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NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:

CINCINNATI GAS & ELECTRIC COMPANY

(Wm. H. Zimmer Nuclear Power Plant)

Docket No: 50-358

Place - Cincinnati, Ohio

Date - Thursday, 15 November 1979

Pages 3394 - 3608

1425 001

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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In the Matter of: :
:
CINCINNATI GAS & ELECTRIC COMPANY : Docket No. 50-358
:
(Wm. H. Zimmer Nuclear Power Plant) :
:
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Courtroom 805
U. S. Federal Courthouse
5th & Walnut Streets
Cincinnati, Ohio

Thursday, 15 November 1979

Hearing in the above-entitled matter was convened,
pursuant to adjournment, at 9:00 a.m.

BEFORE:

CHARLES RECHHOEFER, Esq., Chairman
Atomic Safety and Licensing Board.

GLENN O. BRIGHT, Member.

DR. FRANK F. HOOPER, Member.

APPEARANCES:

On behalf of the Applicant:

TROY B. CONNOR, Jr., Esq. and MARK J. WETTERHAHN,
Esq., Connor, Moore & Corber, 1747 Pennsylvania
Avenue, N. W., Washington, D. C. 20006

On behalf of the Nuclear Regulatory Commission:

CHARLES A. BARTH, Esq., United States Nuclear
Regulatory Commission, Regulatory Staff,
Washington, D. C. 20555

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APPEARANCES: (Continued)

On behalf of Intervenor, Miami Valley Power Project

JAMES FELDMAN, Esq., and TAWN A. FICHTER, Esq.,
216 East Ninth Street, Cincinnati, Ohio 45202.

On behalf of Intervenor Fankhauser:

DR. FANKHAUSER, pro se.

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C O N T E N T SWITNESSES:DIRECT CROSS REDIRECT RECROSS BOARD

E. A. Borgmann)
 Robert E. Cotta)
 Melvin S. Abrams)

3413 3426 3602

F. A. Maura

3495 3498 3534 3537 3524

EXHIBITS:IDENTIFIED RECEIVED

Applicant's 7 (Rev. 13)

3411 3417

Applicant's 8 (Rev. 14)

3411 3419

(Documents added to Applicant's 7)

3418

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P R O C E E D I N G S

CHAIRMAN BECHHOEFER: Good morning, ladies and gentlemen.

Before going on the record this morning Ms. Fichter had a conversation with me asking advice as to when she should present a certain motion or request. I advised her that she should do so at the time when I ask for procedural requests or opening matters.

I will now ask the parties -- it's our intent this morning to begin with the Applicant's panel on electrical insulation -- or insulation of cables, but whether or not we are through with that panel at the beginning of this afternoon we will shift over to hear Mr. Maura, the Staff's witness on control rods.

After that, if we still have more of the Applicant's panel we will resume.

I now ask whether there is any preliminary matter which any of the parties wish to raise?

MS. FICHTER: Yes. I'd like to request that Doug Gillman, who is seated on my right here, be allowed to cross-examine the Applicant's witnesses. Mr. Gillman has an AB in Biology from Oberlin College. He has had one year of electrical engineering technology at Ohio College of Applied Sciences. He's completed a course in differential equations at the University of Cincinnati. And he has thoroughly studied

1 all the materials in this contention and has further familiar-
2 ized himself in this area by studying textbook scientific
3 articles and conferring with various professors in this area.

4 CHAIRMAN BECHHOEFER: Do the Applicant or Staff
5 have comments? I assume this request is made pursuant to
6 10 CFR Section 2.733?

7 MS. FICHTER: Right.

8 MR. CONNOR: Of course that section, your Honor,
9 specifies that it's a person who has scientific or technical
10 training or experience to participate in behalf of the party,
11 and it has to show that the individual is qualified by
12 scientific or technical training or experience to contribute
13 to the development of an adequate decisional record, that
14 the individual has read the testimony which he intends to
15 examine or cross-examine, that the individual has prepared
16 himself to conduct a meaningful and expeditious examination
17 or cross-examination, and it must be limited to those areas
18 within the expertise of the individual.

19 We submit that none of those elements are present
20 in the representations of MVPP's counsel.

21 The fact that the gentleman has an AB degree from
22 someplace, and one year of engineering technology -- whatever
23 that may be -- certainly does not qualify him to conduct
24 cross-examination in the area of fire protection, as is
25 indicated is necessary from the testimony, or in electrical

1 engineering considerations, where there are genuine experts
2 present to testify.

3 Secondly, it remains our position that MVPP has
4 abandoned this contention, not only generally by their
5 failure to pursue it, but secondly because of their failure
6 to provide the documentation as to what they would use for
7 cross-examination.

8 I would note that it does not appear on the
9 record that this morning Mr. Gillman I believe went around
10 passing out copies of two sheets of paper, which on their
11 face appear to relate to this fire protection cable tray
12 fire test, as it's stated on both documents, conducted by
13 the Portland Cement Association.

14 This would indicate to be the type of thing he
15 would conduct as cross-examination. Since he did not meet
16 the mandate this Board delivered to MVPP in view of their
17 past failures, certainly he would not be qualified -- or
18 MVPP would not be qualified to cross-examine in this area,
19 because they have failed to meet the conditions precedent
20 that the Board properly put upon them.

21 Finally, if MVPP had intended to do something like
22 this, they should have brought this up in a motion prior to
23 the hearing, rather than waiting until the last minute to
24 do it.

25 Now, it may be -- we noticed yesterday the long

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1 pauses while Mr. Gillman was conferring with counsel to give
2 them questions to ask, which took a great long time yesterday--
3 and perhaps it might even speed up the hearing. However, he
4 is not qualified under the Commission's regulations or this
5 Board's order, and for that reason we feel he cannot be
6 permitted.

7 MS. FICHTER: It was my understanding that we
8 had to give documents that we had in our possession at the
9 time to the Applicant. I didn't --

10 CHAIRMAN BECHHOEFER: That's correct.

11 MS. FICHTER: And we've had this for 1-1/2 days.

12 CHAIRMAN BECHHOEFER: Mr. Barth, do you have a
13 comment?

14 MR. BARTH: Yes, your Honor.

15 I fully support everything counsel for the Applicant
16 said, with the small exception that if the Applicant's
17 witnesses testified in the area of differential equations
18 I should certainly concede that this man may cross-examine
19 in that area.

20 He obviously is not qualified under the Agency's
21 regulations. The Appeal Board has considered this at great
22 length in Diablo Canyon in regard to the expert proffered
23 by Businessmen for the Public Interest of Chicago.

24 Mr. Gillman has not demonstrated, nor has his
25 counsel demonstrated, the necessary qualifications in fire

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1 protection of cables wrapped with Kaowool. He has demonstrated
2 no expertise in setting up or establishing or judging
3 experiments in fire protection. He has shown no expertise
4 in knowledge of the plant, location of the cable trays, how
5 fires can affect them, what kind of protection is necessary.

6 He fully fails to meet any kind of modicum or
7 scintilla of Agency requirements to qualify as an expert
8 examiner.

9 I would point out that the Staff sometime ago
10 served the Portland Cement test upon everybody. It's been in
11 their possession for a long time. If they felt it was
12 necessary to have an expert over and above the counsel, they
13 could have done so at the time, rather than this sandbag at
14 9:15 in the morning, in the middle of the hearing.

15 It really defies any kind of notion of fairness
16 or justice, your Honor, or rightness.

17 I would point out, too, as the citation from
18 Vermont Yankee Supreme Court decision points out, that
19 Intervenor who do not carry their burden or responsibilities
20 have little or no rights whatsoever. These people have no
21 rights that I can see in this proceeding whatsoever, except
22 at your sufferance, to be here.

23 I would urge the motion be denied and that the
24 very adequate and very able counsel that they have may
25 proceed with cross-examination as she deems fit.

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1 CHAIRMAN BECHHOEFER: I have a couple of questions
2 here.

3 First, is there anything in these rules which
4 even implies that the offer of a scientifically trained
5 person must be made anytime before the offer of the witness
6 himself, or the witnesses themselves? I see nothing in this
7 2.733.

8 MR. BARTH: Sir, I did not refer to that as a
9 matter of regulation. I refer to that as a matter of
10 substantial native justice, rather than sandbagging like this
11 at this time. This was well known, what is being offered,
12 and your order of October 23 makes it very specific. These
13 people must have some kind of responsibility to inform the
14 parties of what they intend to do.

15 They did not provide us with their line of cross-
16 examination. They never served us with any list of documents,
17 and they have not yet been so served unless it's been served
18 in my absence back in Washington, D. C., pertaining to
19 cross-examination.

20 Now, we're talking here of substantial American
21 justice. We're not nit-picking on words, your Honor. At
22 this late date to offer a man whose only qualification is he
23 knows something about differential equations leaves something
24 to be desired.

25 CHAIRMAN BECHHOEFER: I heard something about

wel 7

1 electrical --

2 MS. FICHTER: -- engineering.

3 CHAIRMAN BECHHOEFER: Yes.

4 MR. BARTH: Sir, the qualification is in the area
5 of heat transferability, not conductivity of wires for
6 electricity. We're not here as electrical engineers. We're
7 talking about the conductivity and ability of Kaowool to
8 resist the transfer of heat. Of course, if he'd had a
9 course in heat transfer it might be something different, but
10 these, on the other hand, are intervenors who allege that
11 Kaowool will burn. Kaowool is basically aluminum oxide.
12 That leaves something to be desired.

13 CHAIRMAN BECHHOEFER: I had thought one of the
14 issues was the amount of heat that one could expect to
15 emanate from the cables themselves, in addition to the fire
16 heat. That was one of the areas of questioning yesterday.

17 MR. BARTH: Sir, I do not wish to argue with the
18 Board, but that is a separate issue which has become
19 confused with the issue of Kaowool. You're talking about
20 reliability, system reliability, electronically. This is
21 not something that --

22 CHAIRMAN BECHHOEFER: I was talking about the
23 amount of heat that was present.

24 MR. BARTH: The amount of heat inside of the
25 cables.

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1 CHAIRMAN BECHHOEFER: Anyplace.

2 MR. BARTH: The amount of heat which is produced
3 by the cables is unrelated to the ability of Kaowool to
4 withstand outside heat, which is the subject of contention
5 17.

6 CHAIRMAN BECHHOEFER: Well, that's not what your
7 witnesses said. They said it was not substantial, but they
8 said it was not irrelevant or unrelated.

9 MR. BARTH: He said that the reliability of the
10 system would not make a substantial difference from the
11 internally generated heat. This is different than the
12 ability of Kaowool to withstand external heat.

13 We have mixed up Kaowool as insulating material
14 with reliability of the system. Those are two different
15 areas.

16 MR. CONNOR: Mr. Chairman, to respond to your
17 question, we do not suggest that there is any rule that says
18 that the motion must be duly made. Of course, that's
19 common legal practice. But I think that there is a point
20 that you are overlooking.

21 These people totally failed to respond to our
22 interrogatories, number 3 of which was to identify all
23 individuals having expertise regarding contention 17 that
24 the Project has contacted, either directly or indirectly,
25 or who has contacted the Project, directly or indirectly,

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1 regarding Contention 17, and give a summary of any information
2 and/or opinion given by such individual with regard to the
3 merits of the contention.

4 This, of course, was sent out months ago on
5 August 24th. And, of course, they did not respond to that.

6 Now, if there's no other reason in the case, their
7 failure to respond to the Commission's rules on discovery by
8 identifying the experts that they were relying on -- if,
9 indeed, the man is an expert -- certainly would disqualify
10 him now. He is certainly not an electrical engineer, and
11 I agree with everything Mr. Barth said.

12 The fact that the questions had been allowed to
13 go beyond Kaowool does not mean that that would allow him
14 to come in as a witness on the limited issue of the efficacy
15 of Kaowool.

16 CHAIRMAN BECHHOEFER: I don't think he's trying
17 to be a witness.

18 MR. CONNOR: He'd love to be.

19 In any event, he does not meet the requirements
20 of 2.733, and that is the only basis for the Board's
21 decision.

22 MR. BARTH: If I may give further comment, Mr.
23 Chairman, Mr. Connor has brought up a rather, I think,
24 important point. In view of my comment to you about some
25 kind of native American justice, the Staff asked Miami Valley

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who do you have who knows anything about Contention 17?

There was no answer.

We asked them to identify any expert that they know. There was no answer.

I am sitting here at 9:21 in the morning. They walk in with --quotes--our expert. Mr. Gillman has been with these people for some time and has had possession of the Portland Cement Association report, and he's had possession of the Staff documents.

We did everything humanly possible under American justice and the Agency's regulations to find out: Who do you have that knows anything about this, so that we may do this in an orderly, democratic, American way.

I just strongly protest as I can that this sandbag of hiding anybody who may know something about differential equations is just not seemly, sir.

(The Board conferring.)

MS. FICHTER: Mr. Chairman, before you rule, we did not give Doug Gillman's name to the Staff or the Applicant, because we had no intention of using him as a witness. And it was our understanding that that was what these questions were related to, and we did not intend to have him testify as a witness.

CHAIRMAN BECHHOEEER: The Board has decided that we will allow Mr. Gillman to conduct cross-examination, at

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1 least on the technical areas of the examination of the
2 Applicant's witnesses.

3 We believe it will expedite the proceeding. If
4 Ms. Fichter has to ask Mr. Gillman about every question, that
5 is likely to produce much more delay than if Mr. Gillman asks
6 questions himself. We think it will expedite the proceeding.
7 If it turns out that it isn't doing that, we may cut off Mr.
8 Gillman's examination.

9 But I think we will let him begin, at least in the
10 technical areas.

11 Ms. Fichter, I would assume, would ask questions
12 in any other areas that you may have.

13 MS. FICHTER: Okay.

14 MR. CONNOR: Mr. Chairman, then we ask two things:

15 One, that Ms. Fichter be held directly responsible
16 for his conduct in the event that he attempts to stray away.

17 CHAIRMAN BECHHOEFER: That's what the rules say.

18 MR. CONNOR: But you haven't told her that, and
19 she has a habit of misunderstanding the King's English. So
20 I want to make that very clear.

21 CHAIRMAN BECHHOEFER: Yes, that's correct. You
22 are responsible for Mr. Gillman's conduct of the cross-
23 examination.

24 MR. CONNOR: The other point I was going to make --

25 CHAIRMAN BECHHOEFER: That's very clear from the

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rules.

MR. CONNOR: The other point I was going to bring up anyway, since this is a Board contention, and inasmuch as yesterday was taken up by rather prolonged cross-examination, again we are going to request that the Board begin the questioning of our panel on the theory that more direct and straightforward questions could be asked, and the record made, so that it would be unnecessary to take all of these long pauses and wanderings around to try to get to various points.

This has been done in many other cases, and I think it would be appropriate in this case, particularly in view of the factual situation here. We would request that this order be followed.

MS. FICHTER: I would object to Mr. Connor saying there were many long pauses yesterday. I think there were maybe two or three. I don't believe there were many long pauses, at least not caused by myself, anyway. Cause by objections, maybe.

(The Board conferring.)

CHAIRMAN BECHHOEFER: The Board would prefer to go with the usual order and have the parties conduct questioning first. The Board will try to fill in any gaps that we see.

MR. CONNOR: I will ask the witnesses to take the stand.

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1 CHAIRMAN BECHHOEFER: Have all of them been sworn?
2 I can't remember.

3 MR. CONNOR: Let me say what we're going to do here
4 because there's a technicality as to Revision 13 that I want
5 to clarify on the record, and see how the Board wants to
6 handle it.

7 As we have previously stated in our notice to the
8 Board and the parties, as recently as our letter of October
9 30th, our witnesses will be Mr. Borgmann who, of course, is
10 the quarterback of the panel and the Company spokesman; Mr.
11 Melvin Abrams, Director of the Fire Research Department,
12 Construction Technology Laboratories of Portland Cement
13 Association, the gentleman seated to my left; and the other
14 witness is Mr. Robert E. Cotta, Senior Electrical Project
15 Engineer of Sargent & Lundy Company, the gentleman seated
16 there on my right.

17 Their affidavits have been previously furnished
18 to the Board, both with the motion for summary disposition
19 and again on September 28, 1979, all as noted in our letter
20 to the Board dated October 30, 1979.

21 The fire protection code and Revisions 1 through 12
22 thereof, are already in the record as part of Applicant's
23 Exhibit 1.

24 The new and pertinent revisions are numbers 13 and
25 14, which have heretofore been sent to the Board and the
parties on July 13, 1979 and August 31, 1979, respectively.

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1 Mr. Barth yesterday offered Revision 13 as part
2 of the staff's evidence, which has now been physically
3 incorporated into the transcript of the record following
4 transcript page 3244.

5 We would note, however, that we have checked this
6 revision 13 as it appears there, and apparently in xeroxing,
7 charts 23 and 57 were inadvertently omitted.

8 I don't think they have any particular probitive
9 value, and they are in the copies we sent to the board and
10 parties.

11 We also sent to the board and parties along
12 with Revision 13 a correction page which was included in it
13 dated the same date as it was transmitted, July 13, 1979.
14 This document also was not included in the staff's offer
15 yesterday.

16 So we would ask the board how it would prefer to
17 have this marked; since everybody already has a copy, it
18 might be the simplest way simply to mark Revision 13 as
19 amended and corrected as Staff's Exhibit -- Applicant's
20 Exhibit 7 and revision 14 as Applicant's Exhibit 8 for
21 identification for purposes of clarity in the record.

22 But here again we can do this any number of ways,
23 and I would simply ask the board how it would prefer it.

24 (Board conferring.)

25 CHAIRMAN BECHHOEFER: The board agrees that the

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1 method you just proposed is fine. The Exhibit -- the revised
2 Amendment 13 I think would be better as a whole document
3 which -- rather than, I guess, two or three pages separate,
4 isolated from everything else.

5 They will appear in the record twice then, but
6 that is not too significant.

7 So is your --

8 MR. CONNOR: And with that introduction, I would
9 ask that Revision 13 as described be marked for identification
10 as Applicant's Exhibit 7 and Revision 14 be marked for
11 identification as Applicant's Exhibit 8. And Mr. Wetterhahn
12 will give copies to the reporter at this time. Everybody
13 else has received, as far as I know, copies.

14 CHAIRMAN BECHHOEFER: Any objections to this?

15 MS. FICHTER: No objection.

16 MR. CONNOR: That is just for identification.

17 CHAIRMAN BECHHOEFER: Without objection, that is
18 so ordered.

19 (The above-mentioned document,
20 Revision 13, was marked as
21 Applicant's Exhibit 7 for
22 identification.)

23 (The above-mentioned document,
24 Revision 14, was marked as
25 Applicant's Exhibit 8 for
identification.)

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1 MR. CONNOR: May I request that Mr. Abrams and
2 Mr. Cotta be sworn. Mr. Borgmann has already been sworn.

3 (Board conferring.)

4 CHAIRMAN BECHHOEFER: My fellow board members
5 have told me that they have not actually received the Fire
6 Protection Evaluation Report. I have. and I know that they
7 are on the certificate of service, but anyway I got it. But
8 they tell me they have never received a full copy of that,
9 so we wondered whether copies could be made available --
10 an extra copy could be made available to each of them.

11 MR. CONNOR: I can only say for the record, our
12 transmittal record of July 13 reflects distribution to the
13 three board members first and then to other people.

14 CHAIRMAN BECHHOEFER: I realize that.

15 MR. CONNOR: We have, I think, a couple of other
16 copies we can provide today.

17 (Counsel handing documents to board.)

18 (Board conferring.)

19 CHAIRMAN BECHHOEFER: Okay. I think two of the
20 witnesses --

21 MR. CONNOR: I just asked that Mr. Cotta and
22 Mr. Abrams be sworn.
23 Whereupon,

24 E. A. BORGMANN

25 was called as a witness, and having been previously duly

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1 sworn, was examined and testified as follows:

2 and

3 Whereupon,

4 ROBERT E. COTTA

5 and

6 MELVIN S. ABRAMS

7 were called as witnesses, and having been first duly sworn,
8 were examined and testified as follows:

9 DIRECT EXAMINATION

10 BY MR. CONNOR:

11 Q Mr. Abrams, did you prepare an affidavit, including
12 your professional qualifications and your summary of
13 Revision 13 in this proceeding?

14 A (Witness Abrams) Yes.

15 Q Is that the document that I previously referred to
16 as having been transmitted to the board and parties on
17 September 28, 1979?

18 A Yes.

19 Q And is that document true and correct?

20 A Yes.

21 MR. CONNOR: May I request that this document
22 consisting of four pages be physically incorporated in the
23 transcript of this proceeding at this point as if read for
24 the purposes of setting forth the qualifications of
25 Mr. Abrams and the summary of Revision 13.

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1 CHAIRMAN BECHHOEFER: Any objections to that?

2 MS. FICHTER: No.

3 MR. BARTH: The staff has no objections, your
4 Honor.

5 CHAIRMAN BECHHOEFER: Okay, so ordered.

6 (The document referred to follows.)
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STATE OF ILLINOIS)
) SS.
COOK COUNTY)

AFFIDAVIT OF MELVIN S. ABRAMS

MELVIN S. ABRAMS, being first duly sworn according to law comes forward and states:

1. My name is Melvin S. Abrams. I am employed as Director, Fire Research Department, Portland Cement Association at the Construction Technology Laboratories located in Skokie, Illinois.

2. I received a Bachelor of Science Degree in Mathematics from Illinois Institute of Technology in 1955. In 1958 I took graduate courses in the field of mechanics. From 1949 to the present time, I have been employed by the Portland Cement Association. For the past 20 years, I have been a member of the Fire Research Section and have managed the section since 1970. In this position I have carried out a number of fire test research programs. During the past 10 years, an important part of my work has been the inspection, evaluation and recommendations for repair of numerous fire damaged structures, including nuclear facilities. I am a member of the American Society of Testing and Materials, the American Concrete Institute and the National Fire Protection Association and am a member of several committees in these

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organizations dealing with fire test methods, fire resistance and fire protection.

3. In my position as Director of the Fire Research Department, I directed and witnessed the fire protective cable tray fire test to evaluate the performance of thermal insulation material as a fire shield to protect electrical continuity of cables which was sponsored in part by The Cincinnati Gas & Electric Company, Dayton Power and Light Company and Columbus and Southern Ohio Electric Company. I prepared the resulting "Fire Protective Cable Tray Fire Test Report" ("CTL Report") dated June 1979. The materials utilized, the test equipment, the installation of the specimens in the furnace, the conduct of the test, the test results, including observations during and after the test, are completely described in the Report. This Report is true and correct to the best of my knowledge, information and belief, and I incorporate it into this affidavit by reference.

4. In summary, the following are my conclusions applicable to the present contention regarding the cable trays insulated with three one-inch layers of Kaowool which were subjected to a fire exposure corresponding to ASTM designation E119-79:

1. Wrapping cable trays with three 1-in. layers of Kaowool blanket thermal insulation protected the circuit continuity

of cables in the trays for 94 min. No short circuits were indicated on the light panel or by meggering before that time.

2. No short circuits occurred at a cable jacket temperature of 200C (392F), which is considered as the maximum continuous service temperature for maintaining continuity of this type of cable jacketing.
3. Cable Tray 1 was removed from the furnace 30 min. after the end of the test. At this time, temperatures of the cables had increased about 50F over those at end of test. Cables were inspected visually, and it was determined that no damage occurred to cable jacketing material.
4. Tray 4 was removed from the furnace about 3 1/2 hr. after the test was terminated. Temperatures of the cables continued to rise from 100 to 200F for about 1 1/2 hr. after the test was terminated. When the tray was removed, some cable temperatures were still about

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the same as those at end of test. A visual inspection of cables indicated that there was some softening of jacket material. However, one such cable was meggered and found to have circuit continuity.

Melvin S. Abrams
Melvin S. Abrams

Sworn and subscribed to before me this

_____ day of _____ 1979.

Notary Public

My Commission expires _____.

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BY MR. CONNOR:

Q Mr. Cotta, did you prepare a document entitled "Affidavit of Robert E. Cotta" for use in this proceeding which includes a statement of your professional qualifications attached thereto and a summary of the use of Kaowool in this proceeding?

A (Witness Cotta) Yes.

Q And is the document true and correct?

A Yes.

MR. CONNOR: May I request that this document consisting of four pages and an attachment be physically incorporated into the record of this proceeding as it read, reflecting the professional qualification and summary opinion of Mr. Cotta in this proceeding.

CHAIRMAN BECHHOEFER: Any objections?

MR. BARTH: The staff has no objection.

MS. FICHTER: No objection.

CHARMAN BECHHOEFER: So ordered.

(The document referred to follows.)

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STATE OF ILLINOIS)
) SS.
COOK COUNTY)

AFFIDAVIT OF ROBERT E. COTTA

ROBERT E. COTTA, being first duly sworn according to law, comes forward and states:

1. My name is Robert E. Cotta. I am employed by Sargent & Lundy as the Senior Electrical Project Engineer for the Wm. H. Zimmer Nuclear Power Station. In this position I oversee the electrical design and cable interface between various electrical systems. Specifications for electrical equipment also fall in my area of responsibility. In addition, I have participated in the development of fire protection criteria for cables and cable trays and in the design and observation of various tests relating to this equipment.

2. A statement of my professional qualifications is attached hereto as Exhibit A and is incorporated by reference herein.

3. With regard to electrical cables and cable trays, I participated in the development of fire protection criteria and in the development of the Fire Protection Evaluation Report ("Fire Report") consisting of the Report and 14 revisions which form part of the Application for an operating

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license for the Zimmer Station. This Report, as revised, is, to the best of my knowledge, information and belief, true and correct and incorporated into this affidavit by reference. ^{*/}

4. I am familiar with the tests conducted by the Construction Technology Laboratories ("CTL") of the Portland Cement Association (Revision 13 to the Fire Report). I observed the tests and have studied the resulting report entitled "Fire Protective Cable Tray Fire Test Report." This report is true and correct to the best of my knowledge, information and belief. The cable trays utilized in the CTL test are the same type as utilized in the Wm. H. Zimmer Nuclear Power Station. In addition, the type of Kaowool used in the tests will be the same as utilized at the Zimmer Station. The method of application utilized in the course of the tests will also be identical to that used at the Wm. H. Zimmer Station. Moreover, the cables utilized in the CTL tests were the same type which will be cocooned in Kaowool at the Zimmer Station.

5. The 90-minute test period for the CTL test was determined after consultation with the NRC Staff. It was

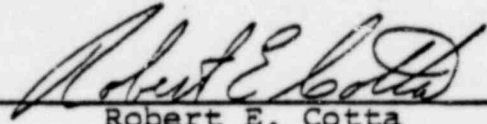
^{*/} It should be noted that Revision 12 which reports on tests which were run by Husky Products, Inc. for the Wm. H. Zimmer Station from September 1978 through January 1979 is only being relied upon with regard to the ampacity measurements for a cocooned cable tray. In addition, Underwriters Laboratories Test Report R8758 dated September 6, 1978 entitled "Report on Cable Raceway Protection Systems, Fire Test Investigation," while valid, has been superseded by the CTL Report contained in Revision 13.

determined on the basis that if this test were passed, a sufficient degree of fire protection in needed parts of the Zimmer facility would be provided considering the various locations of cable trays, ignition and fuel sources, and fire detection and fire protection measures at the various locations.

6. All cable trays which are to be cocooned will be wrapped with three one-inch layers of Kaowool as utilized in the CTL tests. Cables which pass through cable trays cocooned with Kaowool have been suitably derated in order that their design temperatures are not exceeded either in normal operation or as a result of a postulated fire.

7. The design of the Zimmer Station utilizes concrete curbs around penetrations of floors through which cable trays are routed such that any flammable or other liquids spilled on the floor cannot contact a vertical cable tray or penetrate into the Kaowool cocoon. In addition, when Kaowool butts to a floor, ceiling or wall, a qualified fire retardant sealant will be used to further prevent penetration of any flammable liquid.

8. Therefore, I conclude Miami Valley Power Project's
Contention 17 is completely lacking in merit.


Robert E. Cotta

Sworn and subscribed to before me this
____ day of _____, 1979.

Notary Public

My Commission expires _____.

STATEMENT OF PROFESSIONAL QUALIFICATIONS
ROBERT E. COTTA
SENIOR ELECTRICAL PROJECT ENGINEER
SARGENT & LUNDY

My name is Robert E. Cotta and I am the Senior Electrical Project Engineer for the Wm. H. Zimmer Nuclear Power Station. My business address is Sargent & Lundy Engineers, 35 E. Monroe Street, Chicago, Illinois 60603.

As Senior Electrical Project Engineer, my duties are to oversee the electrical design and the cabling interface between various electrical systems. Specifications for electrical equipment also fall in my area of responsibility. I directed the fire protection aspects of cable tray and cable design and I participated in the preparation of the Fire Protection Evaluation Report for the Zimmer Station.

I have completed two years of college level courses at the University of Michigan and the University of Illinois. I am a registered professional engineer, having passed the examination in the State of Illinois, and I am also registered in the State of Ohio. My work history includes 8 years as a plant engineer with several companies, and several years working in maintenance and operating groups for utility companies. I have been with Sargent & Lundy for the past 13 years.

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In 1966 and 1967, I was assigned to the coordination of electrical drawings for the Nuclear Steam Supply Systems on boiling water reactor plants. From that time through 1972, I was assigned as the Electrical Project Engineer and subsequently Senior Electrical Project Engineer on a two unit boiling water reactor. For the past 9 1/2 years, I have been Senior Electrical Project Engineer assigned to the Zimmer Station project.

My professional activities include membership on the Ad Hoc Work Group which developed IEEE 384, "Criteria for Independence of Class 1E Equipment & Circuits," membership on the Steering Committee of the IEEE for the Task Force to develop fire stop standards, past Chairman of the IEEE Wire & Cable Systems Work Group which developed IEEE 422, "Guide for the Design & Installation of Cable Systems in Power Generating Stations," and presently Chairman of the Station Design Subcommittee of IEEE.

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dsp7

1 BY MR. CONNOR:

2 Q Mr. Abrams, was the document -- Mr. Abrams and
3 Mr. Cotta, you both have been here while I was identifying
4 the documents now identified as Applicant's Exhibits 7 and 8.

5 A (Witness Abrams) Yes.

6 A (Witness Cotta) Yes.

7 Q Mr. Abrams, was the document entitled "Fire
8 Protective Cable Tray Test Fire," identified as Applicant's
9 Exhibit 7, prepared by you and under your supervision?

10 A (Witness Abrams) The last two words are "Fire
11 Test" rather than "Test Fire."

12 Q I'm sorry.

13 A That is indeed the document identified, yes.

14 Q And does that include the document containing some
15 changes dated July 13, 1979, which was included in that --
16 I'm sorry; that's the wrong thing.

17 Is this document identified as Applicant's Exhibit 7,
18 your report, true and correct?

19 A That's correct.

20 Q Do you adopt it as your testimony in this proceeding?

21 A That's correct.

22 MR. CONNOR: I would request that Applicant's Exhibit
23 7 be received in evidence in this proceeding.

24 CHAIRMAN BECHHOEFER: Any objections?

25 MR. FELDMAN: No objection.

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MR. BARTH: The staff has no objection.

CHAIRMAN BECHHOEFER: So ordered.

(The document previously marked
Applicant's Exhibit 7 for
identification, was received into
evidence.)

BY MR. CONNOR:

Q Mr. Borgmann --

A Yes.

Q -- were the documents identified as Revision 13
to the Fire Protection Evaluation Report dated July 13, 1979
which was submitted with the Fire Protective Cable Tray Fire
Test Report prepared by you and under your supervision?

A Yes, they were.

Q And does that reflect changes in the general Fire
Protection Report as a result of the Fire Protective Cable
Tray Test conducted by Portland Cement?

A Yes, they do.

Q And is that true and correct?

A Yes, it is.

MR. CONNOR: I would request that this be received
in evidence at this point as part of Applicant's Exhibit 7.

CHAIRMAN BECHHOEFER: Technically, isn't it in
already, or is that --

MR. CONNOR: I beg your pardon?

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1 CHAIRMAN BECHHOEFER: Was that not offered as part
2 of 7 first?

3 MR. CONNOR: Yes. Do you want to mark it as 7-A?

4 CHAIRMAN BECHHOEFER: No. Is it in already? If
5 it isn't, we'll put it in.

6 I wasn't --

7 MR. CONNOR: It wasn't in already because it was
8 prepared by the Company rather than Portland Cement. They
9 do go together, though.

10 CHAIRMAN BECHHOEFER: Oh, okay.

11 MR. CONNOR: They are all part of revision 13.

12 CHAIRMAN BECHHOEFER: Oh, I see. Okay. Any
13 objections to incorporating that as part of Exhibit 7?

14 MR. FELDMAN: No objection.

15 CHAIRMAN BECHHOEFER: Okay, so ordered.

16 (The documents mentioned were
17 incorporated as part of Applicant's
18 Exhibit 7 for identification and
19 received into evidence.)

20 BY MR. CONNOR:

21 Q Mr. Borgmann, I here show you Applicant's Exhibit 8,
22 which is revision 14 to the Fire Protection Evaluation
23 Report and ask you if it was prepared by you and under
24 your supervision?

25 A Yes, it was.

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1 Q And is it true and correct?

2 A Yes, it is.

3 MR. CONNOR: I would ask that this be received in
4 evidence in this proceeding as Applicant's Exhibit 8.

5 CHAIRMAN BECHHOEFER: Any objections?

6 MR. FELDMAN: No objections, your Honor.

7 MR. BARTHE: The staff has no objection, your
8 Honor.

9 CHAIRMAN BECHHOEFER: Okay, so ordered.

10 (The document previously marked
11 as Applicant's Exhibit 8 for
12 identification, was received into
13 evidence.)

14 BY MR. CONNOR:

15 Q Mr. Borgmann, do you adopt Applicant's Exhibits 7
16 and 8 together with the affidavits of Messrs. Cotta
17 and Abrams as the evidence of the company in this proceeding
18 on contention 17?

19 A Yes, I do.

20 MR. CONNOR: We have no further questions as to the
21 identification of the documents.

22 I would propose at this time to bring up some of
23 the matters that the board asked yesterday, that is, to
24 respond to some of the questions.
25

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BY MR. CONNOR:

Q I will direct any questions to you, Mr. Borgmann, as the quarterback and ask that you refer them to anyone you wish.

A Okay.

Q You will recall yesterday that -- I think it was Dr. Bright wanted to get a definition of ampacity. Can you provide that for the applicant?

A I believe so. Ampacity, as we currently use that term, is the current carrying capability of a cable that would cause a cable to reach its thermal rating under a given set of circumstances under which the cable would be utilized.

In other words, it is the current rating of the cable.

MR. BRIGHT: So it is a measure of the heating capacity?

WITNESS BORGMANN: It is expressed in amperes, so it would have a direct relationship to the heating capacity² of the cable according to the I R law.

BY MR. CONNOR:

Q You will recall yesterday some questions that were asked about the terms Okonite and Okolon as used, for example, in Exhibit A-5 -- page A-5 of Applicant's Exhibit 7. Can someone on the panel provide a statement as to what

dsp12

these terms mean?

A First of all, Okonite, of course, is a manufacturer and it is the company's name. But Okonite is also their trade name for their insulation, which is Okolon, and Okolon is merely Okonite Company's name for hypolon which is common used as a jacket over insulation on the cable.

So hypolon is the jacket and Okonite is the insulation.

Q Do these cables meet IEEE 383 standards?

A Yes, they do.

Q Now, Mr. Borgmann, there is some question about how the cables used in the fire test described in Applicant's Exhibit 7 were selected. Would you state how this was done?

A We wanted to conduct a fire test that would have as few questions as possible, so a cable was selected which both ourselves and our consultants believed to be the most susceptible to any outside fire; by being susceptible, I'm talking about the number of conductors and the thickness of the insulation.

So we selected a cable which we thought, if it passed, it certainly would indicate all of the other cables would be at least as good as far as fire resistance is concerned.

Q Would the selection of a particular manufacturer of the cables have made any difference in this test?

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1 A No, it would not because the IEEE standard
2 covers the construction of the cable, and as I indicated
3 before, the use of hypolon and Okonite -- they are merely
4 trade names the same material another manufacturer would
5 use.

6 Q There were several questions -- many questions
7 yesterday about the effect of having the cables energized
8 during a test as to the creation of heat.

9 Can you comment on the effect of energized cables
10 in terms of meeting the test?

11 A I'll try to put it somewhat into perspective. During
12 this test there were -- there was outside heat applied to the
13 cable trays on the order of 7 million btu's per hour, and
14 calculating backwards, using conventional textbook heat
15 transfer equations and the actual data that was obtained
16 during the test, that 7 million btu's per hour being very
17 conservative, about 30,000 btu's per hour got through to
18 the cable, indicating a very, very effective insulating
19 ability of the Kaowool.

20 Now, if the cables were energized, the cables that
21 will be encased in Kaowool have internally generated heat
22 at the rate of 13 watts per foot.

23 Now, there was 10 feet of cable tested; so if you
24 take the 10 feet, multiply it by the 13 watts per foot, you
25 come up with 130 watts that would have been generated inside

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dspl4 1 the cables; converting the 130 watts to watt hours, you come
2 up with 444 btu's per hour compared to the 30,000 btu's
3 per hour that would be -- that we calculated coming through
4 into the cable of the 7 million that was applied externally.

5 Now, assuming a straight line relationship, which
6 again is conservative, that would add 81 seconds to the test
7 or about 1 minute and 20 seconds.

8 So I think that pretty well corroborates the
9 statement that it's on the order of minutes; actually, it's
10 on the lower order of minutes.

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Q Mr. Borgmann, there were also questions yesterday as to what was called the fill of cable trays as to the amount of space occupied by cables, as to the heat effects that might exist.

Can you comment on that as to leading the 90 minute criterion?

A Well, from an external standpoint, we agree with the testimony given yesterday, that the effect would be negligible. And it could almost be more advantageous having more bulk in the cable tray for dissipation of heat.

From an internal standpoint the amount of fill would be secondary to the restriction placed on the watts per foot, and therefore having the design criteria of how much heat would be generated per foot would limit the amount of internally generated heat regardless of the percent fill.

Q Are you saying that there is a second criterion as a limitation on the watts per foot per cable tray that can exist?

A Yes, there is. It does exist.

Q Is that a company criterion?

A It's a Sergeant & Lundy criteria, our consultants. And this is the basis for the design of the cables and cable trays.

Q So speaking generically, even if it were possible to overload -- in quotes -- a cable tray with cables, it would

mpb2 1 still be subject to the limitation of watts per foot.

2 A Well, first of all, I don't want to get to
3 physical loading. We got into that on a prior hearing.
4 But there's a physical loading limitation which would prevent
5 physical overloading. And there is a watts per foot limita-
6 tion which would prevent the thermal overloading.

7 Q Let's see. I think one other question.

8 Will any trays which would be wrapped in
9 Kaowool be wrapped in only one or two layers?

10 A No. When we made a decision to do a three hour
11 test we made the further decision that any cable tray -- a
12 90 minute test, I beg your pardon. When we made the decision
13 to do the 90 minute test we made the further decision that
14 any place that Kaowool would be used would be done on a
15 three-layer basis.

16 Anyplace that Kaowool was being used and will be
17 used at Zimmer will be three inches and have the 90 minute
18 rating.

19 Q And that was stated in our answer to interro-
20 gatories some months ago?

21 A Yes, it was. Our position has been consistent.

22 MR. CONNOR: We have no further questions.

23 CHAIRMAN BECHHOEFER: We're ready for cross-
24 examination.

25 MS. FICHTER: Mr. Gillman will be standing near

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the witnesses there, and I would appreciate it if the witnesses would speak up because he has somewhat of a hearing problem.

MR. CONNOR: Can't the Interrogator use the microphone?

MR. FELDMAN: He can't hear them, that's the problem.

CROSS-EXAMINATION

BY MR. GILLMAN:

Q Would you gentlemen please randomly pick points on a prepared data summary and graph, which are the two pages I passed out --

MR. CONNOR: Objection.

MR. BARTF: Mr. Chairman, I can't hear the gentleman. I think maybe if he'd take the toothpick out of his mouth I could hear him a little better. But with his back to me and muttering, I can't hear him.

CHAIRMAN BECHHOEFER: How far does that microphone go? How far will that stretch?

(Pause.)

BY MR. GILLMAN:

Q To start, would you gentlemen please randomly pick points on our prepared data summary and graph, which are the two pages I passed out, and I'd like you to check them against the data in the PCA test.

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Now later on I'm going to challenge you to point out any errors in this data summary and graph.

MR. CONNOR: Objection.

MR. BARTH: Sir, I can't see the witnesses because counsel is standing between me and the witnesses.

MR. FANKHAUSER: I'm having the same problem with Mr. Connor, if he would sit down.

MR. BARTH: Sir, this is creating enormous problems.

MS. FICHTER: I believe other counsel have stood over here and questioned the witnesses. I don't see any problems with that.

MR. BARTH: I do.

MR. CONNOR: I would now like to make an objection:

One, that was an impossibly compound question, and it was not a question at all, asking to randomly pick data points, so that the question is defective to begin with.

Mr. Gillman should know --

MR. GILLMAN: I intended maybe --

MR. CONNOR: If you'll let me finish my objection before interrupting.

-- that he should not -- he should ask a single question of a witness on a specific point, or ask a general question calling for a specific answer.

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But our main objection goes very simply to the fact that this Board put out an order to this Intervenor setting down some ground rules. This morning we have been given something that nobody has even had a chance to look at. We got it after the hearing started at nine o'clock. And we don't know what's in it.

But now all of a sudden, the Intervenor comes out of the closet with some data points that they now want us to analyze for them and immediately compare to a retort that we have put in consisting of about an inch of material.

Now we submit that this is totally improper under any of the Commission's rules, and that even for intervenors the NRC proceedings do not require this kind of abuse of the process.

They did not bring any of this forward, they did not respond to any of our discovery. Now they want to come in with something they probably worked up last night and bring it up. This is totally unfair. There is no notice to us. And I'm just too sorry for them that they cannot follow the procedures. But I do not believe the Applicant has to be subjected to this type of unethical and improper conduct.

And we object on the basis of the Board's order that anything that we're going to use had to be to us by November 3th, not by the morning of November the 15th.

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MR. BARTH: The Staff supports and endorses what Mr. Connor says, Your Honor, fully.

We take it very seriously.

(The Board conferring.)

CHAIRMAN BECHHOEFER: The Board thinks that questions along this line should be asked on a question and answer basis, not by asking the panel to just analyze a graph. I'm not sure they can sit down and do that immediately.

Could you ask them specific questions and specific answers? Is it possible to do it that way? Try to ask specific questions so that they can respond with definite answers.

I think the broad general survey of the graph is unfair when they haven't had a chance to look at it and analyze it, and they can't just sit there and in five minutes determine this, I don't think.

So he may ask questions, but not along the line of just 'is this graph accurate' or....

MR. CONNOR: Are you overruling my objection on the use of these two pieces of paper?

CHAIRMAN BECHHOEFER: No.

He can ask questions on the basis of these using them as his notes.

MR. CONNOR: I would like a specific ruling

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1 because if the Board is going to rescind its previous
2 order, I think that should be in the record.

3 CHAIRMAN BECHHOEFER: Well, I think they advised
4 that these pieces of paper, for one thing, were not in
5 existence --

6 MR. CONNOR: I'm sorry, I couldn't understand you.

7 CHAIRMAN BECHHOEFER: These pieces of paper were
8 not in existence on the 8th or 9th.

9 MR. CONNOR: The Board ordered them to give us
10 any materials they were going to use on cross-examination,
11 and they didn't do it. And if the Board is now rescinding
12 that --

13 CHAIRMAN BECHHOEFER: The Board said if they
14 had it in their possession at the time.

15 MR. CONNOR: Exception.

16 CHAIRMAN BECHHOEFER: Pardon?

17 MR. CONNOR: Exception.

18 CHAIRMAN BECHHOEFER: Well, read my order.

19 MR. CONNOR: Then we claim surprise.

20 We demand to know that before this line of
21 questioning may proceed that some indication be given to us
22 as to what is intended by this line of what these points on
23 a piece of paper mean. And they may be absolutely innocent.
24 I doubt it, but I don't know.

25 And I do not think it is fair under any standard

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of evidence for some people to come in at the last minute where discovery rules apply and start saying 'you've got to interpret these numbers, Mr. Witness' when they have given absolutely no notice whatsoever.

CHAIRMAN BECHHOEFER: I think, Mr. Gillman, you could give the panel an idea of what -- where you're driving or where you're going, so that we can see what the frame of these questions, where they fall in.

I do think that in order for these people to answer the questions they will have to know what you're trying to drive at.

So could you make an explanation, or could Ms. Fichtar, either one of you?

MR. GILLMAN: Yes, sir.

The data on this, on the graph, is data from thermocouples 13, 49, 31 and 67, and these are thermocouples located on the bottoms of each cable tray on the outside of the cable.

I contend that they measure furnace temperature. Thermocouples 13 and 31 on the upper two trays are plotted on the graph. Now these are the lower two curves on the graph, and they show extremely wide variance from the ASTM E 119, a standard data curve for furnace temperatures.

And I contend that the upper two cable trays were not subjected to ASTM E 119 standard temperatures in the

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mpb9 1 fire test.

2 (The Board conferring.)

3 MR. GILLMAN: Thermocouples 13, 31, 49 and 67
4 are in the thermocouple location number 13, and that's
5 indicated on page 33 of the Portland Cement Association
6 report, which is Figure 15, Thermocouple Locations.

7 I'm asking that the points on the graph be picked
8 at random -- let's say one or two or three points -- just to
9 be checked against the temperature records and the table 3
10 on page 24 of the Portland Cement Association report. And
11 I simply wanted to give the gentlemen some time to possibly
12 check for any points that were plotted in error.

13 MR. CONNOR: If the Board please, this hardly --
14 If all they're talking about on one of the points is the
15 variations from the ASTM E 119 thing, it appears in our
16 Table 3. It's already listed there. And it's well within
17 the range for these tests.

18 If that's all it is, there's nothing to that.
19 We've already set it forth in Table 3.

20 Secondly, I simply don't understand the reference
21 to Figure 15, the one on page 33. For example, thermocouple
22 31, 49 and 69 don't even appear there, so there's no founda-
23 tion for whatever we're getting at here.

24 I'm looking at thermocouple 13 on page 33, and as
25 I read it, as I look at it, that happens to be on the outside

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mpbl0 1 of the Kaowool. I would expect it to be rather hot. I
2 may be reading that incorrectly.

3 So I'm not at all sure what we are trying to get
4 at here other than having us read the report to this gentleman
5 because he obviously doesn't understand it. And it seems to
6 me that this is not something that the Board should consider.

7 If it's something the Board wants to get into,
8 fine, ask the question. But obviously approaching it this
9 way by saying 'look at my data points', we will say 'yes, it
10 appears in our table 3', for example, is hardly cross-
11 examination that would help this Board reach a decision.

12 So I submit there is no foundation for this line.

13 (The Board conferring.)

14 MR. GILLMAN: Your Honor, page 22 has Table 1,
15 which is the location and thermocouple numbers. It indicates
16 that, as I said, thermocouples 13, 31, 49 and 67 are in
17 location number 13 on page 33 in the figure 15, which is
18 thermocouple locations.

19 Furthermore there is no record of the raw
20 furnace temperature data because the Portland Cement
21 Association report states that there were eight furnace
22 thermocouples, and the data for the eight furnace thermo-
23 couples is not present in the Portland Cement Association
24 report.

25 And furthermore, the locations of the furnace

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thermocouples are not shown in the Portland Cement Association report.

MR. CONNOR: Your Honor, this is clearly stuff that should have been brought up on discovery.

(The Board conferring.)

CHAIRMAN BECHHOEFER: I think Mr. Bright would like to ask a few questions to try to unravel something.

MR. BRIGHT: Just one at a time as we go on.

You have figures 28 and 29, page 42 and 43 of the test report. Now you have the furnace atmosphere control temperature, zone two and zone three.

Could you tell me where zone two and zone three is, say, in relationship to figure 26, which is the end view of the cable trays?

WITNESS ABRAMS: What was the figure number you referred to, sir?

MR. BRIGHT: Figure 26, just the end view of the cable trays.

I'm assuming that this is a fairly decent representation of the furnace enclosure.

WITNESS ABRAMS: That is a cross-section view of the furnace in the area where the trays are located.

In response to your question, zones two and three are within the ten foot zone in which the fire was applied to the trays, in that ten foot zone.

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MR. BRIGHT: So the zones refer to horizontal.

WITNESS ABRAMS: Yes. They occur -- they refer to the ten foot space between the end walls that contain the fire where the trays were exposed to the fire from one end to the other, that zone two and three for this test.

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1 MR. BRIGHT: So there is no measurement of any kind
2 of temperature differential between the top and the bottom of
3 this arrangement?

4 WITNESS ABRAMS: Yes, there are measurements. The
5 array of thermocouples in zone 2 and 3 to measure temperatures
6 and control the fire are the spurs, both through the 10 foot
7 length containing the fire and in a vertical separation to
8 sample temperatures also in the vertical direction in the fire
9 zone.

10 MR. BRIGHT: These are the thermocouples that are
11 on the trays themselves?

12 WITNESS ABRAMS: Absolutely not, sir. The gentleman
13 who explained that the thermocouples on the tray represent
14 furnace atmospheric temperature was completely in error. The
15 furnace atmosphere thermocouples are not on the trays. They're
16 in the furnace itself at various spaces, and they are differ-
17 ent than the thermocouples that are used to measure the
18 temperatures on the trays on the wires or what we call the
19 18 thermocouples that were used for each tray, as designated
20 in the 18 thermocouple locations.

21 The thermocouples that are used for furnace
22 atmosphere measurement have to meet certain requirements which
23 are spelled out in the E119 standard, which it appears to me
24 was not read by Mr. Gillman when he made the statement that
25 the thermocouples that he has plotted, numbers 13 through 67,

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wel 2

1 those four on the bottom of the Kaowool on each of the trays
2 represents the furnace atmosphere temperature, they do not.

3 MR. BRIGHT: Well, this is a little puzzling. Is
4 there a cooling mechanism of some kind going on?

5 WITNESS ABRAMS: At what point are you referring to
6 sir?

7 MR. BRIGHT: Well, the discrepancy between the
8 bottom of both trays 1 and 2 and the bottoms of trays 4 and 3.

9 WITNESS ABRAMS: Yes. May I refer you to a statement
10 in the report concerning that matter, sir?

11 MR. BRIGHT: Please do.

12 WITNESS ABRAMS: On page 17, under the heading
13 Temperature Information, paragraph 2, beginning with Table 4.
14 Table 4 lists temperature information, and I'm reading from
15 that paragraph:

16 "Table 4 lists temperature information for the 72
17 thermocouples at 90 minutes and at end of test. Although
18 the furnace atmosphere temperature was closely controlled
19 to the standard fire of ASTM designation E119, and even
20 though efforts were made to separate trays from each
21 other as much as possible, higher temperatures were
22 measured on the bottom trays 3 and 4 than on top trays
23 1 and 2. Evidently, bottom trays acted as a heat shield
24 for top trays. As noted in Figure 26, bottom trays
25 were fairly close to the burners of the furnace."

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The occurrence of the difference in temperature has been noted and reasons suggested for them in the report. This does not in any way invalidate the statement that the ASTM time-temperature curve control temperatures were well within the limits allowed in ASTM-E119. Those differences are given in Table 3, and those are well within the limits allowed by the Standard.

MR. BRIGHT: This Standard E119, is this standard configuration as well as standard time-temperature curve?

WITNESS ABRAMS: What do you mean by standard configuration, sir?

MR. BRIGHT: The way the four trays were laid in there.

WITNESS ABRAMS: No. The standard does not address the position of the specimen in the furnace.

MR. BRIGHT: Okay. So would it be fair to say -- without leading you in any way -- that the bottom two trays certainly reflect the quality of insulation that Kaowool gives at the temperatures that follow the E119, whereas the top two apparently have been shielded a bit, and have not been subjected to as high a temperature due to the configuration of the way they were put in there?

WITNESS ABRAMS: The bottom two trays were probably subjected to higher temperatures than would normally be considered to be the temperatures of the standard curve,

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wel 4

1 because of their close proximity to the burners in the
2 furnace.

3 The top two trays are removed some distance by
4 physical necessity from the position of the burners. And,
5 as you have stated, the bottom two trays would shield those
6 trays from heat to some extent.

7 If such a configuration were found in practice,
8 the same thing would probably be true.

9 So that is true.

10 MR. BRIGHT: Well, if we threw away the results
11 from trays 1 and 2 and merely considered trays 3 and 4, what
12 would be your conclusion as to the insulating value of
13 Kaowool?

14 WITNESS ABRAMS: My conclusion would be that the
15 results that are stated would be the same, that the failures
16 would have occurred in those two bottom trays as they are
17 reported here and at the times they would have basically
18 as given in the report here.

19 MR. BRIGHT: And the presence of the two upper
20 trays wouldn't necessarily have made any difference, as far
21 as the lower trays were concerned?

22 WITNESS ABRAMS: I can't answer that completely,
23 because if the top two trays were not there the positioning
24 of the bottom two trays may have changed, probably would
25 have changed.

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The positions of the trays were determined only on the physical size of the furnace, the physical size of the trays, and the best way to put them in the furnace to get the most space between them and still get representative ASTM tests, and the best heat flow that possibly could have been effected in the test.

So I can't say that just arbitrarily removing the top two would give you exactly the same situations of every characteristic of the test if they were not there, as the bottom two are concerned.

MR. BRIGHT: Well, I'm not familiar with the details of what this ASTM-E119 is. What's the objective here? Is it to subject the thing to a certain Btu input, or is it to have an atmosphere in which a certain time-temperature curve is followed?

WITNESS ABRAMS: That is correct. It is a test the validity of which is based on a temperature-time regime which is clearly stated in the Standard, and which is given in detail in the report in Table 3.

It does not depend on the heat input. If you want to have a valid ASTM test insofar as the time-temperature or the temperature-time regime is concerned, then you have to be within certain limits of the temperatures which they ask you to try to meet. The limits are given because it is virtually impossible to stay right on the curve in every part

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of the furnace, so you average all the measurements you make and make adjustments to try to stay on the curve.

They specifically spell out limits that you have to be within, using the temperature information that you get from the control thermocouples. And if you are within there, you have a valid ASTM test.

MR. BRIGHT: Thank you.

(The Board conferring.)

MR. BRIGHT: Mr. Gillman, to the just casual observer here it would appear that your line of questioning will be to establish that the upper two trays did not experience the test conditions, and are you also trying to say that this invalidates the results obtained from trays 3 and 4?

MR. GILLMAN: Well, sir, ASTM-E119, Underwriters Laboratory, and the National Fire Protection Association have a standard for fire tests which is that the exposed surface area of the material be 180 square feet. It's only --

MR. BRIGHT: The exposed surface?

MR. GILLMAN: Sorry, sir?

MR. BRIGHT: The exposed surface?

MR. GILLMAN: In other words, the total surface area exposed to fire in a fire test must be 180 square feet to qualify the material. If only two cable trays in this test sustained the ASTM temperature, the surface area of

wel 7

these two cable trays will be less than 180 square feet. So that 180 square feet surface area of Kaowool will not have been exposed to ASTM standards.

MR. BARTH: Mr. Chairman, to follow up Mr. Bright's question, counsel for the Staff would request that the requirement for the 180 square feet of surface area be referenced as to the proper section of the ASTM standard. This should follow the statement of the questioner.

CHAIRMAN BECHHOEFER: Do you have the section that requires that? Can you give a reference?

MR. GILLMAN: No, sir, I can't. This information was imparted to me by the witness we would have had for this contention, and I have not seen the figure. I believe it is trustworthy information.

MR. BARTH: I point out, sir, that Section 13.1 says that the area exposed to fire shall not be less than 100 feet square.

This is the problem, of course, Mr. Chairman, which goes over and beyond proper discovery, which is why the Staff asked for discovery, why the power company asked for discovery, why we asked who the experts were, so they could put them on and make any affirmative case they want.

I'm not certain this is really speeding up the proceeding, as the Chairman suggested it would, sir.

MR. CONNOR: Mr. Chairman, this has been going on

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for -- you know, there have been long conferences.

Why not ask the witnesses -- why not have Dr. Bright ask the witness how the standard applies, and find out. And I'm not at all sure that anybody has ever established that all four trays do not meet the ASTM Standard. Let's ask the witness the exact question, and find out, rather than take all this time guessing what Mr. Gillman might or might not be able to show by what he heard from somebody someplace, maybe?

(The Board conferring.)

CHAIRMAN BECHHOEFER: The Board thinks we will take about a -- well, we'll break until ten minutes of. We want to talk over some of these things.

(Recess.)

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CHAIRMAN BECHHOEFER: Back on the record.

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Mr. Bright has a few more questions he would like

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to lead off with.

MR. BARTH: Sir could I ask that the expert in differential equations move somehow so I can see the witnesses.

CHAIRMAN BECHHOEFER: During the period of time when Mr. Bright is asking questions, he can move anyway.

Otherwise, he may have to use the microphone, but --

MR. BRIGHT: Let's see, Mr. Borgmann --

WITNESS BORGMANN: Yes, sir.

MR. BRIGHT: I am personally not familiar with all of the ramifications of the test, the required conditions thereto.

Now, it appears that Mr. Gillman has a concern about the actual square footage. How is that expressed in the test requirements?

WITNESS BORGMANN: I'd like Mr. Abrams to answer these; he's the expert on the test.

MR. BRIGHT: Fine, any one of you.

WITNESS ABRAMS: The document which was referred to as giving the requirements for exposure area was E 119, ASTM 119 and a similar NFPA standard and an Underwriters Laboratory standard that was basically the same.

Those three standards that he referred to basically

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1 contain the same information.

2 This test standard, and I would like to read for
3 your edification, if I may, the introduction so you can
4 get some idea of what it is purporting to do --

5 MR. BRIGHT: Please do.

6 WITNESS ABRAMS: -- and then specifically home
7 in on the area question.

8 The standard -- the E 119 standard document is
9 entitled "Standard Methods of Fire Tests of Building
10 Construction and Materials."

11 The introduction states: "The performance of
12 walls, columns, and other building members under fire;
13 exposure conditions is an item of major importance in
14 securing constructions that are safe and that are not a
15 menace to neighboring structures nor to the public.

16 "Recognition of this is registered in the codes of
17 many authorities, municipal and others.

18 "It is important to secure a balance of the
19 many units in a single building and of buildings of like
20 character and use in a community and also to promote
21 uniformity in requirements of various authorities throughout
22 the country.

23 "To do this it is necessary that the fire resistant
24 properties of materials and assemblies be measured and
25 specified according to a common standard expressed in terms

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that are applicable alike to a wide variety of materials, situations and conditions of exposure.

"Such a standard is found in the methods that follow: they prescribe a standard exposing fire of controlled extent and severity. Performance is defined as the period of resistance to standard exposure elapsing before the first critical point of behavior is observed.

"Results are reported in units in which field exposures can be judged and expressed. The methods may be cited as a standard fire test, and performance or exposure shall be expressed as 'two hours, six hours, half-hour,' et cetera.

"When a factor of safety exceeding that inherent in the test conditions is desired, a proportional increase should be made in the specified time classification period."

That defines, basically, what is defined in this particular standard.

Please note that it said there are a number of test methods that apply to different parts of a structure and materials in a structure. There is not one single method in here. There are several methods.

Now, the requirements for area of exposure are unique to each of these particular tests. The 180 square feet which was cited as that required is specifically defined under the section that deals with floors and roofs, tests for floors and roofs, which is -- and the size of --

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and characteristics of specimens which are required to be tested under the tests for floors and roofs, I read in 25.1: "The area exposed to fires shall be not less than 180 square feet, with neither dimension less than 12 feet."

So the requirement of 180 square feet is not applicable to the test under concern.

Also other areas given have to do with walls which are 100 square feet, which is a completely different test. There are no area requirements for the kind of test which was run and reported in this particular document, the report which I wrote and presented here.

MR. BRIGHT: You mean that there is no dimensional test for insulation except for thickness, perhaps?

WITNESS ABRAMS: I'm not even sure there is a test for that.

MR. BRIGHT: I mean ordinarily it is a matter of even getting R values.

There is a thickness involved.

WITNESS ABRAMS: I assume you're talking about an insulation type value; that is not a part of the standard. The choice of E 119 as a test method for the test which was reported here, I would presume is because the time-temperature exposure alluded to in the introduction is an extremely severe, universally used time-temperature regime.

It has a basis in fact that represents certain

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things, and to my knowledge there is no other standard that contains a time-temperature regime which is applicable to construction material that is more severe than this. It is my impression and opinion that this regime is probably far more severe than you would normally get in a situation involving cable trays.

MR. BRIGHT: Well, let me see if I can recapitulate just a little bit.

You say there are no applicable standards insofar as surface area is concerned.

WITNESS ABRAMS: Not for cable trays and not contained in this standard.

MR. BRIGHT: So your objective in going to E 119 was to take the time-temperature curve, which as you characterized it, was a very tough one; perhaps we could put it that way.

And in doing this test, you took a typical cable tray with a typical fill and you were actually determining then the insulating value of Kaowool in this situation when subjected to the E 119 time-temperature relationship.

WITNESS ABRAMS: That is basically correct, except I did not choose the test, sir.

MR. BRIGHT: Well, by "you" I mean whoever amongst you out there makes these momentous decisions.

WITNESS ABRAMS: Yes, sir, basically you are

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correct.

(Board conferring.)

MR. BRIGHT: So when you are referring -- I just want to make this absolutely clear. When you talk about the E 119 test, you are talking only about the time-temperature relationship that is layed out in those test specifications.

WITNESS ABRAMS: That is not absolutely correct. There are other provisions in the use of the test, even if you only use the time-temperature regime, that are spelled out and should be followed.

MR. BRIGHT: What are those? Could you --

WITNESS ABRAMS: How you measure the furnace atmosphere temperatures, the thermocouples that have to be used for that purpose; the representation of the end point in terms of one and a half hours or 90 minutes, which also is the way they indicate you have to spell out the results of the test.

Those things also apply and were followed as they applied to the test that we performed.

MR. BRIGHT: Would it be your testimony that due to the shielding -- apparently the shielding effect of the bottom two trays that the real test was run on the bottom two trays.

WITNESS ABRAMS: I would respond to your question, if I understand it correctly, that the bottom two trays in

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1 the test, because of the fact that four were tested in the
2 configuration, they were exposed to a much more severe
3 environment, and did indeed, as stated in the report,
4 effectively shield the top two trays to some extent.

5 MR. BRIGHT: I guess my --what I'm trying to find
6 out for the record is: did at least two trays show a 90
7 minute value that would be used by, say, the gentlemen who
8 were here for the staff yesterday in either approving or
9 disapproving the use of this Kaowool?

10 WITNESS ABRAMS: Absolutely. The 94 minutes to
11 end of test when the failure occurred is based on
12 information obtained from the bottom two trays.

13 So they were the ones that were most critically
14 affected in the fire test.

15 (Board conferring.)

16 CHAIRMAN BECHHOEFER: I have a question to add:
17 would -- if the test only included trays three and four and
18 you got the results you got, would that have been sufficient
19 to comply with the requirement for tests, according to the
20 E 119?

21 If you only have the two trays, trays three and
22 four --

23 WITNESS ABRAMS: It's very difficult to respond
24 completely to your question, sir, because we would have run
25 a somewhat different test if only two trays were requested to

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be tested.

They might have been positioned differently in the furnace and could have very easily had a better performance than the two trays that we tested at the bottom of the four trays.

However, it appears to me, to the best of my knowledge, that if we had run only the two trays as shown here, the results would have been similar to what we reported for the four trays.

CHAIRMAN BECHHOEFER: Well, would it have complied with the E 119 test standards to just use the two trays?

WITNESS ABRAMS: Oh, yes, absolutely.

CHAIRMAN BECHHOEFER: This is what I'm trying to find out.

WITNESS ABRAMS: Absolutely.

CHAIRMAN BECHHOEFER: Why was the top tray used at all?

WITNESS ABRAMS: I can't answer that question.

WITNESS BORGMANN: I'll try to answer that. We were anxious to have a test run that would preclude a lot of the questions that we're getting here at this hearing. I mean we wanted the most rigorous test which would be putting the bottom trays in the flame and then have some configuration which would be similar to what is in the plant.

So by having the four trays -- two in the flame

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and two above it -- it gives a more representative picture of some of the installations at the station.

And also having data on at least two trays, it would prove to the NRC that these in fact did pass and we did not just get one lucky installation. So it was the selection by our engineers and fire engineers that selected the configuration.

CHAIRMAN BECHHOEFER: So the conclusion, even if trays one and two did not meet the time-temperature regime that you were testing for, the test could still be valid on three and four.

WITNESS BORGMANN: Very definitely.

CHAIRMAN BECHHOEFER: I see.

WITNESS BORGMANN: Because 94 minutes was based on failure of the two lower trays upon which the fire impinged.

(Board conferring.)

MR. GILLMAN: Your Honor -- your Honor --

CHAIRMAN BECHHOEFER: Mr. Gillman, we're back to you now to -- this line of questioning, did it help you in some of the areas, at least, that you were trying to get into, or is there further information that you wanted to bring out?

MR. GILLMAN: Mr. Borgmann stated that the test simulates condition at Zimmer in terms of the arrangement of cable trays.

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1 If you look at figure 26 on page 40, you will note
2 that there is a distance of five inches between the edge
3 of the cable tray and the wall of the furnace on either
4 side.

5 The distance between the -- in the center between
6 the cable trays is not specified in this figure, the dimensions
7 on this -- five inches and approximately six or seven
8 inches in the middle, and then another five inches. There's
9 approximately 20 inches of air flow.

10 I don't believe that at Zimmer where cable trays
11 are passing through rooms, through walls, that there is only
12 a 15 to 20 inch space in which -- for heat to rise upward.

13 I contend that Mr. Borgman's statement that the
14 cable tray arrangement as demonstrated in figure 26 simulates
15 the conditions out at the power plant, the Zimmer power
16 station.

17 MR. BARTH: Sir, I move to strike the unsworn
18 testimony of Mr. Gillman.

19 CHAIRMAN BECHHOEFER: That's not testimony; it's
20 an offer of proof.

21 MR. CONNOR: No, sir; no, sir. Objection to that.
22 He has no qualification to make an offer of proof. He's
23 testifying about something that he isn't qualified to testify
24 about and which the board has prohibited.

25 CHAIRMAN BECHHOEFER: That is not testimony. I asked

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Mr. Gillman where he intended to go in his questioning from here, given the answers to the questions we had already elicited.

MR. BARTH: He stated what the distances were in the plant, sir.

CHAIRMAN BECHHOEFER: Well, this is what he is obviously going to ask the witnesses. His statement is not evidence, but this is comparable to an offer of proof.

MR. CONNOR: Mr. Chairman, there is a more fundamental fact; their allegation is it doesn't meet the ASTM standards. We're hearing noises about five inches here and two inches there, or whatever.

There is no foundation; there is no relationship to the ASTM E 119.

Without that, why are we listening? I mean, I don't know; it could be 1000 yards or it could be zero. But it still wouldn't show anything in terms of meeting the tests that were selected to be run here, which contention 19 says was not met on Kaowool, by the way; not on cable trays. So I simply say that we are wasting our time on matters which are irrelevant.

(Board conferring.)

DR. HOOPER: Mr. Borgmann, what is in fact -- what was in fact the positioning of the trays in the furnace, exactly as it was as the positioning of the trays

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1 would be in the plant or was there a different configuration?

2 WITNESS BORGMANN: I was not trying to imply that
3 the configuration was exactly that of Zimmer; I was saying
4 that we could have run this test on one tray.

5 DR. HOOPER: Right.

6 WITNESS BORGMANN: We chose to run it on as many
7 trays as we could within the confines of the furnace in
8 which we conducted the test, and I was mainly indicating
9 that we were trying to protect the cable trays from external
10 fires.

11 And certainly the most severe case would be having
12 the fire impinging on the tray which would be the case of the
13 two on the bottom, and I merely indicated that at Zimmer
14 we do have trays above trays.

15 And this would give some indication that the most
16 severe incidents would be on the bottom where the flame
17 would be impinging on the trays. So I was indicating a
18 similar configuration, not implying all dimensions which
19 could not be, due to the confines of the furnace,
20 exactly the same as at the Zimmer Power Plant.

21 But it is certainly representative of a tray over
22 a tray.

23 DR. HOOPER: In other words, you were not trying to
24 exactly simulate; you were trying to approximately simulate
25 and do as best you can under the circumstances of the

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furnace?

WITNESS BORGMANN: Absolutely; we were trying to gather as much data as we could within the confines of the laboratory that was at our disposal to run these tests.

DR. HOOPER: Would you anticipate any great change in your conclusions if the spacing within the furnace was not exactly the spacing within the plant? What would be the -- would this seem to be biasing the results in any way or not?

WITNESS BORGMANN: I don't believe so. As Mr. Abrams testified just prior to my statements here, if you ran the test on one tray or two trays, you could conceivably reposition those in the furnace such that it would be a less stringent test by moving them out of the flames.

So we think we did everything we could, certainly, to demonstrate the most severe condition, which would be having the flame impinge on those bottom trays.

DR. HOOPER: Then particularly insofar as the requirements of the E 119 are concerned, this would not make any difference as to the relative -- the positioning of these units?

WITNESS BORGMANN: In my opinion, absolutely not. I'll ask Mr. Abrams to corroborate my statement.

WITNESS ABRAMS: That is correct. There are no specifications to follow in ASTM 119 concerning the

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1 positioning of those cable trays.

2 DR. HOOPER: Right. Thank you very much.

3 CHAIRMAN BECHHOEFER: Maybe we avoided some of
4 the objections. I think that took care of at least the
5 latest line that you suggested.

6 But you may continue from there. If there are
7 other matters that weren't covered, you may of course pick
8 them up.

9 This has to be related to the validity of the
10 tests to prove that the Kaowool insulation is adequate to meet
11 the Commission's requirements.

12 BY MR. GILLMAN:

13 Q Why didn't you run two tests with two cable
14 trays in the furnace instead of one test with four cable
15 trays, if you are using the ASTM E 119 furnace temperature
16 standards?

17 MR. CONNOR: Objection. There is no foundation
18 that the ASTM standard requires using whatever he said,
19 two trays instead of four or one or anything else. There
20 is a premise in there that is unfounded and the question is
21 irrelevant.

22 There is no requirement that more than one test is
23 required in any event.

24 MR. BARTHE: It is the staff's view that Mr. Connor
25 has correctly stated the contents of E 119; we agree with

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dsp15 1 him, sir.

2 We object to the question.

3 (Board conferring.)

4 CHAIRMAN BECHHOEFER: Could you repeat the salient
5 parts of your question. Really, we didn't hear -- a little
6 louder; we didn't hear all of it, unfortunately.

7 MF. GILLMAN: Yes, sir.

8 BY MR. GILLMAN:

9 Q On page 24, table 3, in the third column is shown
10 the ASTM E 119 temperature. Does this apply only to cable
11 trays three and four and not to cable trays one and two?

12 MR. CONNOR: Objection, your Honor. This is a
13 different question, obviously. Table 3 states on its
14 face that the average furnace atmosphere control temperature
15 and variations -- it doesn't purport to be the temperatures
16 of cable trays.

17 MS. FICHTER: Your Honor, I'm going to object here.
18 He didn't say "purported" anything. He just asked the witness
19 to answer the question if it does.

20 He didn't say it did; he wants to know that -- what
21 the witness thinks.

22 I think these objections are really getting
23 ridiculous. We're going to be here all day if they
24 keep objecting frivolously like they are.

25 MR. CONNOR: If they could ask a question correctly

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1 and state the proper premise -- the question related to
2 temperatures of the trays. This does not relate to the
3 temperature of the trays on its face. It relates to average
4 furnace temperatures.

5 If they can't ask an intelligent question, they
6 shouldn't be allowed to ask any.

7 (Board conferring.)

8 MR. BARTH: Mr. Chairman, we agree with the
9 objection to the question. I would like to point out, because
10 we are talking about temperatures, that E 119 provides in
11 section 3.1 for an average of nine thermocouples, not a
12 particular measure at any particular point of any particular
13 tray.

14 This is not new. The applicant's witnesses have
15 already testified; they're talking about average temperatures
16 here. I do not think that the question was proper, nor
17 does it represent the testimony or E 119.

18 (Board conferring.)

19 CHAIRMAN BECHHOEFER: I think we will overrule
20 this objection. I think it's wasting an awful lot of time
21 having an objection to every question. The witnesses can
22 answer. The witness can say exactly what counsel just said --
23 to counsel, if that is true.

24 They can answer this kind of question, I think. So
25 the witness may answer this one.

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1 MR. CONNOR: Your Honor, I want to make a comment,
2 though, on the record on your ruling. It is the function of
3 counsel to try to keep the record clear on specific
4 contentions, not to allow the opposing party or the board
5 to go on a wide sweeping thing beyond the contentions. Now,
6 that is our duty and our function.

7 We are objecting very strenuously to any board
8 ruling that we should not perform this function and allow
9 anybody to ask anything they can think of that might be
10 interesting, as has been overly evident in this case.

11 Now, we will not withdraw from that function, and
12 I will continue to object to any questions that do not meet
13 the rules of evidence, although I, too, would like to get
14 this hearing over.

15 CHAIRMAN BECHHOEFER: The witness may answer this
16 one. You might have to repeat the question if they
17 didn't remember it.

18 MR. GILLMAN: Your Honor, I am trying to -- repeat
19 the question. Oh.

20 BY MR. GILLMAN:

21 Q If the -- why is the ASTM E 119 temperature
22 curve listed if thermocouples 13 and 31 which indicate the
23 ambient furnace temperature directly underneath cable
24 trays one and two are 25 percent and 37 percent, respectively,
25 less than the ASTM E 119 standard for the 90 minute mark?

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MR. CONNOR: I would note that this is a totally different question. But because the chairman does not want us to object, I will not object, if the witnesses can understand whatever that question meant.

MR. BARTH: I object, sir, because the staff -- we have to make a record upon which you people can make a finding and the position by the gentleman who is an expert in differential equations, that E 119 sets up standards in terms of a particular temperature and a particular place, assumes facts not in evidence.

I have pointed out that 3.1 of E 119 requires an average of nine thermocouples; this is not even related to E 119.

You just cannot have a record built this way, your Honor. You just can't.

(Board conferring.)

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CHAIRMAN BECHHOEFER: I think on this subject the

-- I think this is something the witnesses could say, if so.

They may answer.

WITNESS ABRAMS: I have stated previously that a statement made concerning what the thermocouples 13 and 31 are measuring was in error. They do not measure the furnace atmosphere temperature. They measure the temperature of the Kaowool at that location.

Therefore I cannot respond to the question that was asked.

BY MR. GILLMAN:

Q Are the thermocouples in the thermocouple location number 13 exposed to the furnace temperature?

A (Witness Abrams) They are on the surface of the Kaowool at the bottom of the tray, and basically attached, so that they will be in contact with the Kaowool so that it will record -- the thermocouple will record that particular temperature.

MR. GILLMAN: Your Honor, I'm looking at Figure 15 on page 33.

MR. CONNOR: We object to any argument.

MR. BARTH: I object to the testimony unless there's a question.

BY MR. GILLMAN:

Q Mr. Abrams, on page 33, figure 15, there is a

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mpb2 1 picture of the side view of the cable tray.

2 Why is thermocouple location number 13 indicating
3 thermocouples 13, 31, 49 and 67, not even inside the cable
4 tray, not even anywhere near a cable?

5 A (Witness Abrams) Well, this is a schematic
6 representation of where the thermocouples are located, and
7 if the figure were drawn exactly correctly, that thermo-
8 couple would be at what would be considered to be the bottom
9 of the Kaowool, the third outer layer of the Kaowool closest
10 to the fire.

11 Thermocouple 13 is not intended to measure
12 temperatures of the cables.

13 Q Mr. Abrams, why do thermocouples 49 and 67
14 measure a temperature at the 90 minute mark that is three
15 percent and two-tenths of a percent respectively of the
16 furnace temperature?

17 A I presume because those are the temperatures at
18 the location at which they were attached to the Kaowool on
19 trays three and four.

20 Q Do these temperatures of thermocouples 49 and 67
21 at the 90 minute mark fall within a confidence interval of
22 the furnace temperature?

23 MR. BARTH: Could I have the definition of what
24 confidence none we're talking about, five percent, ten
25 percent, so we can get some meaning to the question?

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MR. GILLMAN: Five percent.

WITNESS ABRAMS: If I understand your question, you're asking me whether the temperatures at those two locations on the bottom trays relate to the furnace atmosphere in terms of the test?

BY MR. GILLMAN:

Q Yes, sir.

A (Witness Abrams) They do not relate to the furnace atmosphere. Their only function is to measure the temperature at the point at which they're attached. They have absolutely no relationship to the control or measurement of furnace atmosphere temperature.

Q What is the height of the furnace thermocouple location? That is, how high is the highest furnace thermocouple in the furnace from the floor of the furnace?

A I don't have that information in the report. To my recollection, the highest one was probably about the distance equal to the lower part of the top trays. I don't know what that is in feet or inches or so forth.

You would have to refer to Figure 26.

Q You state that there were eight furnace thermocouples.

Why don't you show the data for the eight furnace thermocouples?

A We didn't feel it was necessary to include that

mph4 1 in the report. We tried to disperse them in accordance with
2 the provision of E 119 to give us a uniform or a complete
3 sampling of the furnace atmosphere.

4 Q On page 42 and 43 of the report are furnace
5 atmosphere control temperature, the temperatures for zone
6 two and three.

7 How are these arrived at from the eight furnace
8 thermocouples?

9 A Well, in order to control the furnace effectively
10 so that we can stay on the time-temperature curve within the
11 limits, certain of the eight thermocouples are averaged to
12 command the input controls of the furnace, to adjust the heat
13 so that we can stay as close to the hand-drawn curve as
14 possible.

15 In this case two sets of thermocouples were
16 averaged in order to get the information shown on the two
17 figures you're alluding to.

18 Q So for each figure, figure 28 and figure 29, two
19 thermocouples were averaged?

20 A Probably four, probably four.

21 Q To test the ability of Kaowool to protect cables
22 from fire, wouldn't a better test have subjected all four
23 cable trays to the ASTM temperature curve?

24 MR. CONNOR: Objection, Your Honor.

25 The question infers that the test did not meet

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mpb5 1 the ASTM temperature code, which is contrary to any evidence
2 in the case.

3 CHAIRMAN BECHHOEFER: I think that objection is
4 well taken.

5 But the question really could be restated, I
6 think.

7 BY MR. GILLMAN:

8 Q What is the evidence that cable trays one and two
9 met, ASTM E 119 temperature curve standards?

10 A (Witness Abrams) The evidence you see is listed
11 on page -- I think it's 17 -- No, it's on page 24, table three,
12 where the differences from the time-temperature curve are
13 given, and a statement in the report which says that those
14 variations when used in the correction formula given in
15 ASTM E 119 are about one and a half percent variation from
16 the time-temperature curve, and for a 90 minute test you must
17 stay in a seven and a half percent variation.

18 So therefore I conclude that anything in the
19 furnace was subjected to an ASTM fire.

20 Q Then why are the furnace.... Okay.

21 You have not indicated the positions of the
22 furnace thermocouples, and so because the position of a
23 thermocouple is relevant to understanding heat distribution,
24 what is the evidence that the furnace temperatures indicated
25 in table three on 24 follow the thermocouple data?

mpb6

1 In other words, where is the averaging of the
2 thermocouple data?

3 MR. CONNOR: Objection, Your Honor.

4 This is the type of question that should have
5 been brought up in discovery, it should have been gotten
6 into a long time ago. And now all of a sudden they decide
7 they suddenly want to see, they want to check to make sure
8 that the thermocouple data matches the average in table three.

9 It's far too late for that. This is something
10 that they supposedly were going to do a long time ago. They
11 didn't do it.

12 Certainly now it is not appropriate for them to
13 have to dream up some data and go check it in the files or
14 something to find out why this is true.

15 The witness has already answered the question,
16 in the first place, as to why it met the test. And, after
17 all, that's the only relevant point.

18 MS. FICHTER: I didn't hear Mr. Gillman ask for
19 the information. He wanted to know where it was.

20 MR. CONNOR: The same objection would apply any-
21 way.

22 CHAIRMAN BECHHOEFER: I actually think he asked
23 why they didn't put it in.

24 But I think we'll let them answer the question.

25 The appeal board has ruled that failure to ask

1425 085

1 for information on discovery does not preclude a party from
2 asking questions on cross-examination. That's the McClinton
3 Case. I don't remember the number; but it's an explicit
4 holding.

5 So the objection is overruled.

6 WITNESS ABRAMS: What is Mr. Gillman's specific
7 question?

8 MR. BARTH: Could we ask the Reporter to read it
9 back, Your Honor? It might save time.

10 CHAIRMAN BECHHOEFER: Can the Reporter read the
11 question back?

12 (Whereupon, the Reporter read from the record,
13 as requested.)

14 WITNESS ABRAMS: We do not normally put that
15 data in the report. This position of thermocouples-- I do
16 not have their exact positions here -- were determined, one,
17 by the requirements of the standard, and, two, by the
18 physical array of material in the furnace.

19 Laboratories are given that discretion. You
20 can't always put the thermocouple where perhaps you would
21 best like to put it, something is there.

22 The average is shown on page 24, are shown to
23 indicate that the temperatures measured in the furnace
24 varied from the time-temperature curve to the extent shown
25 in that table, and that you need that information to calculate

mpb8

whether or not your temperatures are within the seven and a half percent required in this particular test.

BY MR. GILLMAN:

Q Are the furnace thermocouples in the construction -- in the Portland Cement Association furnace fixed, or can they be moved around?

A (Witness Abrams) They are fixed for -- they are only fixed for each test; depending on what is being tested they are positioned for that particular test and remain that way throughout the test.

Q So you change the position of the thermocouples with every test you run.

A And I'm asking you, is the data of the thermocouple location in the Portland Cement Association furnace still extant, or has it been lost?

A I believe it's still extant for this test. However we did not rotate these at all. They were placed in a particular position for this test in accordance with the specifications and directions of ASTM E 119, as best as we can meet them with the cable tray array in the furnace.

Q Why did you consider the information about the positions of the furnace thermocouples not important enough to include in the report?

MR. CONNOR: Objection, Your Honor.

That's been gone over.

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mpb9

(The Board conferring.)

CHAIRMAN BECHHOEFER: We will sustain the objection to the last question.

I might add, if you're going to -- Do you have any data or any indication that the averaging was not done correctly, or are you just fishing around to find out?

If there is other information, I think you ought to bring that out because if it's just fishing around, I think the witnesses have testified that they have averaged. And I think many other questions along this line would be quite repetitive.

But if you have specific information indicating some faults in the averaging process, then it might be worth going further into where the data is and what it is, what it says, that type of thing.

I really want to know where you're going because basically the appeal board has held that irrespective of the fact that you didn't ask for it on discovery, you can ask questions about it. But if it means that they're going to have to go back and come up with their further data, you have to make a very strong showing that there is likely to be some error, or that some error was performed, that there was some error in the calculation that's presented here, or that the averaging was biased in some way.

I think you have to justify getting the

1425 088

mpbl01 information at this stage of a proceeding; if that's where
2 you're going, I think you would have to make a very strong
3 showing that there is something wrong.

4 So this is just a little guidelines. But you
5 may continue with your questioning, at least.

6 BY MR. GILLMAN:

7 Q You stated in the report the furnace thermocouples
8 were shielded --

9 MR. BARTH: Sir, may we have an answer to the
10 Board question as to where he's going since the Board asked
11 the question? I would also like to know where he's going.

12 MR. GILLMAN: I'm sorry.

13 CHAIRMAN BECHHOEFER: Yes. I had asked if you
14 could indicate where you're going on this particular line,
15 this line about the averaging.

16 I had inquired what type of information you were
17 trying to bring out, or whether you're just fishing for
18 possible errors or whether you had any affirmative indica-
19 tion someplace that there was an error, in the averaging I'm
20 talking about now, which is the subject of the last question.

21 MR. GILLMAN: Well, the data indicate that there
22 is a very close relationship between the thermocouple
23 location 13 on the bottom two cable trays with the furnace
24 temperature.

25 I've been trying to establish why the furnace

mpb11 thermocouples have not shown that the temperature around the
upper two cable trays is less than it is below.

Mr. Abrams stated that there was less heat
rising to the top of the furnace, or there was less heat
rising to the top two cable trays, and I'm trying to under-
stand from information about the furnace thermocouple posi-
tions why the furnace temperature curve that's on table three
on page 24 does not reflect the heat in the upper part of the
furnace.

(The Board conferring.)

CHAIRMAN BECHHOEFER: I think that particular
statement that you made poses a question which we would
like the witnesses to answer if they could.

WITNESS ABRAMS: The statement was made that
they don't reflect the temperatures at that particular point.
The furnace atmosphere temperatures are not supposed to
reflect temperatures at any particular point on the assembly.
They are completely different thermocouples encased in
shields of either ceramic or iron material, iron pipe
material. They must meet certain requirements as outlined
in the standard.

And those are the thermocouples that we used in
the test. We used those thermocouples only to control the
furnace fire as close as we can to the time-temperature
curve which is required.

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mpbl2

The graphs of figures 28 and 29 -- 28 and 29 on pages 42 and 43 show the averaging process in terms of the furnace atmosphere thermocouples as it relates to the curve we're trying to stay with. And the data on page -- table three, in table three on page 24, show the differences.

BY MR. GILLMAN:

Q What is the purpose of the shielded thermocouple?

A (Witness Abrams) They're required by the standard.

Q I'm sorry, sir?

A They're required by the standard.

Q What do they achieve?

MR. BARTH: Sir, here he's challenging the IEEE standard. This is no place to go litigate a national standard for electrical fire testing.

MR. CONNOR: The contention was is the standard the right standard. As I understand, the question is whether the test met the standard. So anything about his opinion of what the standard might -- what the years of technical expertise have come up with is hardly an issue.

MR. BARTH: It will not expedite the proceedings, sir, to litigate the validity of the IEEE standard 119.

MR. FANKHAUSER: Mr. Chairman, I've heard this team of Connor and Barth working all morning, and I must say I've kept my tongue until this point.

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mpb13

But I think that the question is what is the thrust, what is the purpose of these standards. And he is not questioning the standards as such, he is trying to find out what the purpose of these standards is.

And I think that to look to the goal of those standards is an appropriate point at this juncture.

MR. BARTH: In response to Mr. Fankhauser, the gentleman read the introduction to the standards which sets forth the purpose, sir.

MR. CONNOR: Dr. Fankhauser apparently was not listening when Mr. Abrams read the introduction which points out the purpose of the standards earlier.

(The Board conferring.)

CHAIRMAN BECHHOEFER: I think that if it isn't a challenge to the standard, then I think the question has already been answered.

If it's a challenge, it's not permitted.

So we'll uphold the objection to that question.

MR. GILLMAN: Your Honor, what was the surface area requirement of the standard?

CHAIRMAN BECHHOEFER: The witness testified that there wasn't any.

BY MR. GILLMAN:

Q Does a shielded thermocouple shield conductive, convective or radiated heat?

1425 092

mpbl4 1

2 A (Witness Abrams) I'm not prepared to answer the
3 question. It was used only because it's so specified in the
4 standard.

5 Q You don't know what the shielded thermocouple is
6 for?

7 MR. CONNOR: Objection, Your Honor.

8 The question has been asked and answered, simply
9 that the shield was used because this is what is required
10 by the code, and that's all that's in issue. It's irrele-
11 vant as to why the shield is put wherever it is and what it
12 does or doesn't do.

13 MR. FELDMAN: Your Honor, it seems to me that
14 Mr. Gillman is asking this as a foundation question, or may
15 be. And I think he should ask it for purposes of his ques-
16 tioning. It may be an insignificant question.

17 (The Board conferring.)

18 end
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CHAIRMAN BECHHOEFER: The particular question I will sustain the objection to. I think that has either been answered -- it was answered, because it was part of the Code or the Standard, and I'm not sure why it's important, or what purpose in that Standard it serves. But anyhow, you may proceed with your questions.

BY MR. GILLMAN:

Q I'm trying to find out information about --

MR. BARTH: Could we have a question, sir, instead of a speech?

CHAIRMAN BECHHOEFER: He can put a background for his question. That's not a speech. Give him a chance. He can put the premises of the questions.

BY MR. GILLMAN:

Q How can an expert qualified to perform a fire test not know what a shielded thermocouple is for?

MR. CONNOR: Objection, your Honor. That misstates the record. That's not what the witness said. It's irrelevant, in any event.

MR. BARTH: I've given him a chance, your Honor, and I object to the question. It challenges the Standard.

MS. FICHTER: I believe the witness said he was not prepared to answer that question, so I think it was a valid question.

MR. BARTH: If he's not prepared to answer it, in

1425 094

1 that case he's already answered it. He can't. So either way
2 we would object.

3 MS. FICHTER: He's asking why he can't answer, why
4 he considers himself an expert in fire protection, and yet
5 he can't answer the question.

6 MR. CONNOR: These snide questions that always try
7 to infer that something is in the minds of these people, by
8 MVPP sneaking in question after question is reprehensible in
9 any court. But it is particularly bad when the witness said
10 he didn't answer why it was there because it was in the
11 Code, and he didn't know more than that. It doesn't mean
12 that he is less or not an expert in his field.

13 For this interrogator to misstate the record is
14 totally improper, and sometime we're going to have to quit it.

15 MR. FELDMAN: Your Honor, I think that misquotes
16 the question. I think he asked what it was, not why --

17 MR. CONNOR: We object to 16 different counsel of
18 the many counsel for MVPP all chiming in on the same point.
19 One counsel should speak only. That's the last remaining
20 rule.

21 CHAIRMAN BECHHOEFER: Well, I do think that that
22 question was objectionable, and we will sustain the
23 objection to that one.

24 BY MR. GILLMAN:

25 Q Were thermal radiation shields on the thermocouples

1 installed in the cable trays?

2 A (Witness Abrams) No.

3 Q So the cable trays were unshielded?

4 A Yes.

5 Q Therefore, you state that the cable trays would
6 have been picking up radiated heat?

7 A I didn't state that.

8 Q The PCA report lists the thermal conductivity,
9 density and specific heat of Kaowool. Why doesn't it list
10 the emissivity?

11 MR. CONNOR: Objection, your Honor. IN the first
12 place, there should be a reference, and there's no foundation
13 laid as to why or what emissivity should or should not be
14 listed, whatever this interrogator may mean by it.

15 MR. GILLMAN: Page 11.

16 MS. FICHTER: I think the witness can answer. If
17 emissivity is not relevant, then that's why it was not
18 included. And he can answer that as well as Mr. Connor.

19 MR. CONNOR. I object on the further ground that
20 this reference now given refers to a B&W description, not
21 something this witness selected, in any event. I'm sorry,
22 I should have said Babcock & Wilcox.

23 CHAIRMAN BECHHOEFER: That objection we'll
24 overrule. The witness may answer that one.

25 WITNESS ABRAMS: Would you repeat your question?

BY MR. GILLMAN:

Q Why were the emissivity characteristics of Kaowool omitted from your report?

A (Witness Abrams) The specifications for Kaowool that are in this report were not selected by me. It is a piece of information out of a catalogue, referring to the material which was tested in the test. It was included in the report as a piece of information in toto as you see it there. We did not have anything to do with the preparation of that piece of information.

MS. FICHTER: Your Honor, I don't think that was responsive to the question. He asked why it was not included in the report. He's answering that he didn't prepare this page here. He asked why it was not included in the report.

MR. CONNOR: Your Honor, that was the reference they gave when I raised the point.

(The Board conferring.)

CHAIRMAN BECHHOEFER: Well, I think the real question should be: Does emissivity have anything to do with the insulating value of Kaowool? Maybe the witnesses could answer that one.

WITNESS ABRAMS: In terms of the test results as reported here, based on the provisions of Ell9, we are only interested in the information that tells us when we have reached a failure point. The emissivity absolutely has

nothing to do with that determination as reported here.

CHAIRMAN BECHHOEFER: So I take it that's your reason for not including an analysis of emissivity in the report itself?

WITNESS BORGMANN: Might I comment? Anytime you deal with a manufactured product and you want a description of that product, you go to his catalogue sheet.

Now, when the catalogue sheet describing Kaowool was included in the test report it was included simply to show the material that was used. It was not the choice of us, or the men who run the test. It was simply the choice of the manufacturer of Kaowool as to what properties he puts in his tabulation. And that happens to be a property that was not included on the data sheet, so that's why it was not included.

CHAIRMAN BECHHOEFER: But, in other words, it is not relevant to the test results, one way or the other?

WITNESS BORGMANN: When you get right down to it, as long as the Kaowool is a consistent product, the physical characteristics of that product are irrelevant, since you are really measuring the effects of the test. The key to the product is if you have a consistent product, time after time, and you test that product it's the results of the test that are significant. Emissivity is just another physical characteristic of the product, any one of which affects the

characteristics, but you're not measuring the Kaowool. You're measuring the effects of the Kaowool, how it protected the cable tray.

And Babcock & Wilcox who makes the Kaowool does not list that as one of the characteristics in their tabulation of characteristics that they put on their data sheet.

(The Board conferring.)

CHAIRMAN BECHHOEFER: To ask further questions on emissivity, you'll have to tie it up in some way to the results of this test, or to the requirements -- the standard that the test is fulfilling.

So you may proceed.

BY MR. GILMAN:

Q Are you saying that you're not responsible for knowing the emissivity characteristics of Kaowool, that Babcock & Wilcox is responsible for knowing that?

MR. CONNOR: Objection. That presupposes that --

MR. BARTH: Your Honor, I object.

MS. FICHTER: One counsel at a time, please. I know you're all --

MR. CONNOR: Look who's talking now.

The fact is that it's irrelevant. This has already been established. Mr. Borgmann just said that the test was to determine the effects of heat, from whatever source, as to how Kaowool withstood it. So it's irrelevant

1 where the heat came from. It's that simple. It doesn't
2 matter.

3 MR. BARTH: Sir, I would refer you to your own
4 ruling, that he has to connect it up, which he has not done,
5 before further questions.

6 CHAIRMAN BECHHOEFER: Yes. You'll have to connect
7 up your questions on emissivity, to show why they're going
8 to be relevant.

9 MR. CONNOR: There's absolutely no foundation laid
10 for this. He may as well be asking about neutron bombardment,
11 because it's just not there, no connection.

12 BY MR. GILLMAN:

13 Q Then why were the thermal conductivity, density
14 and specific heat deemed important enough to include in the
15 report?

16 MR. CONNOR: Asked and answered.

17 CHAIRMAN BECHHOEFER: I think that question has
18 been answered. So the objection is sustained on that one.

19 BY MR. GILLMAN:

20 Q For energized 40AWG three conductor --

21 CHAIRMAN BECHHOEFER: Could you speak a little
22 louder? We're having trouble hearing you.

23 BY MR. GILLMAN:

24 Q For energized 40AWG three conductor cable installed
25 in a cable tray to a 50 percent fill, would Kaowool be as

wel 8

1 effective in retaining the heat generated by these cables as
2 it is in protecting the cables from external fire?

3 A (Witness Borgmann) The insulating properties would
4 be the same.

5 Q You're saying there will be no more buildup of
6 heat in a cable tray that is covered and insulated, compared
7 with a cable tray that is open and uninsulated?

8 A That wasn't your original question.

9 Q Have you done any studies on medium sized power
10 cable that is energized in a tray to determine when that
11 tray is covered and insulated how the ampacity is affected,
12 and do you know, if you have not done either calculations or
13 experiments, do you know of any?

14 A I'll ask Mr. Cotta to answer that.

15 A (Witness Cotta) When the requirement came up to
16 cover the trays, protect them, as a result of the fire
17 protection evaluation report, and it was decided that we
18 would investigate a blanketing material such as Kaowool, the
19 first thing we did was to see what effect this would have on
20 power trays and the cables in those trays.

21 We looked at those areas where we would have to
22 cover cable trays, at the specific trays, and we took the
23 worst case in watts per foot that we had, and ran that out
24 to see what our loading was.

25 We made calculations based on the thermal

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wel 9

1 condu tivity of material like Kaowool, or this type of
2 material, and then to confirm that we took the watts per foot
3 of the worst case, made up a cable tray section, and ran
4 tests on it, to reach equilibrium temperature with three
5 inches of Kaowool, to assure that we would not exceed the
6 temperature rating of the cable.

7 And that is in the worst case from a loading
8 standpoint.

9 Q How did you determine the worst case, if the
10 Sargent & Lundy computer does not contain records of power --
11 cable tray ampacities?

12 A You don't need a computer to --

13 MR. CONNOR: Objection, your Honor. I mean here
14 again they're trying to shovel something in the back door.
15 There's nobody that said -- there's no foundation for saying
16 that Sargent & Lundy's computers should or should not have
17 such information on them, and to put that in as an inference
18 in the question is improper.

19 CHAIRMAN BECHHOEFER: Can you restate the
20 question to avoid that inference?

21 BY MR. GILLMAN:

22 Q How did you pick the power cable tray at Zimmer
23 Power Plant that carries the most amperage?

24 A (Witness Cotta) We have a computer printout of
25 every routing point -- tray section, if you will -- in the

wel 10

1 Zimmer Station. We know every cable that is in that tray,
2 and we have gone back and looked at every tray that has more
3 than 40 percent fill. We have reviewed every cable, the
4 actual load that is on that cable, and full load current of
5 the motor, or whatever the load is.

6 We ran out the I squared r, heat generation from
7 those cables. It's a very simple thing to do. It's time
8 consuming, but this is a standard practice on -- I don't
9 care if it's a nuclear plant or a fossil plant, this is
10 something you do so you don't burn up your cables. And we're
11 well within the limits that are established for these
12 tray sections.

13 Q Are you saying that you went to the Sargent &
14 Lundy computer, determined which cables were in which tray,
15 identified the cables, and then manually went to the
16 architect-engineer's blueprints to determine the amperage
17 that each cable was carrying, then added them up for each
18 cable tray?

19 A No. We did not go to blueprints. We went to the
20 data sheets that come back from the field giving us the
21 nameplate data for each motor. We do not trust preliminary
22 information for that type of an analysis.

23 Q Earlier you said that you don't need to use the
24 computer. What did you mean by that?

25 A You do not need to use a computer to make a

calculation on the thermal loading of a tray.

(Pause.)

Q If the PCA test were repeated four more times, for a total of five tests, what is the probability that cables would fail before the 90-minute mark?

MR. CONNOR: Objection, your Honor. That is beyond the contention. The contention is the cable would not meet the test, not some speculation as to whether the test should be five times instead of one time, or whatever, or that you should do it on 20 trays instead of four, or one. But that certainly is beyond the scope of the contention, once again challenging the Standard.

MS. FICHTER: I would disagree. I would say that the test itself and the design criteria of the test are very much questioned in this contention, and that's what he's getting at, whether in fact it was designed adequately to test Kaowool.

MR. CONNOR: It is an attack on the Standard to suggest that five tests would be better under the Standard.

(The Board conferring.)

CHAIRMAN BECHHOEFER: I think basically only one test must be passed. The only thing that I, myself, am a little interested in is how likely is it that the fact that the insulation passed on this test was a lucky break, and if you did a test tomorrow would it still pass? Would it still

wel 12

1 be 90 minutes? Could you just do tests until you found one
2 that did pass? Could you keep doing tests until you found
3 one that passed, and then use it to say that it qualifies?

4 That's the only thing in my own mind that the
5 question raises. Maybe some people on the panel could
6 address that. I realize that only one test is all that has
7 to be passed, but I would like to have some background as to
8 whether it's likely that this is just a lucky break that it
9 passed this time, or is it likely that a similar test would
10 product similar results?

11 MR. CONNOR: For the record, I'm going to object
12 to that, too, because even though it is in the interest of
13 the Chairman, it still goes beyond the Standard. And any
14 question the Board asks --

15 CHAIRMAN BECHHOEFER: The Chairman recognizes
16 that. I am predicating my question that way.

17 MR. CONNOR: I understand. But it also opens it
18 up for further cross-examination, and that's why we object
19 to it.

20 CHAIRMAN BECHHOEFER: Well, I have asked the Staff
21 people, I think, some similar questions. And I just think
22 a followup on this panel could be instructive, at least.

23 WITNESS ABRAMS: The question you're asking is
24 extremely difficult to answer, simply because nobody has run
25 five tests, or ten, or three tests that are the same as this

wel 13

1 particular test.

2 From my past experience in other programs we have
3 used our furnaces for, where duplications or triplications
4 were made under the conditions of that particular research
5 program, generally the results duplicate quite well.

6 There are some variations in results, depending
7 upon the conditions of the test that you are running, but
8 mostly the end points are reached very close to one another
9 in repetitive tests.

10 MR. BARTH: Mr. Chairman, it is 12:30. We would
11 like to get Mr. Maura on and off today, because these people
12 cannot question him on Friday, and --

13 CHAIRMAN BECHHOEFER: Right. Well, we were
14 thinking of breaking for lunch around now anyway, and coming
15 back to take Mr. Maura, and then to continue on the
16 insulation question.

17 MR. CONNOR: We would like to object to that.
18 Let's finish this line of questioning, and maybe these
19 witnesses could be completed. I mean it is 12:30, but let's
20 finish up what we're doing here. I mean we agreed to have
21 Mr. Maura, and I'm not objecting to that. But I would like
22 to complete this line.

23 CHAIRMAN BECHHOEFER: Well, do you have any more
24 questions on this particular line, or is this a good breaking
25 point?

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1 MS. FICHTER: He's done with that line, Mr.
2 Chairman.

3 MR. CONNOR: No, I mean is this cross-examination
4 completed?

5 MS. FICHTER: Oh, no.

6 CHAIRMAN BECHHOEFER: Well, the other parties have
7 a chance, also. I think that we will break and come back
8 and talk about control rods, and then we'll go back to the
9 witnesses. I just don't think we can productively finish
10 these people before lunch.

11 MR. CONNOR: We might get some estimate. I mean
12 the City isn't even here, and I don't know whether Dr.
13 Frankhauser wants to cross-examine.

14 CHAIRMAN BECHHOEFER: The City told me Dr.
15 Frankhauser would represent its interests for this particular --

16 MR. CONNOR: Well, we don't know that he's going
17 to take a long time. We don't know that Mr. Gillman is going
18 to take a long time. All I'm suggesting is that we ought
19 to try to move along.

20 CHAIRMAN BECHHOEFER: Well, we'll be back at a
21 quarter of 2:00.

22 (Whereupon, at 12:32 p.m., the hearing was
23 recessed, to reconvene at 1:45 p.m., this same day.)

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AFTERNOON SESSION

(1:48 p.m.)

CHAIRMAN BECHHOEFER: I believe we're ready to proceed.

The testimony -- are there preliminary matters?

MR. FELDMAN: Yes, there is one preliminary matter that I would like to bring up at this point if I might. That is that last night it was brought to my attention that there has been a rumor afloat that Cincinnati Gas & Electric is practicing loading the fuel rods and during this practice one of them broke and some uranium escaped.

And I don't know if it's just a rumor or there's any significance to it, but I talked to Allen Howard of the Enquirer newspaper, and he told me that he had -- through another one of his reporters -- talked to somebody who had represented themselves as being a worker at the plant, that he had told them this.

Although it may have no foundation at all, I think it's serious enough that an investigation should be instituted just to find out if there's any truth to it at all.

And I was wondering if such an investigation could be instituted?

(Board conferring.)

MR. CONNOR: Mr. Chairman, I think that is the type of rumor mongering that has marked this hearing. It is

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absolutely untrue.

No fuel has been loaded into the reactor. You have to have an operating license from the Nuclear Regulatory Commission before you can load fuel into the reactor.

I don't know why Mr. Feldman is spreading rumors, but we do have the NRC inspectors around, and so forth, and I don't believe anybody is trying to make such a terrifying conspiracy that it should be brought before this board.

The NRC inspectors are up there now.

CHAIRMAN BECHHOEFER: Yes. I think loading fuel is not permitted.

MR. FELDMAN: That is the whole point. I suppose we're hoping that they are not going to continue. It is not --

CHAIRMAN GECHHOEFER: I presume the NRC inspection staff has its people out there. I don't know -- I can't presume that they are not doing their job in making sure that the applicant is not loading --

MR. FELDMAN: This is my concern, that I would like to see this rumor put to rest, if it is just a rumor. If it is not -- you know -- I would like this to become public, if there's any truth to it or if there's no truth to it.

(Board conferring.)

MR. CONNOR: As counsel for the company, I just made that representation, and while I don't suppose

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1 Mr. Feldman trusts anybody, that is a fact.

2 MR. FELDMAN: I didn't hear what you said.

3 MR. CONNOR: There is a rumor that there are
4 three dinosaurs loose in the containment.

5 MR. FELDMAN: Perhaps that should be investigated.

6 CHAIRMAN BECHHOEFER: There's nothing that the
7 board can really do on this. If specific facts are brought
8 to our attention, then perhaps we can -- you can raise
9 a contention.

10 But if the applicant is violating the Commission's
11 rules by loading fuel before it gets a license to do so,
12 there are legal remedies.

13 You could request a show-cause order; that would
14 be the method of proceeding then. They would be violating
15 Commission rules by acting without a license.

16 Certainly, the Commission would have jurisdiction
17 to investigate that, but this board doesn't.

18 MR. FELDMAN: Right. But I would just hope that
19 the NRC would send an investigator out just to at least
20 check the fuel rods to make sure they haven't been tampered
21 with.

22 I think that would be a quite simple thing to do.
23 Perhaps you're already doing it; I don't know.

24 CHAIRMAN BECHHOEFER: Tampering with fuel rods
25 is still another question. I think putting them in the

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1 reactor is one thing. Tampering with them is another thing,
2 and I think we certainly don't have authority to take any
3 action. But I think you can bring whatever rumors you have
4 heard to the attention of the Commission.

5 You can show Mr. Barth or --

6 MR. FELDMAN: We will attempt to find this
7 engineer that we understand has brought this up, and if
8 we can locate this person and if he does exist, we will
9 bring him forward.

10 CHAIRMAN BECHHOEPER: Because certain matters are --
11 certain matters we have taken up when affidavits have been
12 presented to us setting forth the facts.

13 I'm not sure that one involving a violation of the
14 rules is even within our jurisdiction at all. Even -- although
15 the operating license board can consider whether any
16 violations have taken place up to the time of the license.
17 But I don't think we would have authority to determine in
18 an ongoing proceeding whether there is a violation of something
19 as basic as the applicant loading fuel without a license
20 to do so.

21 So I don't think that would be in our jurisdiction,
22 but the inspection staff certainly would have authority to
23 look at that and determine whether it was so or no.

24 I have the impression that there are inspectors
25 there. Well, there were going to be resident inspectors;

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1 whether that has started, I'm not sure.

2 But presumably, if a resident inspector were
3 there, he would be aware of whatever along this line
4 would happen or would not happen.

5 MR. FELDMAN: Okay. Thank you.

6 CHAIRMAN BECHHOEFER: But there's nothing really
7 we can do about this at this time.

8 MR. FELDMAN: Thank you.

9 I have no further preliminary matters, then.

10 CHAIRMAN BECHHOEFER: Okay. Anybody else have any
11 preliminaries?

12 (No response.)

13 Otherwise, we will proceed to the staff -- the
14 staff can proceed to present Mr. Maura on control rods.

15 MR. BARTH: We would call Mr. Maura to the stand.
16 Your Honor, he has previously appeared as a witness and
17 been sworn.

18 At the last session of the hearing there was
19 testimony taken regarding an affidavit by Gorman L. Reynolds
20 regarding grinding on the control rods and the effect it
21 might have.

22 The board invited the staff to come back with
23 further evidence or statements of clarification that it
24 felt necessary.

25 Mr. Maura, as the record shows, is with our

dsp7 1 of the page under (a), where it says "80 control rods
2 required grinding of a chamber."

3 Instead of "chamber," that should be chamfer. So
4 it's "f" instead of a "b."

5 Q With those corrections, sir, are the statements
6 contained therein true and correct to the best of your
7 knowledge and ability and do you adopt them as your
8 testimony?

9 A Yes.

10 Q Since the members of the audience do not have
11 a copy of this, what is the conclusion of the staff with
12 regard to grinding on the chamfer?

13 A My conclusions are that as a result of the
14 grinding, no chips entered the control rods.

15 Q Since the grinding was done, if any chips were
16 left, sir, would it pose any safety problem for the
17 operation of the plant, should it ever receive a license?

18 A Assuming any chips were left --

19 Q If any chips were left, would they pose a safety
20 problem, should the plant receive a license?

21 A No, sir.

22 MR. BARTH: Mr. Chairman, I've provided copies
23 of Mr. Maura's testimony to the parties and to the reporter,
24 and I request that it be accepted as evidence and bound into
25 the record as if it were read forth at length.

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inspection and enforcement office in Chicago.

Mr. Maura has investigated the matter. I will proceed with the examination of evidence by Mr. Maura at this time.

Whereupon,

FEDERICO A. MAURA

was called as a witness, and having been previously duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BARTH:

Q Mr. Maura, I show you a document and ask you to identify it. Will you please, sir.

A This is -- is this working?

Q I don't care. Speak loudly.

A "Direct Testimony of Federico A. Maura Regarding Metal Chips in Control Rods." It has three attachments.

Q Was this prepared by you, Mr. Maura?

A Yes.

Q Was this prepared by you in response to the board's invitation at the last session of the hearings in order to further clarify the staff's view of Mr. Reynold's affidavit?

A Yes.

Q Are the statements contained therein true and correct to your knowledge and ability, sir?

A I'd like to make a correction on page 2, middle

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