room for equalization of rates in the CAPCO companies. Examples of promotional rates include special rates for space conditioning from CEI and Ohio Edison, and special all-electric rates from CEI and TEC. Since these rates are not aimed specifically at off-peak use, they can be assumed to have some effect on the peak demands of these companies. Thus, if the CAPCO companies were to make efforts toward equalizing their rate structures, some reduction in the 1977 CAPCO peak could be expected.

Another possible source of demand reduction would be a change in the advertising policies of the CAPCO companies. At present, most of the CAPCO companies are heavily promoting the use of electricity. While some of the advertising is directed toward off-peak usage, much of the advertising is likely

to affect peak demands. Appendix E contains examples of advertising and promotional materials employed by CAPCO companies. The ads promoting area development and industrial usage will certainly affect CAPCO peaks unless all industries affected by such advertising completely shut down during peak hours. Similarly, the ads promoting electric dryers and water heaters are likely to add to CAPCO peaks. If the CAPCO companies were to cease all promotional activities relating to peak use, a substantial amount of energy could be saved by 1977. The exact amount would be difficult to determine because the effectiveness of utility advertising is largely unknown. Even if the companies do not voluntarily cease all advertising, CEI, TEC and OE may soon be forced to do so through actions of the Public Utilities Commission of Ohio.

It should be noted that the five CAPCO companies combined spent $15.5 million in 1972 on advertising and sales. Most of this sum went toward promoting greater consumption. Small amounts of it were spent on energy conservation. By drastically expanding energy conservation advertising, additional reduction in future peak demands would be possible. The well-known Save-A-Watt compaign instituted by Consolidated Edison is credited with shaving 2% off the company's peak demand. Two percent of CAPCO's 1977 demand is 262 MW - more than one-fourth of Davis-Besse's capacity. This savings would represent more than one-third of the load reduction required to leave CAPCO with a 16% reserve margin in 1977 without Davis-Besse.

There are many more opportunities for energy conservation which could reduce CAPCO peaks by 1977. For example, the most efficient air conditioner on the market today is about twice as efficient as the average air conditioner. Flourescent lights are more than three times as efficient as common incandescent bulbs. Similar efficiency improvements are possible on other appliances. Buildings could be designed to use energy more efficiently. Insulation can cut a building's heating and air conditioning requirements in half. Other fuels, such as natural gas, could be substituted for electricity in new on-peak appliances such as water heaters, clothes dryers, and ranges. Of course, conservation of natural gas would be necessary in order to insure that supplies would be available to meet the increased demands caused by the substitution.

To the best of my knowledge, no study has been undertaken to determine the potential of these methods to conserve electricity in Ohio and Pennsylvania. However, estimates of the potential savings can be gleaned from the studies elsewhere, such as the one conducted in California by the Rand Corporation. Rand estimates that up to 59% of the commercial demands projected by utilities could be eliminated by the year 2000 through efficiency improvements and fuel substitution. Rand further projects a decrease of up to 64% of residential demand projections for 2000. These reductions would translate to a decrease in total peak demand of

up to 47% of the utility projections. Of course only a small portion of this savings could be realized by 1977. The Rand study simply outlines the potential electricity savings that could be achieved if concerted efforts were made by the government, utilities and consumers.

A number of the energy conservation methods suggested by Rand could have a significant effect on CAPCO's peak demand in 1977. Marked improvements in air conditioning and lighting efficiencies could be realized within a few years. These savings could be achieved through standards set by state government and/or the utilities. Some of the CAPCO companies already set insulation standards for electrically-heated homes. These standards could be expanded to apply to homes with air conditioning. The exact magnitude of the potential for electricity conservation in the CAPCO region by 1977 is unknown. But the Rand study shows that energy conservation is a promising alternative to new generating plants.

In determining the need for the Davis-Besse generating plant, there were many factors that were not considered by Cleveland Electric Illuminating, Toledo Edison, and the Atomic Energy Commission. The future power supply situation in Northern Ohio and Western Pennsylvania is much better than has been assumed by the Applicants and the AEC staff. Higher rates will probably cause a significant decline in future power demands. Changes in

advertising and promotional policies and concerted energy conservation efforts could reduce demands much further.

The reserve margin figures in the 1973 ECAR report imply that the initial operation of the Davis-Besse plant could probably be delayed until at least 1977 with no threat to CAPCO's power supply. The 1977 demand must be reduced to 8.9% below utility projections in order to allow a 20% reserve margin. This reduction need be only 5.7% if a 16% reserve margin is considered acceptable. It is entirely possible that energy conservation efforts, coupled with existing factors, could reduce 1977 peak demands by those amounts.

The earliest possible completion of the Davis-Besse plant is not crucial. Further construction could be halted while the utilities begin efforts designed to reduce the 1977 peaks. If these measures were taken, the Davis-Besse plant probably would not be needed at all.

Appendix A

PROJECTED CAPCO RESERVE STATISTICS

	AEC ESTIMATE OF RESERVE MARGIN[1]		INTERVENOR'S ESTIMATE OF RESERVE MARGIN[2]		REDUCTION IN NATIVE LOAD (PEAK) REQUIRED FOR RESERVE OF[2]	
	With Davis-Besse	Without Davis-Besse	With Davis-Besse	Without Davis-Besse	20%	16%
1973	-	10.2%	-	16.5%	3.0%	NONE
1974	-	5.6	-	13.3	5.6	2.4%
1975	17.0%	9.6	25.4%	17.6	2.0	NONE
1976	17.5	10.6	24.1	16.8	2.7	NONE
1977	10.8	4.3	16.3	9.4	8.9	5.7
1978	8.4	2.3	15.8	9.3	8.9	5.8
1979	9.6	3.8	17.5	1.4	7.2	4.0
1980	9.0	3.5	18.7	12.9	5.9	2.7

[1] Based on internal load reserves according to 1972 ECAR report. Source: AEC Final Environmental Statement, Page 8-6.

[2] Based on native load reserves according to 1973 ECAR report.

Annual report of THE TOLEDO EDISON COMPANY — Year ended December 31, 19__

ELECTRIC ENERGY ACCOUNT

Report below the information called for concerning the disposition of electric energy generated, purchased, and interchanged during the year.

Line No.	Item (a)	M-Kilowatt-hours (b)
	SOURCES OF ENERGY	
	Generation (excluding station use):	
3	Steam	4,568,311
4	Nuclear	
5	Hydro—conventional	
6	Hydro—pumped storage	35,331
7	Other	
8	Less energy for pumping	
9	Net generation	4,603,642
10	Purchases	1,331,395
11	Interchanges: In (gross) 8,878 M-Kwh	
12	Out (gross) 65,300 M-Kwh	
	Net	(56,422)
13	Transmission for/by others (wheeling): Received 34,591 M-Kwh	
14	Delivered 34,591 M-Kwh	
15	Net	
16		
17	Total	5,878,615
18	**DISPOSITION OF ENERGY**	
19	Sales to ultimate consumers (including interdepartmental sales)	4,917,321
20	Sales for resale	589,225
21	Energy furnished without charge	130
22	Energy used by the company (excluding station use):	
23	Electric department only	11,284
24	Energy losses:	
25	Transmission and conversion losses	354,214
26	Distribution losses	
27	Unaccounted for losses (Frequency Changer Losses)	6,441
28	Total energy losses	360,655
29	Energy losses as percent of total on line 17 6.14 % — TOTAL	5,878,615
30		

MONTHLY PEAKS AND OUTPUT

1. Report hereunder the information called for pertaining to simultaneous peaks established monthly (in kilowatts) and monthly output (in kilowatt-hours) for the combined sources of electric energy of respondent.

2. Monthly peak col. (b) should be respondent's maximum kw. load as measured by the sum of its coincidental net generation and purchases plus or minus net interchange, minus temporary deliveries (not interchange) of emergency power to another system. Monthly peak *including* such emergency deliveries should be shown in a footnote with a brief explanation as to the nature of the emergency.*

3. State type of monthly peak reading (instantaneous 15, 30, or 60 minutes integrated).

4. Monthly output should be the sum of respondent's net generation for load and purchases plus or minus net interchange and plus or minus net transmission or wheeling. Total for the year should agree with line 17 above.

5. If the respondent has two or more power systems not physically connected, the information called for below should be furnished for each system.

Toledo Edison System

Line No.	Month (a)	Monthly Peak: Kilowatts (b)	Day of week (c)	Day of month (d)	Hour (e)	Type of reading (f)	Monthly output (kwh) (See instr. 4) (g)
31	January	1,094,000	Tuesday	20	2 p.m.	60-min. int.	551,996
32	February	1,043,000	Tuesday	3	7 p.m.	"	498,323
33	March	968,000	Monday	2	11 a.m.	"	505,426
34	April	933,000	Monday	13	12 a.m.	"	460,850
35	May	987,000	Monday	25	12 a.m.	"	483,012
36	June	1,078,000	Wednesday	17	2 p.m.	"	508,832
37	July	1,062,000	Wednesday	29	2 p.m.	"	516,[illegible]01
38	August	947,000	Monday	3	12 a.m.	"	502,554
39	September	905,000	Monday	28	11 a.m.	"	463,[illegible]
40	October	876,000	Friday	9	2 p.m.	"	456,503
41	November	985,000	Tuesday	24	7 p.m.	"	435,104
42	December	1,014,000	Monday	14	7 p.m.	"	495,719
						TOTAL	5,878,615

* In some cases there may be situations of commingling of purchases and exchanges and "wheeling," also of direct deliveries by the supplier to customers of the reporting utility wherein segregation of kw demand for determination of [illegible] ... this schedule may be unavailable. In these cases [illegible] explanatory note, however, should be furnished which indicates, among other things, the relative significance of the deviation from basis otherwise applicable. If the individual kw amounts of such totals are needed for billing under separate rate schedules and are estimated, give the amount and basis of estimate.

ELECTRIC ENERGY ACCOUNT

Report below the information called for concerning the disposition of electric energy generated, purchased, and interchanged during the year.

Line No.	Item (a)	M = Kilowatt hours (b)
1	SOURCES OF ENERGY	
2	Generation (excluding station use):	
3	Steam	4,812,275
4	Nuclear	
5	Hydro—conventional	
6	Hydro—pumped storage	
7	Other	32,484
8	Less energy for pumping	( )
9	Net generation	4,844,759
10	Purchases	1,489,938
11	Interchanges: In (gross) 7,828 M-Kwh.	
12	Interchanges: Out (gross) 62,111 M-Kwh.	
13	Interchanges: Net	(54,283)
14	Transmission for/by others (wheeling): Received 37,458 Kwh.	
15	Transmission for/by others (wheeling): Delivered 37,458 Kwh.	
16	Transmission for/by others (wheeling): Net	
17	Total	6,280,414
18	DISPOSITION OF ENERGY	
19	Sales to ultimate consumers (including interdepartmental sales)	5,302,810
20	Sales for resale	575,883
21	Energy furnished without charge	84
22	Energy used by the company (excluding station use):	
23	Electric department only	17,429
24	Energy losses:	
25	Transmission and conversion losses	
26	Distribution losses	377,812
27	Unaccounted for losses Frequency changer losses	6,396
28	Total energy losses	384,208
29	Energy losses as percent of total on line 17 6.12 %	
30	TOTAL	6,280,414

MONTHLY PEAKS AND OUTPUT

1. Report hereunder the information called for pertaining to simultaneous peaks established monthly (in kilowatts) and monthly output (in kilowatt-hours) for the combined sources of electric energy of respondent.
2. Monthly peak col. (b) should be respondent's maximum kw load as measured by the sum of its coincidental net generation and purchases plus or minus net interchange, minus temporary deliveries (not interchange) of emergency power to another system. Monthly peak *including* such emergency deliveries should be shown in a footnote with a brief explanation as to the nature of the emergency.*
3. State type of monthly peak reading (instantaneous 15, 30, or 60 minutes integrated).
4. Monthly output should be the sum of respondent's net generation for load and purchases plus or minus net interchange and plus or minus net transmission or wheeling. Total for the year should agree with line 17 above.
5. If the respondent has two or more power systems not physically interconnected, the information called for below should be furnished for each system.

Toledo Edison System

Line No.	Month (a)	MONTHLY PEAK: Kilowatts (b)	Day of week (c)	Day of month (d)	Hour (e)	Type of reading (f)	Monthly output (kwh) (See instr. 4) (g)
31	January	1,060,000	Monday	18	7 p.m.	60-min.int.	504,316
32	February	1,191,000	Monday	22	2 p.m.	"	511,816
33	March	1,064,000	Tuesday	23	2 p.m.	"	544,871
34	April	1,018,000	Friday	2	11 a.m.	"	482,660
35	May	981,000	Thursday	27	2 p.m.	"	481,204
36	June	1,154,000	Monday	28	1 p.m.	"	538,624
37	July	1,026,000	Friday	9	3 p.m.	"	526,100
38	August	1,100,000	Tuesday	10	2 p.m.	"	526,987
39	September	1,073,000	Wednesday	8	4 p.m.	"	527,273
40	October	967,000	Friday	1	3 p.m.	"	506,999
41	November	958,000	Monday	27	3 p.m.	"	502,573
42	December	1,149,000	Friday	3	7 p.m.	"	622,471
						TOTAL	6,280,414

* In some cases there may be situations of commingling of purchases and exchanges and "wheeling" also of direct deliveries by the supplier to customers of the reporting entity wherein segregation of kw demand for determination of peaks as specified by this schedule may be unavailable. In these cases peaks may be reported which include these intermingled transactions. An explanatory note, however, should be furnished, which indicates, among other things, the relative significance of the deviation from basis otherwise applicable. If the individual kw amounts of such totals are needed for billing under separate rate schedules and are estimated, give the amount and basis of estimate.

Annual report of THE TOLEDO EDISON COMPANY

Year ended December 31, 19[illegible]

ELECTRIC ENERGY ACCOUNT

Report below the information called for concerning the disposition of electric energy generated, purchased, and interchanged during the year.

Line No.	Item (a)			M- Kilowatt hours (b)
	SOURCES OF ENERGY			
2	Generation (excluding station use):			
3	Steam			4,995,483
4	Nuclear			
5	Hydro - conventional			
6	Hydro - pumped storage			40,318
7	Other			
8	Less energy for pumping			5,035,801
9	Net generation			1,879,786
10	Purchases			
11	Interchanges	In (gross) 30,365	M- Kwh	
12		Out (gross) 73,397	M- Kwh	(43,032)
13		Net		
14	Transmission for/by others (wheeling)	Received 42,596	M- Kwh	
15		Delivered 42,596	M- Kwh	
16		Net		
17	Total			6,872,555
	DISPOSITION OF ENERGY			
18	Sales to ultimate consumers (including interdepartmental sales)			5,824,708
19	Sales for resale			596,551
20	Energy furnished without charge			9
21	Energy used by the company (excluding station use):			
22	Electric department only			30,757
23	Energy losses:			
24	Transmission and conversion losses			414,097
25	Distribution losses			6,433
26	Unaccounted for losses Frequency change losses			
27	Total energy losses			420,530
28	Energy losses as percent of total on line 17 6.12 %			
29			TOTAL	6,872,555

MONTHLY PEAKS AND OUTPUT

1. Report hereunder the information called for pertaining to simultaneous peaks established monthly (in kilowatts) and monthly output (in kilowatt-hours) for the combined sources of electric energy of respondent.

2. Monthly peak col. (b) should be respondent's maximum kw. load as measured by the sum of its coincidental net generation and purchases plus or minus net interchange, minus temporary deliveries (not interchange) of emergency power to another system. Monthly peak *including* such emergency deliveries should be shown in a footnote with a brief explanation as to the nature of the emergency.*

3. State type of monthly peak reading (instantaneous 15, 30, or 60 minutes integrated).

4. Monthly output should be the sum of respondent's net generation for load and purchases plus or minus net interchange and plus or minus net transmission or wheeling. Total for the year should agree with line 17 above.

5. If the respondent has two or more power systems not physically connected, the information called for below should be furnished for each system.

Toledo Edison System

Line No.	Month (a)	MONTHLY PEAK Kilowatts (b)	Day of week (c)	Day of month (d)	Hour (e)	Type of reading (f)	Monthly output (kwh) (See Instr. 4) (g)
31	January	1,222,000	Friday	21	11 a.m.	60 min. int.	641,022
32	February	1,105,000	Monday	14	11 a.m.	"	585,046
33	March	1,144,000	Monday	6	12 a.m.	"	591,237
34	April	1,165,000	Friday	7	11 a.m.	"	536,427
35	May	1,175,000	Wednesday	30	1 p.m.	"	526,583
36	June	1,171,000	Monday	19	2 p.m.	"	526,396
37	July	1,147,000	Wednesday	19	3 p.m.	"	542,836
38	August	1,135,000	Monday	14	3 p.m.	"	589,694
39	September	1,054,000	Friday	8	11 a.m.	"	542,375
40	October	1,159,000	Monday	2	9 a.m.	"	570,320
41	November	1,277,000	Monday	27	6 p.m.	"	602,191
42	December	1,284,000	Monday	4	7 p.m.	"	618,428
						TOTAL	6,872,555

...some cases there may be situations of commingling of purchases and exchanges and "wheeling," also of direct deliveries by the supplier to customers of the reporting utility wherein segregation of kw. demand for determination of peak as specified by this schedule may be unavailable. In these cases explanatory note, however, should be furnished which indicates among other things, the relative significance of the deviation from basis otherwise applicable. If the individual kw. amounts of such loads are needed for billing under separate rate schedules and are estimated, give the amount and basis of estimate.

Appendix C: Toledo Edison Form 12 (FPC)

Power System Statement of THE TOLEDO EDISON COMPANY for the Year Ended December 31, 1969

Schedule 19

SUMMER AND WINTER PEAK MONTH AND CALENDAR YEAR LOAD ESTIMATES

1. Furnish estimates of system's power requirements for the summer and winter month during which the seasonal peak load occurs on the same basis as schedule 14, columns 9, 10, and 13.

2. Furnish estimates of the system's power requirements for the next four calendar years on the same basis as schedule 14, columns 9, 10, and 13.

3. Include under "Remarks" a brief discussion of the major factors affecting power requirements which were considered in making the estimates.

(1)	Month of Peak (2)	Net Energy for Load (Kilowatt-hours) Thousands (3)	Peak Load (Kilowatts) (4)	Load Factor (Percent) (5)	
Seasonal peak month data:					
1970:					
Summer	Aug.	497,508	969,000	69.01	1
Winter (1970-71)	Feb.	503,130	967,000	77.43	2
1971:					
Summer	Aug.	537,392	1,067,000	67.69	3
Winter (1971-72)	Dec.	580,535	1,047,000	74.53	4
1972:					
Summer	Aug.	582,140	1,173,000	66.70	5
Winter (1972-73)	Dec.	625,237	1,119,000	75.10	6
1973:					
Summer	Aug.	621,967	1,259,000	66.40	7
Winter (1973-74)	Feb.	625,914	1,193,000	78.07	8
Calendar year data:					
1970	Aug.	5,762,708	969,000	67.89	9
1971	Aug.	6,344,647	1,067,000	67.88	10
1972	Aug.	6,840,667	1,173,000	66.39	11
1973	Aug.	7,282,991	1,259,000	66.04	12

Remarks:

Power System Statement of THE TOLEDO EDISON COMPANY for the Year Ended December 31,

Schedule 19

SUMMER AND WINTER PEAK MONTH AND CALENDAR YEAR LOAD ESTIMATES

1. Furnish estimates of system's power requirements for the summer and winter month during which the seasonal peak load occ on the same basis as schedule 14, columns 9, 10, and 13.

2. Furnish estimates of the system's power requirements for the next four calendar years on the same basis as schedule 14, colun 9, 10, and 13.

3. Include under "Remarks" a brief discussion of the major factors affecting power requirements which were considered in mak the estimates.

(1)	Month of Peak (2)	Net Energy for Load (Kilowatt-hours) Thousands (3)	Peak Load (Kilowatts) (4)	Load Factor (Percent) (5)	
Seasonal peak month data:					
1971:					
Summer	August	511,809	1,030,000	66.78	1
Winter (1971-72)	January	568,367	1,003,000	76.17	2
1972:					
Summer	August	569,027	1,118,000	68.41	3
Winter (1972-73)	January	610,944	1,069,000	76.82	4
1973:					
Summer	August	613,789	1,203,000	68.58	5
Winter (1973-74)	January	664,173	1,159,000	77.02	6
1974:					
Summer	August	670,373	1,310,000	68.78	7
Winter (1974-75)	January	718,293	1,251,000	77.17	8
Calendar year data:					
1971	August	6,033,620	1,030,000	66.87	9
1972	August	6,601,242	1,118,000	67.22	10
1973	August	7,112,269	1,203,000	67.49	11
1974	August	7,749,968	1,310,000	67.53	12

Remarks:

Power System Statement of THE TOLEDO EDISON COMPANY for the Year Ended December 31, 197

Schedule 19

SUMMER AND WINTER PEAK MONTH AND CALENDAR YEAR LOAD ESTIMATES

1. Furnish estimates of system's power requirements for the summer and winter month during which the seasonal peak load occurs on the same basis as schedule 14, columns 9, 10, and 13.

2. Furnish estimates of the system's power requirements for the next four calendar years on the same basis as schedule 14, columns 9, 10, and 13.

3. Include under "Remarks" a brief discussion of the major factors affecting power requirements which were considered in making the estimates.

(1)	Month of Peak (2)	Net Energy for Load (Kilowatt-hours) Thousands (3)	Peak Load (Kilowatts) (4)	Load Factor (Percent) (5)	
Seasonal peak month data:					
1972:					
Summer	August	550,965	1,095,000	67.6	1
Winter (1972–73)	January	599,383	1,073,000	75.1	2
1973:					
Summer	August	609,010	1,194,000	68.6	3
Winter (1973–74)	January	649,679	1,152,000	75.1	4
1974:					
Summer	August	663,072	1,301,000	68.5	5
Winter (1974–75)	January	704,854	1,258,000	75.3	6
1975:					
Summer	August	721,834	1,414,000	68.6	7
Winter (1975–76)	January	745,284	1,346,000	74.4	8
Calendar year data:					
1972	August	6,465,015	1,095,000	67.2	9
1973	August	6,980,671	1,194,000	66.7	10
1974	August	7,584,823	1,301,000	66.6	11
1975	August	8,248,007	1,414,000	66.6	12

Remarks

Appendix D: 1973 ECAR Report, Section I-F

III. CAPCO CAPABILITY ADDITIONS AND REMOVALS 1973 - 1982

Service Date	Company	Unit Designation	Type	Net Demonstrated Capability	
April 1973	DL	Reed 1,2 (Shutdown)	Coal	-136	
June 1973	CEI	Eastlake C.T.	Comb. Turb.	35	
June 1973	CEI	Avon Lake C.T.	Comb. Turb.	35	
June 1973	OE	Edgewater C.T.	Comb. Turb.	56	
June 1973	OE	W. Lorain C.C.	Comb. Cycle	139	
June 1973	DL	Brunot Island C.C.	Comb. Cycle	195	
October 1973	DL	Stanwix (Shutdown)	Coal	-2	
			1973 TOTAL	322	(1)
June 1974	OE	W. Lorain C.C. (Uprate)	Comb. Cycle	96	
June 1974	DL	Brunot Island C.C. (Uprate)	Comb. Cycle	138	
October 1974	DL	Shippingport (Derate)	Nuclear	-55	
			1974 TOTAL	179	(1)
April 1975	CAPCO (2)	Mansfield 1	Coal	825	
May 1975	DL	Shippingport (Shutdown)	Nuclear	-35	
May 1975	CAPCO	Beaver Valley 1	Nuclear	856	
May 1975	CAPCO	Davis-Besse 1	Nuclear	906	
			1975 TOTAL	2552	
April 1976	CAPCO	Mansfield 2	Coal	825	
May 1976	CAPCO	Beaver Valley 1 (Uprate)	Nuclear	29	
May 1976	DL	Shippingport (Return with New Core)	Nuclear	60	
			1976 TOTAL	914	
1977		(No Additions or Removals)			
March 1978	CAPCO	Beaver Valley 2	Nuclear	856	
			1978 TOTAL	856	(1)
April 1979	CAPCO	Perry 1	Nuclear	1205	
November 1979	CAPCO	Beaver Valley 2 (Uprate)	Nuclear	29	
			1979 TOTAL	1234	(1)
April 1980	CAPCO	Perry 2	Nuclear	1205	
			1980 TOTAL	1205	(1)

III. CAPCO CAPABILITY ADDITIONS AND REMOVALS (contd)
1973 - 1982

Service Date	Company	Unit Designation	Type	Net Demonstrated Capability
April 1981	CAPCO	Undetermined	Undetermined	1200
			1981 TOTAL	1200 (1)
April 1982	CAPCO	Undetermined	Undetermined	1200
			1982 TOTAL	1200 (1)

(1) Additional capacity requirements have been identified for 1973, 1974, as well as for 1977 and the years following. Studies of additional capacity are underway.

(2) Capability additions labeled CAPCO are jointly owned by two or more of the CAPCO Pool Parties.

IV. MONTHLY LOADS AND RESOURCES

CAPCO

1973

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPT	OCT	NOV	DEC
NET DEMONSTRATED CAPABILITY- MW	11527	11527	11527	11391	11391	11851	11851	11851	11851	11849	11849	11849
NET SEASONAL CAPABILITY- MW	11527	11522	11503	11320	11280	11594	11547	11546	11599	11718	11778	11849
RECEIPTS- MW	484	482	474	460	452	445	439	440	445	663	674	689
DELIVERIES- MW	0	0	0	0	0	0	0	0	0	0	0	0
AVAILABLE CAPABILITY- MW	12011	12004	11977	11780	11732	12039	11986	11986	12044	12379	12452	12538
NATIVE LOAD- MW	9206	9057	8906	8664	9095	10256	10063	10292	9969	9079	9476	9655
AVAILABLE RESERVE- MW	2805	2947	3071	3116	2637	1781	1923	1694	2075	3300	2976	2883
- PERCENT	30.5	32.5	34.5	36.0	29.0	17.4	19.1	16.5	20.8	36.3	31.4	27.2
INTERNAL LOAD-MW	9404	9255	9104	8862	9293	10456	10261	10490	10167	9277	9674	10053
RESERVE- MW	2607	2749	2873	2918	2439	1583	1725	1496	1877	3102	2778	2485
- PERCENT	27.7	29.7	31.6	32.9	26.2	15.1	16.8	14.3	18.5	33.4	28.7	24.7

1974

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPT	OCT	NOV	DEC
DEMONSTRATED ABILITY- MW	11849	11849	11849	11849	11849	12083	12083	12083	12083	12028	12028	12028
NET SEASONAL CAPABILITY- MW	11849	11844	11816	11752	11698	11828	11781	11780	11833	11895	11957	12028
RECEIPTS- MW	689	688	678	665	655	649	643	644	649	667	680	694
DELIVERIES- MW	0	0	0	0	0	0	0	0	0	0	0	0
AVAILABLE CAPABILITY- MW	12538	12532	12494	12417	12353	12477	12424	12424	12482	12562	12637	12722
NATIVE LOAD- MW	9761	9596	9424	9161	9627	10918	10711	10968	10606	9589	10029	10427
AVAILABLE RESERVE- MW	2777	2936	3070	3256	2726	1559	1713	1456	1876	2973	2608	2295
- PERCENT	28.4	30.6	32.6	35.5	28.3	14.3	16.0	13.3	17.7	31.0	26.0	22.0
INTERNAL LOAD-MW	9959	9794	9622	9359	9825	11116	10909	11166	10804	9787	10227	10625
RESERVE- MW	2579	2738	2872	3058	2528	1361	1515	1258	1678	2775	2410	2097
- PERCENT	25.9	28.0	29.8	32.7	25.7	12.2	13.9	11.3	15.5	28.4	23.6	19.7

NOTES - 1. INTERNAL LOAD EQUALS NATIVE LOAD PLUS INTERRUPTIBLE LOAD
2. PURCHASES INCLUDE OHIO EDISON PURCHASED POWER FROM OHIO POWER.
3. LOAD INCLUDES OHIO EDISON POWER SALE TO OHIO POWER.

V. SEASONAL LOADS AND RESOURCES

CAPCO

SUMMER

	1975	1976	1977	1978	1979	1980	1981	1982
NET DEMONSTRATED CAPABILITY- MW	14580	15494	15494	16350	17595	18789	19989	21189
NET SEASONAL CAPABILITY- MW	14246	15145	15145	15988	17193	18428	19628	20828
RECEIPTS- MW	386	228	113	117	118	103	108	113
DELIVERIES- MW	0	0	0	0	0	0	0	0
AVAILABLE CAPABILITY- MW	14632	15373	15258	16105	17311	18531	19736	20941
NATIVE LOAD- MW	11668	12387	13119	13904	14730	15607	16524	17493
AVAILABLE RESERVE- MW	2964	2986	2139	2201	2581	2924	3212	3448
- PERCENT	25.4	24.1	16.3	15.8	17.5	18.7	19.4	19.7
INTERNAL LOAD-MW	11866	12605	13337	14142	14998	15905	16842	17831
RESERVE- MW	2766	2768	1921	1963	2313	2626	2894	3110
- PERCENT	23.3	22.0	14.4	13.9	15.4	16.5	17.2	17.4

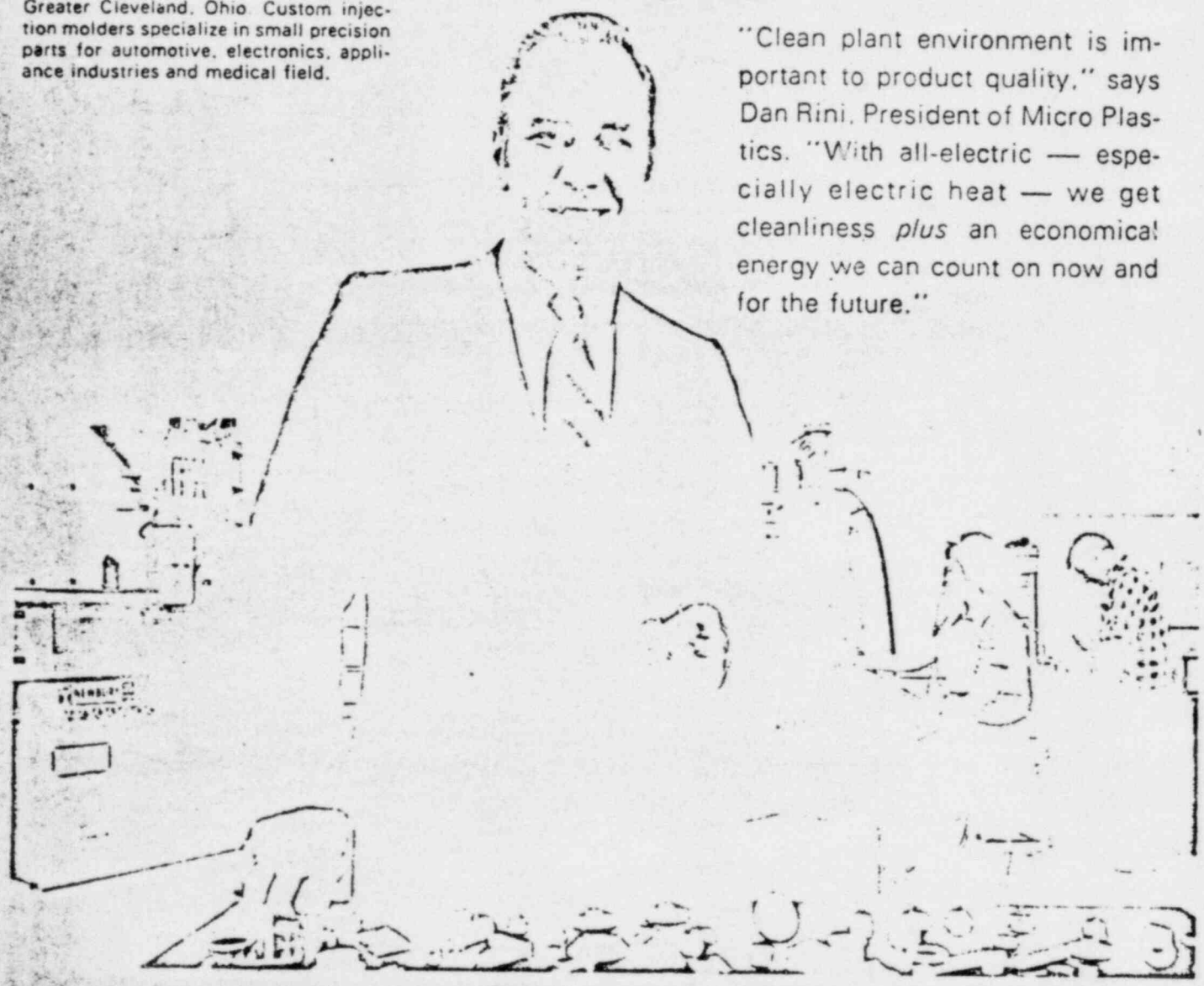
WINTER

	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83
NET DEMONSTRATED CAPABILITY- MW	14580	15494	15494	16350	17584	18789	19989	21189
NET SEASONAL CAPABILITY- MW	14980	15494	15494	16350	17584	18789	19989	21189
RECEIPTS- MW	374	179	168	175	157	164	172	182
DELIVERIES- MW	0	0	0	0	0	0	0	0
AVAILABLE CAPABILITY- MW	14954	15673	15662	16525	17741	18953	20161	21371
NATIVE LOAD- MW	11030	11672	12344	13053	13814	14619	15460	16349
AVAILABLE RESERVE- MW	3924	4001	3318	3472	3927	4334	4701	5026
- PERCENT	35.6	34.3	26.9	26.6	28.4	29.6	30.4	30.7
INTERNAL LOAD-MW	11228	11890	12562	13301	14092	14927	15788	16693
RESERVE- MW	3726	3783	3100	3224	3649	4026	4373	4678
- PERCENT	33.2	31.8	24.7	24.2	25.9	27.0	27.7	28.0

NOTES - 1. INTERNAL LOAD EQUALS NATIVE LOAD PLUS INTERRUPTIBLE LOAD
2. PURCHASES INCLUDE OHIO EDISON PURCHASED POWER FROM OHIO POWER.
3. LOAD INCLUDES OHIO EDISON POWER SALE TO OHIO POWER.

micro plastics is all electric

Micro Plastics Company, Willoughby, in Greater Cleveland, Ohio. Custom injection molders specialize in small precision parts for automotive, electronics, appliance industries and medical field.



"Clean plant environment is important to product quality," says Dan Rini, President of Micro Plastics. "With all-electric — especially electric heat — we get cleanliness *plus* an economical energy we can count on now and for the future."

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OHIO EDISON Company
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This coupon will not get you a fancy four-color brochure about Northwestern Ohio.

Instead, it will bring you a personal reply. One that sets the stage for a tailor-made proposal with facts about relocating or expanding your plant's facilities in Northwestern Ohio. We'll give you all the facts you need regarding transportation, labor supply, building costs and community economic conditions. Let us help.

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Toledo Edison
Toledo, Ohio 43652

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Flameless Electric Range with a Self-Cleaning Oven

- Proven in years of actual use
- Does the whole job, including the broiler area

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- Fewer parts for greater dependability
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OHIO EDISON WILL PAY UP TO . . .

$80.00 †Residences already served. Necessary wiring and service entrance equipment to change existing two or three wire service with less than 60 amp. capacity to 100 amp. service.

MINIMUM SERVICE ENTRANCE EQUIPMENT

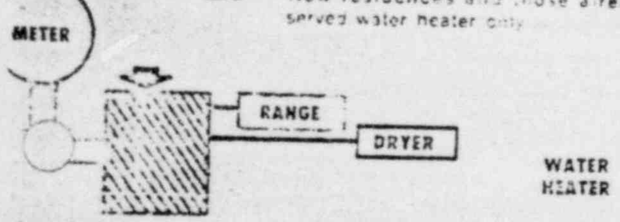
12 Circuit Panel with:
1–50 amp. 2 pole range circuit breaker.
1–50 amp. 2 pole main circuit breaker for branch section, or

12 Circuit Panel with:
1–100 amp. 2 pole main circuit breaker.
1– 50 amp. 2 pole circuit breaker

$25.00 New residences and those already served range only.

$25.00 New residences and those already served dryer only.

$25.00 New residences and those already served water heater only.



†$80.00 allowance toward the cost of installing necessary wiring for a range and or water heater and or clothes dryer is not cumulative but is mutually exclusive so that only one $80.00 allowance may be made with respect to the installation of a range and or water heater and or clothes dryer.

For a built-in type electric range (separate oven and surface units), two 30 ampere, 2 pole circuit breakers or suitable capacity as required by the National Electric Code.

**Where an allowance of $80.00 has been paid toward the cost of installing necessary wiring for a range, a water heater or a clothes dryer, the allowance of $150.00 provided toward the cost of necessary wiring with respect to space heating shall be reduced by $80.00.

***For electric ranges, water heaters and dryers of recent purchase from a bona fide dealer.

NOTE: Illustrations in this booklet are for sales use only, not a wiring diagram. For complete information, call your Ohio Edison Dealer Sales Representative or Residential

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Cleveland Plain Dealer	Feb. 23, Oct. 25, 1972
Cleveland Press	March 9, Dec. 6, 1972
Rowley Publications	April 7, 1972
[illegible] News Herald	March 30, 1972

Appendix F: Qualifications of Richard E. Morgan

Richard E. Morgan graduated from Antioch College, Yellow Springs, Ohio, in June, 1971, majoring in Economics. Before graduating, Mr. Morgan worked for the John Muir Institute for Environmental Studies and the Southwest Research and Information Center, both in Alburquerque, New Mexico, where he conducted research on the economic aspects of electric utility pollution problems. He testified on this subject before the U.S. Senate Committee on Interior and Insular Affairs in Albuquerque, New Mexico on May 24, 1971. Following his graduation from Antioch, Mr. Morgan was employed for a year as Utilities Research Director for the Ohio Public Interest Action Group (OPIAG), an organization founded by Ralph Nader. There he helped to prepare a case against electric utility advertising which was filed before the Public Utilities Commission of Ohio. This case is still pending, and Mr. Morgan is retained as a consultant by OPIAG. Since April, 1973, Mr. Morgan has been employed as Energy Research Director for the Environmental Action Foundation in Washington, D.C., where he is conducting further research on the environmental and economic problems of electric utilities. He is also the author of two articles which have appeared in Environmental Action magazine, "Reddy Kilowatt Invades the Southwest", November 27, 1971, and "Nixon's Energy Message: 'Lights Out'", April 28, 1973.

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CHAIRMAN FARMAKIDES: Let's proceed, Mr. Baron.

MR. BARON: That is all the testimony we have from Mr. Morgan.

CHAIRMAN FARMAKIDES: All right. Cross-examination, Mr. Applicant?

CROSS-EXAMINATION

BY MR. CHARNOFF:

Q Mr. Morgan, I take it from your statement of qualifications that you have an undergraduate degree from the Antioch College in June of '71, majoring in economics, is that correct?

A That's correct.

Q Have you done any graduate work in economics?

A No.

Q Have you done any graduate work in engineering?

A No, I have not.

Q Have you ever performed any studies of plant reliability or forced outages?

A No, I have not.

Q Have you ever done any systematic energy demand forecasts for any particular electric company?

A No. I have done a lot of reading of Federal Power Commission publications, company annual reports, and things like that.

But you have never performed any demand forecasts for

any studies of what conservation programs might result in, in the way of the energy savings, have you?

A Nothing other than this. I haven't done any very detailed studies, no.

Q In Appendix A of the document that was just introduced into evidence, there is a reference --

A Which appendix is that?

Q Appendix A, the third table, or the third column of numbers under the heading AEC estimate of reserve margin without Davis-Besse. For 1975 it shows a figure of 19.6 percent.

A Right.

Q Yet with Davis-Besse you show a figure of 17.0 percent. On page 2, I believe, of your testimony, you refer to that without Davis-Besse as 9.6 percent.

A That is a typographical error.

Q So that ought to be 9.6 percent, is that right?

A That's right. Let me check my work papers here.

CHAIRMAN FARMAKIDES: Mr. Shon advises me that is a typo. That is from the Final Environmental Statement, I understand, Mr. Morgan. So your figure on page 2 is correct.

MR. SHON: I caught that. That table was taken from the Final Environmental Statement. It appears as 9.6 percent there.

THE WITNESS: Okay.

MR. SHON: It is just a typo.

BY MR. CHARNOFF:

Q Mr. Morgan, you prepared the table appearing on Appendix A, is that correct?

A That's correct.

Q The sources for that were primarily the ECAR report? Is that correct?

A The ECAR report and the Final Environmental Statement.

Q Also there appears as Appendix D to your testimony a document which I recognize as being Xeroxed from the 1973 ECAR report. Is that correct?

A That's correct.

Q In your Appendix A you have a number of estimates of reserve of margins for CAPCO with and without Davis-Besse, is that correct?

A That's correct.

Q Are the estimates that are made on Appendix A of reserve margins without Davis-Besse made on the assumption that all of the other plants that are listed in Appendix D as capability additions and removals -- well, specifically with regard to the capability additions -- that they are provided and installed and available for commercial service on time and in accordance with that schedule?

A Yes, that's right. I made the same assumption that the authors of the ECAR report made in further pages such as Tables 4 and 5. They are doing the same type of comparison of figures to determine reliability factors.

Q And if any of the other new plants that are listed on Appendix D as not yet being in service, but scheduled to be in service in the future were either not to be completed or were delayed for one reason or another, you would have to adjust your estimates of reserve margins without Davis-Besse in Appendix A to reflect that, is that correct?

A That is true. That would be true whether a plant did not come on line in time or perhaps came on sooner than expected, either way. There would need to be an adjustment.

Q That's correct. Included in your Appendix D are -- for 1975 and 1976 -- there are two major new coal plants and one major nuclear plant in addition to Davis-Besse, is that correct?

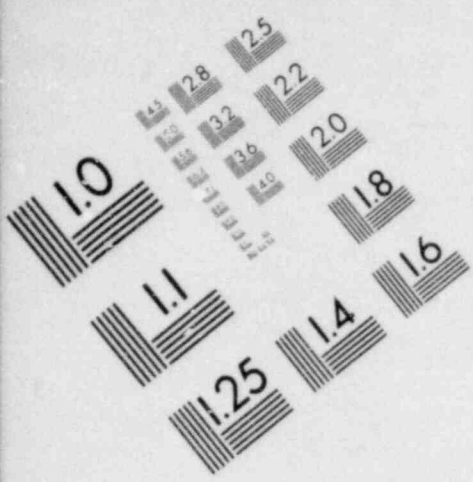
A Which year was that?

Q 1975 and 1976.

A You are referring to Beaver Valley and Mansfield?

Q Beaver Valley 1 and Mansfield 1 and 2.

A Right.



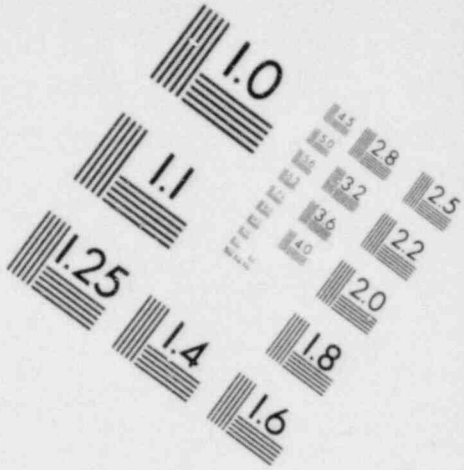
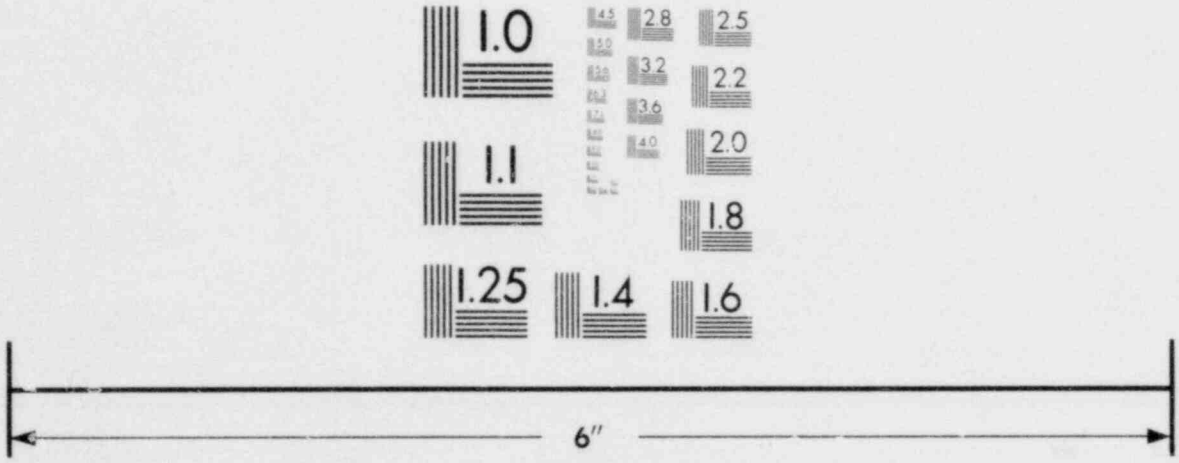
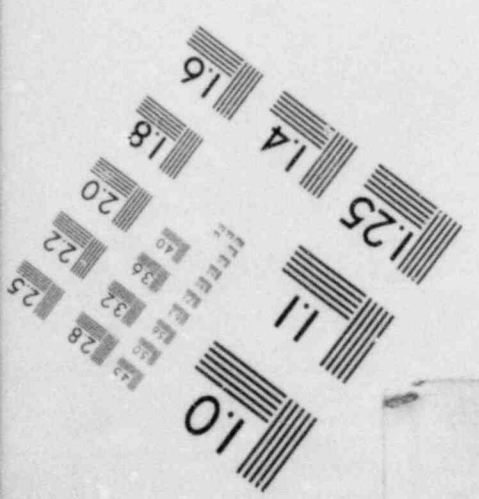
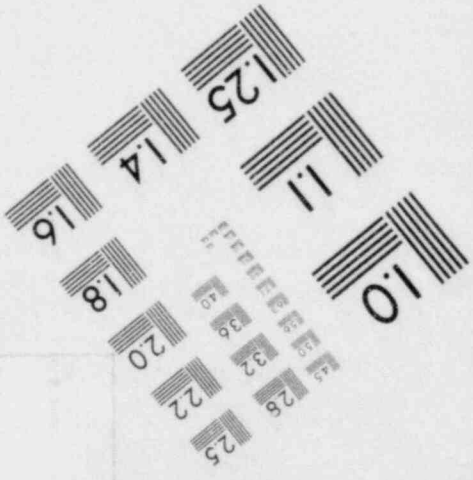


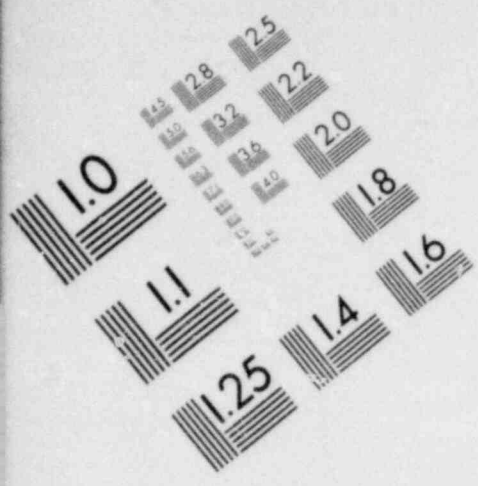
IMAGE EVALUATION
TEST TARGET (MT-3)



MICROCOPY RESOLUTION TEST CHART







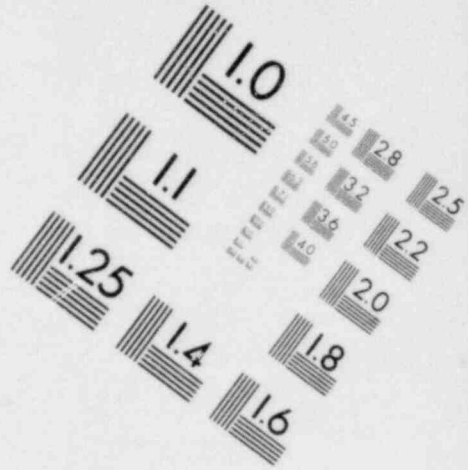
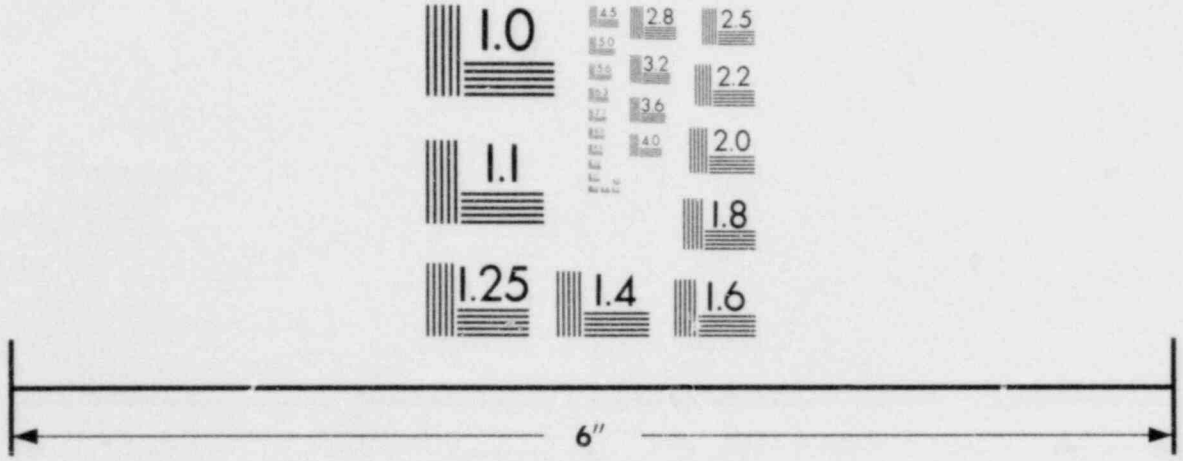


IMAGE EVALUATION
TEST TARGET (MT-3)



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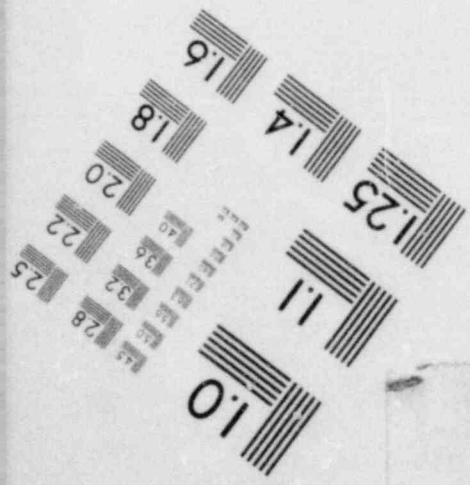

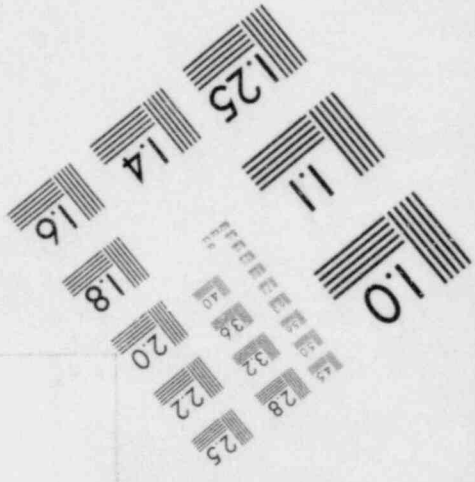

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Q Are you aware of the fact that the Beaver Valley 1 Plant is subject to an intervention and a licensing hearing?

A Yes. I don't know much about it, but I was aware that there are hearings and interventions going on.

Q In the course of your reading of these various documents over the last few years, have you developed any knowledge with respect to the impact of some of those licensing hearings on plant availability schedules?

A I know that there are some cases where hearings have delayed plant completion. I am aware of that.

MR. CHARNOFF: Thank you.

I have no further questions.

CHAIRMAN FARMAKIDES: Mr. Davis, did you have any questions?

MR. DAVIS: I have just a couple of questions, Mr. Chairman.

BY MR. DAVIS:

Q Mr. Morgan, on page 3 of your prepared testimony, the only full paragraph that appears on that page, you state that, "The full capacity of Davis-Besse would not be needed," assuming other assumptions you have earlier in the paragraph, "until December of 1977." Making those assumptions, however, you would still grant that the need for the plant would become apparent -- the need would be

2mil

just delayed a year or two, is that right?

A I say in the sentence following that, "These estimates assume that the CAPCO demand projections are correct and that no energy conservation efforts are undertaken."

Now, later in my testimony, of course, I argue that perhaps these projections are incorrect and that there could be energy conservation efforts undertaken. So here I am saying if nothing is done then the plant won't be needed until about the summer of 1977. But those are based on assumptions which I later explain perhaps are false.

Q Thank you.

Orally just a few minutes ago you said that you have become aware, I believe, that the "Save a Watt" campaign of Consolidated Edison has saved some four or five percent of the peak demand. What do you base this assumption that you have made on?

A This was the testimony that I read of Mr. Dennis Nightingale for this case.

Q Referring to page 5 of Mr. Nightingale's testimony, which we will be introducing into evidence, but which has not yet been introduced into evidence, you will note that the last sentence of the first paragraph after discussion of the "Save a Watt" campaign says that there is no real way to determine the validity of such figures.

3mil 1 A That is true. I agree with that, that it is hard to tell how effective it is. However, I don't think that is a reason not to try it.

MR. DAVIS: Thank you. Those are the only questions we have. Thank you.

CHAIRMAN FARMAKIDES: Any redirect, Mr. Baron?

MR. BARON: None.

CHAIRMAN FARMAKIDES: No redirect?

MR. BARON: No redirect.

CHAIRMAN FARMAKIDES: Did I understand you correctly, Mr. Morgan? You were saying that if the Applicant does nothing with respect to conservation, you felt that he would not need the additional capacity of Davis-Besse before 1977. Is that correct?

THE WITNESS: That's right.

CHAIRMAN FARMAKIDES: You are also suggesting that if he did something along the line of Con Ed, that he would not need the plant before when?

THE WITNESS: Well, if you look at my table, Appendix A, this is what most of my calculations -- most of my statements were based on. You will see that if you look in the last column -- you will see the year 1977 -- you would have to reduce demands by 5.77 percent in order to have a reserve margin of 16 percent. I think common sense would say that in between 1973 and 1980 the toughest

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problem we are going to have in terms of energy conservation would be meeting that 1977 peak and that that is the year to aim for. I would assume that if you can meet 5.7 by 1977, you can meet 5.8 by 1978. So this was the basis of that calculation.

CHAIRMAN FARMAKIDES: Okay.

THE WITNESS: That is what we would have to do to achieve a 16 percent margin.

In the column immediately to the left of that, if we assume a 20 percent margin, you can see 8.9 percent.

CHAIRMAN FARMAKIDES: Thank you very much.

We have no further questions.

The parties have no further questions, so, Mr. Morgan, thank you very much. You are excused.

(Witness excused.)

CHAIRMAN FARMAKIDES: There is nothing else on Issue 1 at this time.

MR. BARON: There is, Mr. Chairman.

CHAIRMAN FARMAKIDES: Mr. Baron?

MR. BARON: Before when we had the bench conference with respect to further pursuing the brochures, the area development program --

CHAIRMAN FARMAKIDES: Exhibits 1 through 47

MR. BARON: Right. I indicated that would be it, that we would not pursue it. Earlier, however, when I was

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cross-examining the two witnesses with respect to some of the answers to the interrogatories, much of it dealt with CEI's area, to which they could not address themselves. I think we talked about somebody being produced for that purpose.

CHAIRMAN FARMAKIDES: In the morning.

MR. BARON: In the morning?

CHAIRMAN FARMAKIDES: Mr. Charnoff has already indicated that will be the case.

MR. CHARNOFF: That's right. If we are through with that --

CHAIRMAN FARMAKIDES: Is that sufficient, Mr. Baron?

MR. BARON: Yes.

MR. CHARNOFF: We will have a gentleman here from the Cleveland Electric's advertising department.

Mr. Chairman, if I may, I indicated that Mr. Baron and the Regulatory Staff had indicated their agreement to go on with Contention 8 tomorrow to the extent the Board allows Contention 8. We have two witnesses who are not employees of either the Edison Company or the Illuminating Company, and who are from out of town, who have prepared what in effect is rebuttal testimony on Contention 8.

What I would like to do is distribute copies

6mil

of this document tonight so that those gentlemen could have this testimony introduced tomorrow and we could proceed directly with cross-examination.

CHAIRMAN FARMAKIDES: All right, fine.

MR. CHARNOFF: What I am distributing is proposed testimony by Dr. Wilbur L. Hartman and Dr. Lauren Donaldson.

CHAIRMAN FARMAKIDES: We will mark this later.

MR. CHARNOFF: Yes, I don't propose to mark it. It is just to give you something to read. Do you have copies, Mr. Baron?

MR. BARON: Yes.

CHAIRMAN FARMAKIDES: Mr. Davis, do you have copies?

MR. DAVIS: Yes.

CHAIRMAN FARMAKIDES: We have no other business to do today. We will recess until 9:00 o'clock tomorrow morning. Is that convenient?

MR. CHARNOFF: 9:00 o'clock will be fine.

CHAIRMAN FARMAKIDES: Mr. Davis?

MR. DAVIS: Yes.

CHAIRMAN FARMAKIDES: Mr. Baron?

MR. BARON: Yes.

CHAIRMAN FARMAKIDES: 9:00 o'clock tomorrow morning in this room.

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(Whereupon, at 4:05 p.m., the hearing was adjourned, to reconvene at 9:00 a.m. Wednesday, July 25, 1973.)