

NUCLEAR REGULATORY COMMISSION

ORIGINAL

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:

PENNSYLVANIA POWER & LIGHT COMPANY

AND

ALLEGHENY ELECTRIC COOPERATIVE, INC.

(Susquehanna Steam Electric Station,
Units 1 and 2)

DOCKET NOS. 50-387
50-388

DATE: October 20, 1981 PAGES: 2191 - 2392

AT: Wilkes-Barre, Pennsylvania

TRO1
3
0/1



ALDERSON  REPORTING

400 Virginia Ave., S.W. Washington, D. C. 20024

Telephone: (202) 554-2345

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

-----x
:
In the matter of: :
:
PENNSYLVANIA POWER & LIGHT COMPANY :
:
and :
:
ALLEGHENY ELECTRIC COOPERATIVE, INC. :
:
(Susquehanna Steam Electric Station, :
Units 1 and 2) :
:
-----x

DOCKET NOS. 50-387
50-388

Empress Room,
Genetti Motor Inn
88 East Market Street
Wilkes Barre, Pennsylvania

Tuesday, October 20, 1981

The hearing in the above--entitled matter was
convened, pursuant to notice, at 9:07 a.m.

BEFORE:

- JAMES P. GLEASON, Esq., Chairman,
Atomic Safety and Licensing Board
- GLENN O. BRIGHT, Administrative Law Judge
- DR. PAUL J. PURDOM, Administrative Law Judge

1 APPEARANCES:

2 On behalf of the Applicants, Pennsylvania Power &
3 Light Company and Allegheny Electric Cooperative, Inc.:

4 JAY SILBERG, Esq.
5 MATIAS F. TRAVIESO-DIAZ, Esq.
6 Shaw, Pittman, Potts and Trowbridge
7 1800 M Street, N.W.
8 Washington, D.C. 20036

9 BRYAN A. SNAPP, Esq.
10 Legal Department
11 Pennsylvania Power & Light Company
12 Two North Ninth Street
13 Allentown, Pennsylvania 18101

14 On behalf of the NRC Regulatory Staff:

15 JAMES M. CUTCHIN, IV, Esq.
16 MARY E. WAGNER, Esq.
17 Office of the Executive Legal Director
18 U. S. Nuclear Regulatory Commission
19 Washington, D.C.

20 On behalf of the Commonwealth of Pennsylvania:

21 WILLIAM P. DORNSIFE,
22 THOMAS POLLOG,
23 THOMAS GERUSKY,
24 Bureau of Radiation Protection,
25 Pennsylvania Department of Environmental Resources

RALPH HIPPERT,
Pennsylvania Emergency Management Agency

GENERAL FRANK TOWNEND,
Director, Luzerne County Civil Defense Council

26 On behalf of Petitioners for Leave to Intervene:

27 DR. JUDITH JOHNSRUD
28 State College, Pa.
29 For the Environmental Coalition on Nuclear Power

30 THOMAS J. HALLIGAN
31 Berwick, Pa.
32 For Citizens Against Nuclear Danger

33 GERALD SCHULTZ
34 For Susquehanna Environmental Advocates

C O N T E N T S

CROSS

<u>WITNESS:</u>	<u>DIRECT</u>	<u>CROSS</u>	<u>REDIRECT</u>	<u>RECROSS</u>	<u>BOARD</u>	<u>ON BOARD</u>
1						
2						
3	Raghaw Prasad (Recalled)					
4	By Mr. Cutchin	2195				
5	By Mr. Halligan		2197			
6	By Mr. Schultz		2233			
7	Scott McCandless					
8	By Mr. Silberg	2247				
9	By Mr. Adler		2257			
10	By Mr. Schultz		2262			
11	By Mr. Bright				2266	
12	By Mr. Purdom				2269	
13	By Chairman Gleason				2275	
14	By Judge Purdom				2289	
15	By Mr. Schultz		2290			
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

AFTERNOON SESSION .. page 2294

11	Scott McCandless (Resumed)					
12	By Mr. Adler	2294				
13	By Chairman Gleason				2296	
14	By Mr. Silberg		2302			
15	By Chairman Gleason				2303	
16	Oran K. Henderson (Recalled)					
17	and					
18	Robert M. Carroll					
19	By Mr. Silberg	2308				
20	By Mr. Adler		2315			
21	By Mr. Cutchin		2320			
22	By Ms. Merrill		2321			
23	By Chairman Gleason				2323	
24	By Judge Bright				2327	
25	By Judge Purdom				2328	
26	By Chairman Gleason				2331	
27	By Mr. Adler		2332			
28	By Mr. Silberg			2335		
29	By Mr. Silberg	2338				
30	By Judge Purdom				2343	
31	By Judge Bright				2347	
32	By Chairman Gleason				2349	
33	By Judge Purdom				2356	
34	By Chairman Gleason				2357	
35	Oran K. Henderson (Recalled)					
36	By Mr. Silberg	2358				

C O N T E N T S

WITNESS:

DIRECT CROSS REDIRECT RECROSS BOARD CROSS
ON BOARD

Oran K. Henderson					
By Chairman Gleason					2362
By Judge Bright					2372
By Chairman Gleason					2373
By Mr. Schultz			2377		
By Mr. Adler			2380		
By Mr. Silberg				2382	
Steven H. Cantone					
By Mr. Silberg		2382			

Professional Qualifications and Written Testimony of Dr. Prasad on Contention 4, Parts A and B.....	2196
Statement of Qualifications of Mr. McCandless.....	2248
Written Testimony of Mr. McCandless on Contention 6A.....	2250
Professional Qualifications of Oran K. Henderson.....	2309
Prepared Testimony of Mr. Henderson.....	2339
Applicant's Testimony of Oran K. Henderson on Contention 6-C.....	2358
Statement of Technical and Professional Qualifications of Steven H. Cantone.....	2382
Applicant's Testimony of Steven H. Cantone on Contention 6-C.....	2384

300 7TH STREET, S.W., REPORTERS BUILDING, WASHINGTON, D.C. 20024 (202) 554-2345

P R O C E E D I N G S

1

(9:07 a.m.)

2

3 CHAIRMAN GLEASON: Are there any preliminary
4 matters that need to be brought up?

5

(No response.)

6

7 If not, I believe we are to proceed this morning
8 with the staff's witness, and the remaining witness, I
9 understand, on contention 4; is that correct?

9

MR. CUTCHIN: That is correct, Mr. Chairman.

10

CHAIRMAN GLEASON: Would you proceed, please.

11

12 MR. CUTCHIN: I call Raghav Prasad back to the
13 stand. Dr. Prasad has previously been sworn.

13

CHAIRMAN GLEASON: Yes, I understand.

14

15 MR. CUTCHIN: Mr. Chairman, as he approaches the
16 stand, I would point out for the record, I have, because
17 portions C and D of contention 4 have been summarily
18 disposed of, I have redistributed Dr. Prasad's testimony to
19 eliminate those portions which were directed to that
20 contention. And the corrections have been made on the copy
21 that has been furnished to the reporter and new copies have
22 been furnished to the Board and each of the parties.

22

CHAIRMAN GLEASON: Thank you.

23

24 MR. CUTCHIN: Without objection, we would like to
25 proceed without having --

25

MR. HALLIGAN: We have an objection. Citizens

1 Against Nuclear Danger would like to register an objection
2 to this. The legal staff of the NRC knew well apparently,
3 knew well that they were going to make these changes and
4 should have done so at a prior time.

5 We are prepared to ask this witness questions
6 based on his testimony as submitted, and this is the latest
7 of, I would say, 10 or 15 attempts at last minute insertions
8 of evidence into witnesses' testimony moments before the
9 witness goes on the stand. And we feel it is highly
10 irregular and we object to this, not only this case but in
11 the case of witness McNair for the PP&L. And we want the
12 record so noted.

13 CHAIRMAN GLEASON: Yes. I might say, Mr.
14 Halligan, I am not sure that you precisely understood the
15 correction that was made. The correction, if I understand
16 it, was simply to delete from Dr. Prasad's testimony any
17 reference to those parts of contention 4 which have already
18 been summarily disposed of because they do not relate to his
19 testimony and thus would not be a part of this proceeding.
20 There is no attempt to add anything to his testimony.

21 MR. CUTCHIN: That is correct, Mr. Chairman.

22 MR. HALLIGAN: I am aware of that. But he deleted
23 practically an entire page just moments before we were
24 prepared to ask questions on this. It should have been done
25 at a prior time, yesterday, last evening or last week.

1 CHAIRMAN GLEASON: All right, your objection is
2 noted. So let's proceed.

3 Whereupon,

4 RAGHAW PRASAD,
5 recalled as a witness by counsel for the Regulatory Staff,
6 having previously been duly sworn by the Chairman, was
7 examined and testified further as follows:

8 DIRECT EXAMINATION

9 BY MR. CUTCHIN:

10 Q Dr. Prasad, do you have before you a copy of the
11 document bearing the caption of this proceeding and now
12 entitled "Testimony of Raghaw Prasad Relating to Need for
13 Power (Contention 4, Parts A and B)"?

14 A Yes.

15 Q That document consists of seven numbered pages; is
16 that correct?

17 A Yes, sir.

18 Q And it is accompanied by a two-page statement of
19 your professional qualifications?

20 A Yes, sir.

21 Q As the document has been redistributed, are there
22 any further modifications or corrections to be made?

23 A No, no.

24 Q Is the document then true and correct to the best
25 of your knowledge and belief as it is now modified?

1 A Yes, yes, sir.

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

4 A Yes.

5 MR. CUTCHIN: Mr. Chairman, I ask that Dr.
6 Prasad's testimony, consisting of seven pages plus the two
7 pages of his professional qualifications, be received into
8 evidence and bound into the transcript at this point as if
9 read.

10 CHAIRMAN GLEASON: Is there objection other than
11 the one that has been noted previously?

12 (No response.)

13 Hearing none, the statement will be received into
14 the record, bound into the record as the testimony of Dr.
15 Prasad as if read.

16 (The document referred to, the professional
17 qualifications and written testimony of Dr. Prasad on
18 contention 4, Parts A and B, follows:)

19

20

21

22

23

24

25

determination of the benefit to be derived from operation of the Susquehanna facility is limited to a finding that the facility is needed because the electricity it will generate, if licensed, will enhance reliability of supply of electricity to Applicants' customers or be use it will satisfy growth of electrical energy requirements. The Staff's determination of benefit is not limited to conclusions regarding reliability or growth in electrical energy requirements as alleged in the contention. The FES-OL^(NUREG-0564) concluded that the benefit to be derived from operation of the Susquehanna facility is the assurance of a low cost supply of electrical energy through minimization of production costs. More specifically, substantial economic savings will be gained by substitution of the electricity to be generated by the facility for electricity generated by more expensive generating units available to Applicants. FES-OL, §§ 7.3 and 7.3.2.

4. ~~Contention 4 also alleges that conservation and solar energy should be considered as alternatives to operation of the Susquehanna~~

facility. The FES-OL concludes that the only reasonable alternative to the proposed action of granting an operating license for the Susquehanna facility available for consideration at the operating license stage is denying the license for operation of the facility and thereby not permitting the constructed nuclear facility to be added to the applicant's generating system. FES-OL, § 7.4. Alternatives such as construction at alternative sites, extensive station modification, or construction of facilities utilizing different energy sources would each require additional construction activity with its accompanying economic and environmental costs, whereas operation of the already constructed plant would not create these costs. Furthermore, even if increased conservation savings and additional solar applications could be achieved without additional construction costs, It would still be unreasonable to deny an operating license for the Susquehanna facility because any resultant reduction in demand would not displace the need for the facility as a substitute for less economical generating units. I will demonstrate this last point on pages four through seven of my testimony.

5. Given this factual background, it is not readily conceivable that an alleged reduction in the need for power to supply growth in electrical energy requirements ~~or new developments concerning alternative energy sources, in and of themselves,~~ could result in the denial of an operating license because such a result would be unreasonable. This result would be reasonable only if there had been some significant change in (or newly discovered) information concerning the public health and safety or environmental impacts associated with operation ~~of the FES.~~ No such concerns have been revealed with regard to operation of the Susquehanna facility.
FES-OL, § 7.4.
6. As stated in the FES-OL, the benefit to be derived from operation of the Susquehanna facility is substitution of the electricity to be generated by it for electricity generated by less economical generating units available to Applicants. I can demonstrate that operation of the Susquehanna facility will result in a net benefit even under the conditions alleged by Intervenor in Contention 4, ~~parts a & b.~~ I have therefore assumed that Applicants' system has excess capacity ~~and low energy growth, increased conservation savings, and additional solar applications~~ as alleged in Contention 4.
7. An examination of the capacity currently (1981) available to PP&L and the PJM interchange shows that only about 2 percent and 23

percent of their respective capacities can generate electricity at an equivalent or lower cost to the Susquehanna facility.^{1/} This capacity represents hydro and other nuclear units on these systems. The remaining 98 percent of PP&L's capacity burns either coal (64 percent) or oil (34 percent), while the remaining 77 percent of PJM's capacity is dependent on either coal, oil, or combustion turbines (oil and gas) in the following proportions: 34 percent, 26 percent, and 17 percent.^{2/} This strong dependence on fossil fuels shows that if Susquehanna were not operating, replacement energy would have to be forthcoming from more expensive fossil fuels.

8. The exact source of replacement energy is not something one can readily predict. Logically, the utility will rely upon the least expensive alternative available. For the purpose of this assessment, I have assumed that all replacement energy will be made-up by capacity already on the PJM system. Further, to accommodate the contention's allegations of low demand and excess capacity, I have assumed that PJM will have underutilized coal

^{1/} U.S. Nuclear Regulatory Commission, Final Environmental Statement related to the Operation of Susquehanna Steam Electric Station, Units 1 and 2, NUREG-0564, Tables 7.4 and 7.5, June 1981.

^{2/} Ibid.

capacity to replace what could have been generated by Susquehanna. This means that demand is assumed to be so low that generation from about 43 percent of PJM's capacity, that with the highest production costs, would not be required at all even if Susquehanna is not available to the system.

9. I have also assumed that the Susquehanna units would have operated at an average annual capacity factor of 60 percent.^{3/} The 1982 nuclear fuel cost is estimated at 10 mills/kWh and is assumed to escalate at 5 percent per year.^{4/} The coal fuel cost is based on the weighted average of the actual value (cents per million BTU) paid by the PJM utilities for coal as of February 1981 and 8 percent per year escalation.^{5/} The coal cost is converted to mill/kWh based on an average plant heat rate of 10,000 BTU per kWh. Based on these assumptions, the fuel cost differential associated with the first full year of operation of unit 1 is estimated at \$30 million. In the 1983 timeframe, the first year both units are expected to be in operation, the savings are approximately \$64 million.^{6/} Additional savings would be expected to

^{3/} See for example, R.G. Easterling, Sandia National Laboratory, "Statistical Analysis of Power Plant Capacity Factors Through 1979," NUREG/CR-1881, April 1981.

^{4/} J.O. Roberts, S.M. Davis, and D.A. Nash, "Coal and Nuclear: A comparison of Generating Baseload Electricity by Region", NUREG-0480, December 1978.

^{5/} U.S. Department of Energy, Energy Information Administration, "Cost and Quality of fuels for Electric Utility Plant - February 1981," FPC Form No. 423, Table 29.

^{6/} The production cost analysis employed here differs from the one presented in the Susquehanna FES-OL in that fuel costs have been updated and here it is assumed that Susquehanna's output can be totally replaced by coal fired generators in order to satisfy the intervenor's scenario of lower energy growth and excess capacity.

occur over a period of approximately 30 years, corresponding to the estimated useful life of the Susquehanna facility. These savings would be expected to increase in subsequent years because even if equivalent escalation were assumed for coal and nuclear fuel, the escalation is being applied to a larger base value in the case of coal relative to nuclear.

10. A similar analysis was recently prepared by the U.S. Department of Energy's Division of Power Supply and Reliability.^{7/} Its estimated replacement fuel cost for Susquehanna Unit 1 in 1982 is \$13.5 million per month (\$162 million on an annual basis) and reflects equal portions of replacement energy coming from oil and coal. The DOE results are based on an independent analysis prepared by that office. My analysis assumes unusually low energy demand on the PJM interchange such that the marginal cost energy source is shifted from an oil/coal mix to a total reliance on coal. In either case, significant benefits are to be derived by having the units available for operation.

^{7/} Estimates of the Costs of Delaying Operating Licenses for Nuclear Plants, Division of Power Supply and Reliability, U.S. Department of Energy, May 15, 1981.....Included in HRC's Monthly Report to Congress.

PROFESSIONAL QUALIFICATIONS

Raghaw Prasad

Argonne National Laboratory

I am an Economist with the Environmental Impact Studies Division of the Argonne National Laboratory at Argonne, Illinois. My responsibilities consist of financial evaluation, cost-benefit analysis, analyzing the demand and supply of different energy resources, and transport network analysis, as part of the preparation of environmental impact statements. I joined the Division in May, 1979, and since have participated in the preparation of about half a dozen statements.

I have a Bachelor of Science degree (1961) in Electrical Engineering from Ranchi University, India, a Master of Business Administration degree (1973), a Master of Arts (1977) in Economics, and a Ph.D. Candidacy in Economics from Temple University, Philadelphia. My dissertation topic is "Evaluation of Time-of-day and Lifeline Rate Structures and Estimation of Electricity Demand". I have completed all requirements of a Ph.D. degree.

From 1961 to 1970, I worked as an operations research analyst. My responsibilities involved production scheduling, inventory control, cash management, and capital budgeting.

From 1971 to 1973, I was a consultant at a community mental health center, Albert Einstein Hospital, Philadelphia. I directed a program which utilized Eastern philosophy, yoga, and meditation to help individual's and family's mental and physical problems.

From 1973 to 1974, I was a senior systems analyst with Combustion Engineering Refractory Division at Valley Forge, Pennsylvania. I developed and managed a Management Information System, and Business Planning Model.

From 1974 to 1977, I worked as a senior systems planner with Sperry Univac, Blue Bell, Pennsylvania. As a part of my responsibilities I designed and developed a financial and accounting inventory control system to handle the flow of computer parts to and from their subsidiaries located throughout the world.

From 1977 to 1978, I was employed as a senior economist with General Public Utilities, New Jersey. My responsibilities included development of residential and industrial electricity demand models, regional economic impact analyses and electricity demand forecast.

Since joining Argonne, I have performed a number of cost-benefit analyses, financial evaluations, and energy supply and demand analyses to be incorporated into the environmental impact statements. I developed a production and financial model for estimating the natural gas production and financial viability of U.S. Lake Erie Gas Development Program. The results of the model were utilized in the preparation of draft environmental impact statement of U.S. Lake Erie Natural Gas Development Program. I was asked to defend the production and financial data before a public hearing at Buffalo, New York.

I also developed a levelized cost model for comparing per unit cost of generation of electricity using different primary energy fuels. The results were utilized for the Pebble Springs project. I also developed a model to

evaluate the need for the Pond Hill Reservoir to supply the consumptive needs of Susquehanna Steam Electric Station during periods of low river flow.

As a part of my responsibility in the preparation of the Northeast Regional EIS, I provided the coal supply/demand scenario to evaluate the impact of incremental coal demand resulting from conversion of power plants from oil to coal. Presently, I am involved in developing a Northeast Regional Transportation Model.

I am a member of the American Economic Association.

1 MR. CUTCHIN: Dr. Prasad is available for
2 cross-examination, Mr. Chairman.

3 CHAIRMAN GLEASON: All right.

4 MR. SILBERG: The Applicants have none of this
5 witness, sir.

6 CHAIRMAN GLEASON: Do the Intervenors wish to
7 cross-examine the witness?

8 MR. HALLIGAN: Yes, Mr. Chairman. The Citizens
9 Against Nuclear Danger have some questions of Dr. Prasad.

10 CROSS-EXAMINATION

11 BY MR. HALLIGAN:

12 Q On page one of your testimony, sir, you are going
13 to speak, are you not, on the benefits to be derived on the
14 operation of the Susquehanna facility?

15 A That is true.

16 Q And according to this amended statement, you are
17 not going to speak on the alternatives.

18 MR. CUTCHIN: Objection, Mr. Chairman. I believe
19 we have cleared that up.

20 MR. HALLIGAN: No, it is not clear.

21 MR. CUTCHIN: We would request the Board make a
22 ruling at this time to forego coverage of this type of
23 thing.

24 CHAIRMAN GLEASON: Mr. Halligan, go ahead.

25 MR. HALLIGAN: The reason why I ask, Mr. Chairman,

1 is he refers extensively to the final environmental
2 statement as the basis for his analysis, and in the federal
3 environmental -- final environmental statement you must
4 consider alternatives. And I point out that the witness for
5 the PP&L, Mr. McNair, although he spoke only on parts A and
6 B also of the testimony, the attorneys for the Applicant did
7 not strike from their testimony what was in there about
8 conservation, solar power, et cetera. And as a result they
9 answered explicitly statements in that regard.

10 In other words, a precedent had been set. The
11 testimony submitted by Mr. McNair and Mr. Hecht dealt with
12 parts A and B of contention 4, but in both instances they
13 did refer to these other alternatives. It was part of their
14 testimony directly and they answered direct questions on
15 that, and it was not objected to and was admitted as
16 evidence.

17 Now, the NRC staff seems to be changing the
18 procedure of the rules at this point and making it
19 difficult, if not impossible, to elicit information from
20 this witness which is in his possession and which he had
21 prepared for this hearing.

22 CHAIRMAN GLEASON: Let me, Mr. Halligan, attempt
23 again to clarify the air. First of all, it is a basic rule
24 of procedure that the testimony of the witness is clearly
25 the function and the responsibility of the party supplying

1 that witness. It is true, as you indicate, that several of
2 the other witnesses did refer in their remarks to
3 alternative methods, such as conservation and solar power.
4 And you are certainly within your rights to cross-examine
5 them on them.

6 This witness does not choose to do so. Those
7 issues, those alternatives, are not a part of this
8 proceeding any longer, and so therefore one could literally
9 have them stricken out at any time. They could have been
10 stricken out of those other witnesses if someone had
11 objected to them.

12 Now, it is true, as you point out, that
13 alternatives can be looked at in terms of the environmental
14 report, and it may be that there is an alternative of not
15 operating the plant. That is one alternative that is still
16 viable in the light of A and B. But that is a different
17 question than the alternatives we are talking about here.

18 And I must sustain the objection. Conservation
19 and solar energy are no longer a part of this proceeding.
20 Please proceed.

21 BY MR. HALLIGAN: (Resuming)

22 Q Dr. Prasad, on page 1 of your testimony, under
23 item 3, you speak of reserve margins and you have a phrase
24 in there, "potential for very low growth." Could you tell
25 us what you mean in general by the "potential for very low

1 growth"?

2 A Well, I am just referring to the contention 4,
3 which says there is a potential for very low growth or
4 demand. Usually like say if you are talking about pre-oil
5 embargo, the Applicants might experience 7 to 8 percent
6 growth. But due to various conservation methods, there is
7 possibly growth in demand maybe lower than what historically
8 it has been.

9 I guess that is what the Intervenor had in mind
10 when they made this statement.- I am just repeating their
11 statement.

12 Q All right. All right. In your analysis, you
13 mentioned just a moment ago the historical perspective.
14 Have you in your research done some historical review of the
15 projections that were made by the Applicants during the past
16 five to ten years, going back in time?

17 A Yes, I have done that.

18 Q All right. Are you aware that, oh, approximately
19 eight or nine years ago they were estimating an annual
20 growth of 8 to 10 percent annually?

21 A Yes.

22 Q And what is their projected growth estimates in
23 the years ahead as of today? What are they projecting?

24 A The latest projection which I have seen, which has
25 been referred to here, is about 2.1 percent, which is not

1 away from the national average which has been projected by
2 many forecasting organizations.

3 Q All right. Then in the ten-year span their
4 estimates have dropped from a high of near 10 percent to the
5 present figure of about 2 percent growth; is that correct?

6 A Yes, it is.

7 Q At any time did the Applicants estimate a growth
8 rate of zero?

9 A I am not aware of it. If they have, I am not
10 aware.

11 Q And it was not part of your calculations, estimate
12 zero energy growth?

13 A Well, you are on the first page. If you go to the
14 end of the testimony, I have even come to the conclusion --
15 not zero growth. I am saying demand has gone 35 percent
16 more than what it is today; it still is a benefit. So I
17 have considered not even zero, but minus 35 percent.

18 Q One other question on this matter here. Have you
19 considered in any of your calculations or estimations the
20 possibility the company will have a net loss of energy in
21 the years ahead, like in other words 1981 it might be one
22 percent less than it was, you know, the year before, and the
23 year after that it might be one or two percent lower than
24 that. Have you gone in that direction?

25 MR. CUTCHIN: Clarification, Mr. Chairman. When

1 the questioner uses the term "a net loss in energy," does he
2 mean a decrease in energy demand? I do not understand the
3 question.

4 MR. HALLIGAN: Well, in reference to his term
5 "very low growth," I would change --

6 BY MR. HALLIGAN: (Resuming)

7 Q Did you estimate or calculate any figures dealing
8 with very low decline in demand instead of a growth
9 annually, a decline annually?

10 MR. CUTCHIN: If the witness understands the
11 question, I withdraw the objection. But --

12 CHAIRMAN GLEASON: Well, let's see if he does.

13 THE WITNESS: I think I answered your question,
14 but I will try again.

15 BY MR. HALLIGAN: (Resuming)

16 Q Well, just answer this one here, please. If --

17 CHAIRMAN GLEASON: Why don't you let him try, Mr.
18 Halligan.

19 MR. HALLIGAN: Okay.

20 THE WITNESS: I have not gone taking a different
21 rate of growth to calculate the benefit from the operation
22 of the plant. What I have tried to show in this testimony,
23 not even talking of low growth rates, I am saying that even
24 if the demand has fallen to the extent of 35 percent there
25 still is a benefit of the operation of the Susquehanna

1 plant.

2 BY MR. HALLIGAN: (Resuming)

3 Q 35 percent of what are you referring?

4 A Of the existing demand.

5 Q Again, you are talking about demand as a growth
6 factor.

7 CHAIRMAN GLEASON: No, Mr. Halligan. He is
8 talking about a decrease of 35 percent.

9 MR. CUTCHIN: Which I believe would be a negative
10 growth; is that correct? -

11 CHAIRMAN GLEASON: That is one way of naming it.

12 MR. HALLIGAN: All right.

13 BY MR. HALLIGAN: (Resuming)

14 Q On page 2 of your testimony, you made your
15 determinations of the so-called benefits you claim because
16 it will satisfy growth of electrical energy requirements.
17 Do you define "energy requirements," again, as similar to --
18 as energy demands? This is in your first sentence there.

19 A You are on page 2?

20 Q Yes.

21 A Where are you? Which one are you talking about?

22 Q Well, you read -- the sentence which starts at the
23 top and you are talking about, "To enhance the reliability
24 of supply of electricity to Applicants' customers." That is
25 one determination. Or another one would be because it would

1 satisfy growth of electric energy requirements.

2 MR. CUTCHIN: Mr. Chairman --

3 BY MR. HALLIGAN: (Resuming)

4 Q I do not understand what you mean by "energy
5 requirements."

6 MR. CUTCHIN: Mr. Chairman, I have a problem with
7 this. If the questioner would read the entire question or
8 the entire sentence, which starts on page 1, I believe it
9 would show that all the testimony is doing is trying to
10 identify the underlying premise of the contention which was
11 raised by the Intervenor, for the purpose of going on to
12 describe what the purpose of this testimony is.

13 And I think the record is suffering some
14 clarification here by taking these things out of context and
15 attributing them to the witness as opposed to the
16 Intervenor.

17 MR. HALLIGAN: My question is, I just want to know
18 what the witness means by "electrical energy requirements."

19 CHAIRMAN GLEASON: That is a good question.
20 Answer it, please.

21 THE WITNESS: Yes, it does mean energy demand.

22 BY MR. HALLIGAN: (Resuming)

23 Q It is basically energy demands. Now, is this
24 based primarily on supply and demand?

25 A Your question is not clear. What do you mean by

1 -- what do you mean by "supply and demand"? Supply is one
2 thing, demand is another thing. When we are talking energy
3 requirement, it is demand.

4 Q Well, it has been brought out by other witnesses,
5 and in fact I believe you may have mentioned this in your
6 prior testimony, that the Applicants have facilities on line
7 now that can more than meet demand at the present time.
8 They have a surplus of generating facilities. That is the
9 supply end of it.

10 The demand comes from the customers, of course.
11 So the demand has, in your judgment, decreased based on
12 historical studies, and what would indicate otherwise, that
13 this demand may continue to decline in the years ahead?

14 MR. CUTCHIN: Mr. Chairman --

15 BY MR. HALLIGAN: (Resuming)

16 Q Is there any trend that you see there that would
17 offset a continuing decline?

18 MR. CUTCHIN: Mr. Chairman.

19 CHAIRMAN GLEASON: Yes?

20 MR. CUTCHIN: I am going to object to this
21 continuing line of questioning. The purpose of this
22 testimony is to address the contention on the part of the
23 Intervenor that there will indeed be low growth, low
24 demand. It is not the purpose of this witness to justify
25 that low growth or demand. He has assumed it and has

1 assumed an even lower demand than was contended by
2 intervenors.

3 The purpose that he is here for is to show that
4 nevertheless there is a benefit from operating the plant.

5 CHAIRMAN GLEASON: Well, Mr. Halligan, I think it
6 would be helpful if you could just sharpen your questions a
7 little bit more.

8 MR. HALLIGAN: Yes, I will. And it would be
9 helpful if the witness could be allowed to answer them
10 instead of his attorney.

11 BY MR. HALLIGAN: (Resuming)

12 Q All right. Assuming, as you have, this low growth
13 scenario, you say in -- on page 2 that substantial economic
14 savings will be gained by substitution of electricity to be
15 generated by the facility, meaning the Berwick plant, for
16 electricity generated by more expensive generating units
17 available to the Applicants.

18 Could you describe one or more of these more
19 expensive generating units?

20 A Yes, I can. If you look at the Table 7.3 of the
21 FES, there is a cost estimation from different units, like
22 oil-fired, coal-fired, combustion turbine. And you can see
23 the cost of generating electricity from them is far more
24 than the cost of generating electricity -- I am referring to
25 fuel cost -- of generating electricity from the Susquehanna

1 nuclear plant.

2 I do not have the FES in front of me, but from my
3 memory I can say that the cost of oil-fired units is 25
4 mills per kilowatt hour; for coal it is 15 mills; and for
5 nuclear it is 9 mills. That is what I am referring to.

6 Q So you are saying that oil-fired is much more
7 expensive and coal would be next, and you say nuclear power
8 is the lowest of the three as far as the cost of fuel is
9 concerned?

10 A That is true. -

11 Q There are, of course, other factors. Were they
12 factored in? The disposal or transportation of these fuels
13 and so on, was all this calculated in your estimate?

14 MR. CUTCHIN: Objection, Mr. Chairman. Will the
15 questioner please identify the other factors he is referring
16 to for clarity of the record.

17 MR. HALLIGAN: I just said disposal of wastes,
18 transportation, and whatever other factors are important in
19 the total cost of mining or processing the fuel involved.

20 BY MR. HALLIGAN: (Resuming)

21 Q Are these costs of fuels -- are your figures you
22 just quoted, are they independent of all these other
23 auxiliary costs, or were they all factored in?

24 A The fuel cost estimation includes the entire fuel
25 cycle cost, so they are included in it.

1 Q All right. On page 3, we cannot seem to ask this
2 question on alternatives. It has been stricken, apparently,
3 part of it.

4 At the bottom of page 3 you say it would be
5 undesirable -- unreasonable to deny an operating license for
6 the Susquehanna facility because any reduction in demand
7 would not displace the need for the facility as a substitute
8 for less economical generating units.

9 Now, was this study done on a company-wide basis
10 or did you analyze this in conjunction with the so-called
11 pool of utilities that are connected through the grid?

12 MR. CUTCHIN: Mr. Chairman, I'm going to object.
13 At the bottom of page 4 there is an explanation as to what
14 the examination was made of, and we are wasting a lot of
15 time having this questioner ask questions that are already
16 answered in the testimony.

17 MR. HALLIGAN: Mr. Chairman, we are not wasting
18 any time. First of all, there is no page 4 any more. There
19 is no page 4 in the testimony.

20 CHAIRMAN GLEASON: You do not have a page 4?

21 MR. HALLIGAN: No, I do not.

22 MR. CUTCHIN: I apologize that one was omitted
23 from that set. It was indeed in the original copy supplied
24 him, and that has not been stricken.

25 MR. HALLIGAN: This is precisely an example of

1 what I have been talking about, this handing of documents
2 moments before a witness is on the stand that are incomplete
3 and misleading, deceiving and so on. I object to this once
4 again.

5 BY MR. HALLIGAN: (Resuming)

6 Q The question was, and I think the witness should
7 be able to answer it, is, without referring to a lot of
8 charts -- I am not pinning him down on statistics or actual
9 weights or measures -- the question is, was the analysis
10 made here primarily based on the facilities, exclusively on
11 the facilities of the companies, PP&L and Allegheny, or did
12 it include other factors, power from other companies
13 connected in the grid?

14 A Yes. If you refer to page 4, item 7, I have made
15 an analysis of PP&L and PJM capacities.

16 Q Are you aware that the Applicants for this
17 operating license are the Pennsylvania Power & Light and the
18 Allegheny Electric exclusively?

19 A Would you repeat that question, sir?

20 Q Are you aware that the Pennsylvania Power & Light
21 Company and the Allegheny Electric Cooperative are
22 exclusively the Applicants for this operating license?

23 A Yes, I am aware.

24 Q And are you also aware that the Philadelphia
25 Electric Company and Pennsylvania Electric and other

1 utilities are not Applicants for this operating license?

2 A Yes, I am.

3 Q Thank you.

4 All right. On page 4 you say in item 5, in the
5 middle of the statement, this result, dealing with the
6 result of denying -- the option of denying the license --
7 would be reasonable only if there had been some significant
8 change or newly discovered information concerning the public
9 health and safety or environmental impacts associated with
10 operation -- with the operating -- with operation.

11 Could you signify perhaps what you would consider
12 a significant change or a new discovery of information that
13 might affect this license?

14 A Well, I am not a health expert, so I have gone
15 under the opinion of what information was given to me that
16 there has not been any change in the health and safety
17 effect or environmental effects which would change this
18 situation of granting the operating license.

19

20

21

22

23

24

25

1 Q So you are saying then in your opinion it would be
2 primarily a significant health or safety matter that would
3 tip the scales against granting of a license?

4 A Yes.

5 Q And you do not think it would be an economic issue
6 that would tip the scales, necessarily?

7 A Based on this analysis, that is what my conclusion
8 is: that there is an economic benefit.

9 Q And do we draw from this conclusion that even if
10 there was a significant change or some new, dramatically
11 new, information on the economics of the Applicants, that
12 would not tip the scales against an operating license?

13 You understand you indicated correctly, I believe,
14 that you would only -- it would only be some tremendous
15 significance adverse health or safety matter that would
16 affect the human environment that could persuade the
17 Licensing Board to defer or deny a license?

18 That I think we agree on. But on the economics
19 which is your area of expertise, could there not be some
20 significant change in the financial status of the company
21 that would change your opinion about the reasonableness of
22 granting a license?

23 A Actually, I am not aware of what you are alluding
24 to. But I have just tried to show what is happening today
25 and what are the costs, what are the cost projections over

1 30 years. And based on that I have made this analysis and
2 have tried to show that there is a benefit from operating
3 this plant.

4 And I have taken the worst-case scenario, that
5 even if the demand has fallen so far that if PP&L has to
6 generate any amount of electricity, the other substitute to
7 PP&L is a coal-fired unit and if they have the other as
8 opposed to nuclear, if that electricity is generated from
9 the nuclear unit, they will be saving money.

10 Q All right. You mention worst-case scenario, so
11 you are basing your assumptions on good, sound theoretical
12 practice, obviously. But could not that worst-case scenario
13 include the economic difficulties that now are present at --
14 to the management of Metropolitan Edison Company?

15 MR. CUTCHIN: Objection, Mr. Chairman.

16 CHAIRMAN GLEASON: I am not sure I understand the
17 question.

18 MR. HALLIGAN: Well, we are trying to find out if
19 some significant change in the economic status of the
20 company would change your analysis or conclusions about
21 issuing a license and the reasonableness involved in this
22 determination.

23 BY MR. HALLIGAN: (Resuming)

24 Q And I am saying, in essence, or asking you,
25 knowing full well, I am sure, of the economic conditions at

1 Metropolitan Edison, which is a neighboring facility in an
2 adjoining service area, do you think you would make a
3 comparison of their situation?

4 As a worst-case scenario, why have you not
5 analyzed their economic plight, where their stock has
6 dropped, their rating has dropped in the bond market, and
7 they have to borrow money at high interest rates, they have
8 to go to the Federal and State Government to seek grants,
9 long-term loans, and are threatened by bankruptcy? Why have
10 you not analyzed all this? It certainly would be in the
11 category of worst-case scenario.

12 MR. CUTCHIN: Objection, Mr. Chairman. That
13 question is totally irrelevant and immaterial to the issue
14 to be decided here, which is a function of fuel costs.

15 CHAIRMAN GLEASON: It is. It really is. It has
16 nothing to do with this Contention, Mr. Halligan. I have to
17 sustain the objection.

18 MR. HALLIGAN: It would seem to me it would have
19 -- or maybe I did not present it in the right light. But
20 the Contention has to do with the needs of the operation of
21 the plant. It goes much beyond the need for fuel for the
22 plant. The plant itself involves the financing of it, the
23 construction, the decommissioning, all these other matters.
24 And it is not just a fuel matter at all; it goes much be 1
25 that.

1 BY MR. HALLIGAN: (Resuming)

2 Q So it would seem -- did you say that you did not
3 deal with that as a worst-case scenario?

4 MR. CUTCHIN: There has been an objection, Mr.
5 Chairman. It has been sustained.

6 CHAIRMAN GLEASON: Mr. Halligan.

7 MR. HALLIGAN: He has answered the question.

8 CHAIRMAN GLEASON: I assume you are asking him if
9 the same situation that occurred at Three Mile Island would
10 occur here, would that change his analysis in his
11 testimony? Is that your question?

12 MR. HALLIGAN: It would have been.

13 CHAIRMAN GLEASON: That is outside this
14 Contention.

15 MR. HALLIGAN: Well, we want it noted for the
16 record that we protested interpretation of it, because it is
17 our judgment that is precisely the purpose of this part of
18 that Contention.

19 BY MR. HALLIGAN: (Resuming)

20 Q All right. On item 6 at the bottom of page 4, you
21 say, Dr. Prasad, "I have therefore" -- this is part of the
22 -- I am sorry, this is parts that has been stricken now,
23 increased conservation savings. I withdraw that question.

24 On page 5 near the top, you give some percentages
25 in your testimony. You say the remaining 98 percent of

1 PP&L's capacity burns either coal or oil. Under the oil you
2 list 34 percent. Is that not 25 percent?

3 A Well, this is kind of mixed. It is 25.3 percent
4 is oil and 8.3 percent is combustion turbine and diesel
5 engine. And I am sure you are aware the cost of those
6 units, generating cost of those units is even higher than
7 the oil-fired units.

8 Q All right. But the figure is --

9 A I have tried to be more conservative. I am giving
10 less -- I am giving more cost to the nuclear, less cost to
11 the present fuel. So my results would be even more
12 conservative than has been shown here.

13 Q All right. At the bottom of page 5, item 8, you
14 state the exact source of replacement energy -- identify the
15 type you mean by the word "replacement."

16 A Well, if there is any of demand for electricity
17 from where that electricity will come, it is not exactly
18 known today, like, say, we need some electricity, whether it
19 will come from oil-fired units, whether it will come from
20 coal-fired units, whether it will come from the fossil --
21 from the combustion turbine, whether it will come from TJM's
22 same kind of unit is not clear at this time.

23 There is a projection made by Applicant, as has
24 been shown in Table 7.3, from where they will get those
25 kinds of electricity.

1 Q All right. Then you say that logically the
2 utilities will rely upon the least expensive alternative
3 available. Is it logical to assume that -- do you really
4 believe that this is their policy, to obtain the least
5 expensive alternative?

6 MR. CUTCHIN: Mr. Chairman, I am going to object.
7 If the Board may remember, we have been over this once
8 before where the questioner asked the witness if he really
9 means what he says under oath in his testimony and has been
10 told that that is not productive. If he did not mean it, he
11 would not have said it.

12 CHAIRMAN GLEASON: Maybe you could rephrase your
13 question.

14 MR. HALLIGAN: Yes.

15 BY MR. HALLIGAN: (Resuming)

16 Q Is there any research to back up your assumptions
17 or theories here that the utilities have in fact used the
18 least alternative fuel in their makeup demands?

19 MR. SILBERG: I assume you mean "the least
20 expensive alternative"?

21 MR. HALLIGAN: Yes.

22 THE WITNESS: Well, as you are aware, PJM has an
23 economic dispatch system, and the philosophy behind that is
24 generating electricity from the least-cost alternative. And
25 as I am aware, that is the stated philosophy of the electric

1 utility, to go to the least expensive alternative.

2 If your question relates to actually I have looked
3 in to the operation of the electric utility and are they
4 doing it? I would say "No."

5 BY MR. HALLIGAN: (Resuming)

6 Q You have not?

7 A No.

8 Q So philosophically, at least, you believe this
9 would be good business policy where the economic dispatch
10 system of the interstate power system would prevail, but you
11 have no factual evidence that you used in your research
12 precisely on that matter?

13 A Yes. My experience is not at hand. I do not have
14 a stated policy, but based on economic logic. And that is
15 what I conclude.

16 Q Yes. But it was not based on actual technical
17 reports that said, "In each and every instance this
18 particular fuel was used in this particular plant," and so
19 on, there is no report to that effect that you were -- that
20 you studied to come to your assumptions on -- to come to
21 your conclusions?

22 A I have seen some reports by different electric
23 utilities, and it seems they use low-operating-cost units
24 more often, particularly for base load. And those are my
25 bases of this conclusion.

1 Q But the NRC itself does not evaluate actual
2 reports of the companies that prove conclusively certain
3 fuel was used to generate power at a certain time? That is
4 not part of your analysis, apparently.

5 A No, I have not evaluated the day-to-day operation
6 of the electric utilities.

7 Q Okay. Thank you. On page 6, item 9, Doctor, you
8 assume that Susquehanna units will be operated at average
9 capacity of 60 percent. In any of your research in
10 compiling your findings in this case, have you analyzed the
11 effect on production of electricity that could be affected
12 by orders from the NRC concerning the cutback of production
13 at a nuclear reactor for health or safety reasons?

14 MR. CUTCHIN: Mr. Chairman, I am going to object
15 to this question and this line of questioning, in that we
16 are going so far afield from challenging the credit for use
17 of higher-cost fuels should the plant not be licensed that I
18 do not think it is helping this record one iota on the
19 subject matter of this Contention.

20 MR. HALLIGAN: Mr. Chairman, I am not talking
21 about the fuel at all.

22 MR. CUTCHIN: That is my point, Mr. Chairman.

23 MR. HALLIGAN: We are talking about just trying --

24 CHAIRMAN GLEASON: Someone sometime should let the
25 chairman of this Board say something.

1 (Laughter.)

2 I assume he is asking the question whether there
3 has been any consideration of any factors he has used, any
4 capacity he has used whether that includes down time as a
5 result of actions emanating from the Nuclear Regulatory
6 Commission. It may seem like a specious question, but it is
7 something that can logically be asked within the context of
8 his statement. So please respond.

9 THE WITNESS: Okay, sir. Thank you, sir.

10 We have tried to make a projection in history of
11 what will be the average capacity factor of Susquehanna.
12 Our bases are based on this historical performance of
13 average nuclear reactors. So if you see we have the third
14 reference, we say the statistical analysis of powerplant
15 capacity factors since 1979. So I have referred to that
16 report, which has about 70 nuclear plants, and taken their
17 history operating from ten to fifteen years.

18 The second basis of coming to this conclusion was
19 the Book of Licensed Operating Reactors Summary Report.

20 So from these two studies, which have considered
21 those kind of things which you have mentioned, I have taken
22 the lowest projection of the capacity factor, which is 60
23 percent in this case.

24 BY MR. HALLIGAN: (Resuming)

25 Q In this analysis did you segregate out General

1 Electric-manufactured boiling water reactors and average
2 their down time and so forth, or did you average it out
3 including Westinghouse and B&W reactors and GE together? In
4 other words, the big difference in the manufacturing design
5 and so on, did you restrict it to plants that would be of
6 similar size and design of Berwick to get your 60 percent
7 figure?

8 A Yes. The literature which I have quoted here that
9 is specifically referred to boiling water reactor of a size
10 which we are concerned here, and they have concluded that
11 size has no effect on the capacity factor.

12 Q All right. The down time for maintenance or
13 emergency repair or whatever is one element. But there are
14 instances, and probably will be more in the future, where
15 the NRC may order reactors to cut power in half because of
16 generic problems or other reasons that do not specifically
17 -- in other words, they do not directly relate to a leak or
18 accident in that reactor but ones like that have developed a
19 problem. And this is occurring among, I believe,
20 Westinghouse reactors but it could possibly occur among
21 General Electric reactors. Even brand-new ones might be
22 ordered to cut power in half while long-term testing or
23 retrofitting is taking place.

24 Was that factored in in any of your estimations?

25 A The kind of cut you have mentioned, I do not know

1 how long they can stay. It is very difficult at this time
2 to stipulate if this would be for the 30-year life or just a
3 couple of years.

4 CHAIRMAN GLEASON: Mr. Halligan, I do think this
5 last question is getting pretty far afield. He cannot look
6 into the future any more than you can. He has given his
7 testimony. He has put his conclusion in. I think you
8 should go on.

9 MR. HALLIGAN: Well, I will.

10 BY MR. HALLIGAN: (Resuming)

11 Q But I believe the NRC has already ordered in the
12 past, in its actual past history, reactors to cut power
13 substantially for a variety of reasons. So it is not
14 theoretical. They have done this. They have the power to
15 do it. And I was wondering if that was factored in, the
16 past performance of the NRC ordering private utilities to
17 cut back, because they have that authority to do it.

18 CHAIRMAN GLEASON: Mr. Halligan --

19 BY MR. HALLIGAN: (Resuming)

20 Q Was that --

21 CHAIRMAN GLEASON: The witness has testified as to
22 what his capacity factor is based on. I suggest you go on
23 to your other questions.

24 MR. HALLIGAN: All right. It is still not clear
25 to me, but I will go on to the final questions.

1 BY MR. HALLIGAN: (Resuming)

2 Q Now, it appears that page 7 has been stricken, or
3 do I have -- is page 7 part of the -- I am missing a page
4 7.

5 CHAIRMAN GLEASON: You do not have a page 7?

6 MR. HALLIGAN: I have it in the original one.

7 MR. CUTCHIN: Page 7 in the original and the
8 redistributed is the same. Nothing has been stricken.

9 MR. HALLIGAN: Fine. Back on track here.

10 BY MR. HALLIGAN: (Resuming)

11 Q You say in item number 9, Doctor -- I have three
12 sets of testimony here and not one of them is identical. At
13 the bottom of page 6 you say, "Additional savings would be
14 expected to" -- at the top of page 7 -- "occur over a period
15 of 30 years." And further on, you allude to the fact that
16 there will be an escalation -- escalation was assumed for
17 coal and nuclear power.

18 What do you base your idea on for the escalation
19 of coal?

20 A When we are talking about escalation, there are
21 two factors which increases the cost of anything. One is
22 the real cost, real cost of production. One is the
23 inflation rate.

24 In this case there is another factor. In the case
25 of coal, I mean. It is transportation cost. All these

1 things have been mixed, and we have come up with one rate of
2 escalation peculiar to coal. And I have driven my
3 projection based on the Data Resource, Incorporated energy
4 forecasting model.

5 Q And this coal model projection, which was averaged
6 out, does it assume that there will be a continuing level of
7 inflation for the next 30 years, or is there some other way
8 of adjusting that?

9 A No. I have been optimistic. I am saying only 8
10 percent will be inflation escalation rate, which even today,
11 last year coal escalated at a rate of 12 percent. So I am
12 optimistic on that.

13 Q You are saying it will go up, though, 8 percent
14 each year for the next 30 years?

15 A That is true.

16 Q Did you take into consideration the rapid and
17 widespread increase in coal mining, especially in a coal
18 mining state like Pennsylvania?

19 A Yes. That model has taken into consideration the
20 reserve capacity of the entire U.S.

21 Q And there was nothing in your findings that would
22 indicate that the price of coal may taper off or actually
23 decline during that 30-year period?

24 A Well, as I mentioned to you, there are three
25 factors. One is the actual cost of mining. The second

1 factor is as you deplete the mine the cost goes up. And
2 third is the transportation cost. And as we are aware, cost
3 of transportation has gone up faster than any other cost
4 right now.

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1 Q Are you aware here in Pennsylvania, where this
2 license is going to -- where the plant is going to operate,
3 the government is -- has been and plans to further subsidize
4 the transportation of coal to override this problem, to
5 solve the high cost of transportation? Were you aware of
6 this?

7 A No, I am not.

8 Q Also on page 7, item 10, you analyzed a report by
9 the Department of Energy, the power supply study which you
10 mention here. And you say it is estimated -- excuse me.
11 Its estimated replacement fuel cost for Susquehanna Unit 1
12 in 1982 is \$13.5 million. Susquehanna 1 will not be
13 operated in 1982.

14 MR. CUTCHIN: Is that testimony, Mr. Chairman, or
15 a question?

16 MR. HALLIGAN: Well, it is in his testimony, and
17 the question is why did he put that particular year in
18 there.

19 CHAIRMAN GLEASON: Why did you use the year 1982,
20 Dr. Prasad?

21 THE WITNESS: That is what I was aware, that this
22 unit was going into operation in 1982. But it does not make
23 that much difference if you go -- you have to follow the
24 same calculation, and what will happen is that you escalate
25 each factor by a certain rate. So the saving may be even

1 higher than what is shown here.

2 BY MR. HALLIGAN: (Resuming)

3 Q Well, the -- is this the first year you have
4 calculated fuel costs for Susquehanna unit, in 1982? Was
5 that the first year of a 30-year period?

6 A Clarification, sir. You are referring to item
7 10?

8 Q Yes.

9 A In this report?

10 Q Yes.

11 A Yes. This is '82.

12 Q So you would project that 30 years from 1982.
13 When did you prepare this study or analysis? Was it this
14 year or last year?

15 MR. SILBERG: Which study and analysis.

16 BY MR. HALLIGAN: (Resuming)

17 Q Your testimony, when did you prepare this
18 testimony?

19 A You mean the whole thing or item 10?

20 Q Well, in general, the entire testimony. I assume
21 it was all done at the same time.

22 A I would say -- a few months ago.

23 Q A few months ago, and you were under the
24 impression that the Berwick reactor Unit 1 would start in
25 1982?

1 A Yes, I would say that, because as I mentioned to
2 you, sir, that it does not make much difference, because
3 what you are doing, you are calculating the cost at one
4 point in time. If you bring the same calculation to 1983,
5 the only difference is you escalate it at a different rate.

6 Like if you recollect, in the FES we have all the
7 costs in terms of 1980 dollars.

8 Q Further on in item 10, you say: "My analysis
9 assumes unusually low energy demand on the PJM
10 interchange." This assumption of unusually low demand,
11 could you describe or, you know, what is the basis for your
12 assumption?

13 A As I mentioned to you, we are trying to show a
14 worst case scenario. That is what I am saying. Even if the
15 demand of PJM goes lower by about 43 percent, and in that
16 case PJM will have -- the only alternative to them was a
17 coal-fired unit.

18 Q Does this demand on the PJM assume that there
19 would be some growth factor, however, or the demand would be
20 increasing, even though at a low rate? Did you consider the
21 alternative that all of the utilities in this power pool
22 would be suffering from energy loss of demand in the years
23 ahead? To me that would be the worst case scenario.

24 A Sir, I am not even considering demand. I am
25 saying there is a negative demand of 43 percent given from

1 what today is there. I am saying if it goes down 43
2 percent.

3 Q 43 percent of what?

4 A Of today's demand.

5 Q All right. Did you take into consideration in
6 your analysis the added cost of transporting this power, the
7 transmission cost?

8 A I think your question is not clear to me.

9 CHAIRMAN GLEASON: He has already answered that
10 question, Mr. Halligan. He has assumed delivery at the site
11 and that is his comparison. That includes all costs related
12 to getting it there.

13 BY MR. HALLIGAN: (Resuming)

14 Q Did you consider, though, the transportation or
15 the transmission in particular?

16 A You mean transmission costs?

17 Q Yes.

18 A That is there.

19 Q And in your analysis in connection with the final
20 safety impact statement, the safety report, did you come
21 across a document known as the Energy Park transmission
22 study of 1974?

23 A No, I do not recollect.

24 Q Are you aware that in the operating license
25 version of the final impact statement there was a change

1 from the impact statement that was prepared on the
2 construction permit dealing with transmission lines?

3 MR. CUTCHIN: Mr. Chairman, I am going to object.
4 I do not see the relevance or the materiality at all of this
5 question.

6 CHAIRMAN GLEASON: What do the transmission lines
7 have to do with this witness?

8 MR. HALLIGAN: Well, it -- the point is, I was
9 wondering first of all if he is aware there was a
10 significant change in the impact statement on transmission
11 power, because I believe when you are talking about uranium
12 and the fuel cycle and the need for power, transmission of
13 that power is a significant cost, especially at the
14 ultra-high voltages that are involved here.

15 BY MR. HALLIGAN: (Resuming)

16 Q I was wondering if he was familiar with this
17 report on the Energy Park and if he analyzed any
18 transmission studies evaluating the costs in comparison with
19 if the plant was not operating.

20 CHAIRMAN GLEASON: Do you understand the
21 question?

22 THE WITNESS: I will try to answer. We are here
23 comparing the costs of generating electricity from the two
24 sources and trying to show if there is any benefit. Whether
25 the electricity is generated by nuclear or a coal unit, it

1 will go on the same transmission line. So the cost will
2 cancel, any cost, the worst case scenario; but that would be
3 applicable to both scenarios. So why consider that? You
4 have to cancel that.

5 BY MR. HALLIGAN: (Resuming)

6 Q All right. Final questions deal with the
7 contention -- the alternative of not having operating power
8 from the plant at all. In your analysis have you considered
9 the option of operating one reactor and not operating the
10 other?

11 MR. CUTCHIN: Objection, Mr. Chairman. We are now
12 getting into Parts C and D, I believe.

13 MR. HALLIGAN: No.

14 CHAIRMAN GLEASON: I do not believe so. Go
15 ahead. Objection is overruled. It is denied.

16 THE WITNESS: I want to refer to something here.

17 (Pause.)

18 You see on page 6 I am saying the saving from Unit
19 1, even in the worst case scenario, which is comparing coal
20 versus nuclear, there is a saving of \$30 million. But if
21 you have both units operating, there will be a saving of \$64
22 million. So I am trying to show that the operation of both
23 units will save more money.

24 You can operate one unit if you -- well, let me
25 rephrase it. I am saying if there is any demand and you

1 want to generate it, the generation from nuclear units will
2 be cheaper than from the cheapest unit available to the
3 Applicant.

4 BY MR. HALLIGAN: (Resuming)

5 Q When you say "lower cost," lower cost to whom?
6 Certainly not to the consumer?

7 A Yes.

8 Q Who would the lower costs accrue to?

9 A I assume that if there is a cost saving to the
10 Applicant there is a flow-through to the consumer.

11 Q Have you analyzed any of the PUC tariff requests
12 of recent years by the PP&L?

13 A No, I have not.

14 Q Have they ever asked for a rate reduction for
15 their customers that you know of?

16 A Looking into the history and analysis of the cost
17 of electricity, the cost of electricity has not gone down.
18 What I am trying to say here is you are mixing a lower cost
19 of electricity with a higher cost, and still it is high. It
20 has not gone down as compared to what they have been
21 paying.

22 Q The possibility exists and have you in your study
23 analyzed this possible option where the Applicant might sell
24 one or both reactors to another company or other agency that
25 would generate electricity? Have you considered that, that

1 they might sell one of the two units? How would that affect
2 this in any way? Would it be favorable or unfavorable?

3 A You mean they will give the ownership to some
4 other party?

5 Q Yes. This has happened in a number of other
6 cases, most notably in New York State, where the private
7 company sold one reactor to a state authority and they
8 operate it, and the company was reimbursed for costs. There
9 was a financial settlement which it will take years to
10 develop -- pay off --

11 MR. SILBERG: Mr. Chairman, again we are getting
12 into testimony by the cross-examiner. Is there a question?

13 BY MR. HALLIGAN: (Resuming)

14 Q The question is, did you analyze in your analysis
15 -- put in your analysis any of this possible case, that they
16 would sell one reactor and obviously make a profit or make
17 money on it?

18 CHAIRMAN GLEASON: Just answer yes or no, Dr.
19 Prasad.

20 THE WITNESS: No, sir, I have not considered
21 that.

22 BY MR. HALLIGAN: (Resuming)

23 Q And if one reactor is operating only, for whatever
24 reason, because of maybe one reactor would be shut down
25 because of an accident or other safety matters or they would

1 not need the power, are you saying that they would still
2 economically justify the operation of the one plant, one
3 unit?

4 A My analysis here is concerned with -- I am
5 assuming the operation of the plant. I am not considering
6 if it is shut off, because that is not known to me. But if
7 it is operated and if it generates electricity, there is a
8 saving.

9 MR. HALLIGAN: All right. No further questions,
10 Mr. Chairman.

11 CHAIRMAN GLEASON: All right. Mr. Schultz, do you
12 have questions of this witness?

13 MR. SCHULTZ: I believe I just have one question.

14 BY MR. SCHULTZ:

15 Q Dr. Prasad, in your testimony, if I understand it
16 correctly, you discuss the financial benefit to PP&L
17 customers from the operation of the plant. Now, this is
18 only one factor that the Board should take into
19 consideration in their analysis of the cost-benefit of the
20 plant, is it not?

21 A That is true.

22 MR. SCHULTZ: I have no further questions.

23 CHAIRMAN GLEASON: All right. Any questions on
24 the part of the State?

25 MR. ADLER: No, sir.

1 testimony on 6A, another witness who would sponsor the
2 testimony on 6B, part of the testimony on 6C and contention
3 20. The third witness would sponsor another portion of the
4 testimony on contention 6C.

5 Our presentations are divisible and can be
6 presented separately.

7 CHAIRMAN GLEASON: Would you tell me again how
8 many witnesses you have on 6, please?

9 MR. SILBERG: We have three witnesses on 6, one
10 witness on 6A, another witness on 6B, and two witnesses on
11 6C, one of whom is the witness on 6B.

12 MR. SCHULTZ: Can you name the witnesses?

13 MR. SILBERG: Our witness on 6A is Mr. Scott
14 McCandless. Our witness on 6B is Oren Henderson. And our
15 witnesses on 6C are Oren Henderson and Steve Cantone. Mr.
16 Henderson is also our witness on contention 20.

17 CHAIRMAN GLEASON: You will just have one witness
18 on 20?

19 MR. SILBERG: Yes, sir.

20 CHAIRMAN GLEASON: All right. Can we hear from
21 the staff, please?

22 MR. CUTCHIN: Yes, Mr. Chairman. The staff also
23 is prepared to address contention 6 and 20 separately. Our
24 witnesses on contention 6 will be two in number, and it is
25 our preference to put them on the stand together since there

1 is some overlap of their testimony on one portion of the
2 three parts.

3 CHAIRMAN GLEASON: All right. How about
4 contention 20?

5 MR. CUTCHIN: On contention 20, our witness, we
6 will have one. He will be from FEMA.

7 CHAIRMAN GLEASON: Would you like to identify the
8 witnesses?

9 MR. CUTCHIN: Yes. The two witnesses, Mr. Steve
10 Chesnut from the NRC staff will testify on 6, as will Mr.
11 Bruce Swiren from the Federal Emergency Management Agency.
12 Mr. Swiren will also be our witness on number 20. I believe
13 he pronounces that "Swarren." It is spelled S-w-i-r-e-n.

14

15

16

17

18

19

20

21

22

23

24

25

1 CHAIRMAN GLEASON: All right, could we hear from
2 the Commonwealth, please?

3 MR. ADLER: Yes, sir. The Commonwealth has two
4 sets of testimony on emergency planning. The first is by
5 Margaret Riley from the Bureau of Radiation Protection.

6 CHAIRMAN GLEASON: Are we talking about contention
7 six?

8 MR. ADLER: Ms. Riley will be testifying on
9 contention 6(b) and those portions of contention 20 related
10 to radiological protection aspects of the contention.

11 The second piece of testimony is by four witnesses
12 from the Pennsylvania Emergency Management Agency, Mr.
13 Belser, Mr. Lemison, Mr. Hippert and Mr. Comey. They will
14 be testifying on those aspects of contentions six and 20
15 related to the other emergency management portions of the
16 contention.

17 Since we have divided our testimony in this
18 manner, radiological protection aspects and other emergency
19 management aspects, we would prefer to put the testimony on
20 as written rather than dividing them into contentions six
21 and 20. This was the most logical division of
22 responsibilities in terms of the expertise of our witnesses.

23 CHAIRMAN GLEASON: All right. You lost me when
24 you got into your identification of four witnesses. Who are
25 they and where are they from?

1 MR. ADLER: There are four witnesses from the
2 Pennsylvania Emergency Management Agency, PEMA, and they are
3 Adolph Belser, Kenneth Lemison, Ralph Hippert and John Comey.

4 CHAIRMAN GLEASON: How do you spell the last two
5 names?

6 MR. ADLER: Mr. Hebert spells his name
7 H-i-p-p-e-r-t, and Mr. Comey spells his name C-o-m-e-y.

8 CHAIRMAN GLEASON: All right. The only thing I
9 would suggest to you, Mr. Adler, is that when your witnesses
10 are going from one contention to the other, an
11 identification be made at that point so we try to keep this
12 record clear. If there is a problem on appeal, I am trying
13 to give it as much clarity as we can.

14 MR. ADLER: Yes, sir, I believe that the written
15 testimony clearly denotes which portion of the contentions
16 are being addressed and on which page.

17 CHAIRMAN GLEASON: Fine. All right, what I would
18 suggest then is -- any questions from any of the
19 intervenors? Mr. Schultz?

20 MR. SCHULTZ: You may be going to discuss this. I
21 just wanted to get an idea of the order that the witnesses
22 will be called in. At some point in the day I have some
23 actual other work that I need to get done; legal kind of
24 private practice work, and I would like to be able to get it
25 done and still participate, you know, as much as possible,

1 on these contentions.

2 CHAIRMAN GLEASON: It seems to me -- first of all,
3 what we would like to do is go through the applicant's case
4 on contention six and then follow that up with any cross
5 examination that occurs, and then we will go to the staff's
6 witness, two witnesses on contention six followed by --

7 MR. CUTCHIN: Mr. Chairman, would not the normal
8 order be staff last?

9 CHAIRMAN GLEASON: I meant the state, the state
10 should go second, I'm sorry, on contention six, and then
11 follow that up with cross examination and then the staff. I
12 just cannot tell just how long those things are going to go
13 on.

14 Of course, you have some impediments with respect
15 to this contention, but I just cannot answer you right now.
16 We will just have to proceed and see how it goes. You can
17 communicate your difficulties later on.

18 MR. SCHULTZ: So we will have the applicants on
19 six and then the state on both six and 20?

20 CHAIRMAN GLEASON: I am going to try -- that is
21 the way they would like to put them on, and that does
22 present a problem. Why is it, Mr. Adler, you cannot
23 separate these?

24 (Counsel for the Commonwealth conferring.)

25 MR. ADLER: There would not be too much difficulty

1 in actually tearing the pages apart and separating them.
2 The problem is that we organized our testimony along the
3 lines of radiological protection aspects on the one hand and
4 emergency management aspects on the other, and said that
5 they were the relative areas of expertise of our witnesses.

6 We tried to answer, in Ms. Riley's testimony, all
7 of those aspects of question six and 20 that relate to
8 radiological protection, since she is our health physicist
9 from the Bureau of Radiation Protection, and in the PEMA
10 testimony we attempted to answer the aspects of contention
11 six and 20 related to emergency management, since these are
12 our emergency management witnesses. So it would make more
13 sense to present it in that manner.

14 We have the additional problem that most of our
15 PEMA panel will not be here until tomorrow morning due to
16 duty rosters and so forth, and it would be far more
17 convenient for them to testify tomorrow.

18 CHAIRMAN GLEASON: Then that is going to work out
19 all right for tomorrow for Mr. Schultz's problem, because he
20 is -- his concern is really contention 20. If your
21 witnesses are not going to be here until tomorrow, why then
22 that protects him at least as far as this afternoon is
23 concerned.

24 MR. ADLER: I believe so.

25 CHAIRMAN GLEASON: All right, Mr. Schultz?

1 MR. SCHULTZ: That is a step in the right
2 direction. Is Riley here? Is she going to testify today,
3 do you know?

4 CHAIRMAN GLEASON: She is on contention six and 20.

5 MR. SCHULTZ: And 20.

6 MR. ADLER: We hope to have her testify today. I
7 do not know if we will get to her. She will be available
8 tomorrow as well.

9 CHAIRMAN GLEASON: That should be no problem. All
10 right. We will make sure we protect your rights, Mr.
11 Schultz.

12 MR. HALLIGAN: Mr. Chairman, could you briefly
13 reiterate who can cross examine among the intervenors on
14 each of these two contentions dealing with evacuation, to
15 verify it for the record?

16 CHAIRMAN GLEASON: I think by prior order the
17 Board have barred the SEA organization from participating in
18 contention six.

19 MR. SILBERG: Excuse me, Mr. Chairman, the Board's
20 order of July 7, 1981 entitled Memorandum and Order on
21 Pending Motions and Requests states --

22 CHAIRMAN GLEASON: Am I incorrect in what I have
23 just said?

24 MR. SILBERG: In part, yes.

25 CHAIRMAN GLEASON: Where am I incorrect?

1 MR. SILBERG: I can summarize best by just quoting
2 the order. It says, "The Board orders herein that SEA will
3 be prohibited from participating in the forthcoming hearings
4 on those emergency evacuation planning issues encompassed in
5 contention six; however, the Board will require the ..." and
6 so forth. This ruling will also have the effect of
7 eliminating -- excuse me -- SEA's participation in any
8 evacuation issues in contention 20. So it is out of both
9 six and 20.

10 CHAIRMAN GLEASON: You just did not permit me to
11 go far enough.

12 MR. SILBERG: I apologize.

13 CHAIRMAN GLEASON: With respect to contention 20,
14 SEA is also barred on any questions relating to evacuation
15 aspects of the contention. I believe that by prior order,
16 ECNP is also barred from participating in contention -- both
17 the contentions, and so where that leaves us, Mr. Halligan,
18 is you to carry the ball on contention six, and Mr. Schultz
19 to carry it on contention 20 as far as any cross examination
20 is concerned, with whatever assistance you are prepared to
21 give.

22 MR. HALLIGAN: Thank you, Mr. Chairman. In that
23 case, I best should make this very, very brief statement to
24 clarify this situation before we go any further. It seems
25 the NRC expects to conduct this week what amounts to a final

1 hearing on the emergency evacuation plan for the Berwick
2 reactors. The NRC legal staff on Wednesday, October 14,
3 with the apparent approval of this Board, stated in effect
4 that only those few narrow, explicit questions admitted as
5 contentions concerning the alleged inadequacies of the
6 present, incomplete draft emergency plan submitted for
7 review will be admitted for adjudication. And the NRC
8 claims that there would be no other public review of the
9 plans allowed in the future.

10 It was never the intent nor the expectation of the
11 Citizens Against Nuclear Dangers that their restricted
12 participation would come to the full extent of public
13 participation in the overall review of the emergency
14 evacuation plan for the Berwick Nuclear Power Plant.

15 The Columbia County plan, which in our judgment is
16 a vital link to any emergency evacuation within the ten-mile
17 radius of the PP&L reactors, has not been published or at
18 least, it has been withheld from the public. But we feel
19 that without the Columbia plan there can be no meaningful
20 evaluation by the intervenors. And for that matter, by the
21 public.

22 As the representative from CAND, we will not
23 participate any further in these hearing proceedings on
24 contentions six and 20; we will not be an accessory to any
25 actions that may ensue under the auspices of the NRC

1 concerning contentions six and 20.

2 MR. CUTCHIN: Mr. Chairman, to hopefully be able
3 to clarify the record a little bit, I do not know if it will
4 make any difference at all, but as the Board, I'm sure, well
5 understands, the staff was identifying its position as to
6 the contentions that have been admitted in this proceeding.
7 There was never any statement on my part, nor any contention
8 on my part, to indicate that other avenues of exploring
9 these plants were not available to anyone.

10 Whatever hearings might be held in connection with
11 these plans, outside this proceeding, we have nothing to do
12 with and they would be available to the members of the
13 general public, regardless of what happens at this
14 proceeding.

15 CHAIRMAN GLEASON: Well, --

16 MR. CUTCHIN: The state may well hold hearings on
17 portions of the plan, FEMA may well hold public meetings and
18 the like and will do so, and whatever participation
19 intervenors as private citizens choose to avail themselves
20 of there are separate and apart from the issues that we
21 decided in this proceeding. And I would like the record to
22 reflect that.

23 CHAIRMAN GLEASON: I do not think it should come
24 as any surprise. I'm sure it is not any surprise to the
25 party -- intervenors or any other parties in this case that

1 this hearing is held on the contentions that have been filed
2 by the parties and are not held on anything else, because
3 this Board is not authorized to hear any other subject.

4 The Board has already communicated to the parties
5 of the proceeding that it will have some questions regarding
6 the emergency evacuation plans. It may have questions that
7 will be on the contentions and it may not. But as far as
8 the issues in the proceeding are concerned, those issues are
9 the contentions and we are restricted to having hearings
10 with respect to them by Commission rules.

11 MR. ADLER: Mr. Chairman, excuse me. I would like
12 to clarify further that a public hearing on the emergency
13 plans is planned and, in fact, is required by the
14 regulations prior to plant operation, and will occur.
15 Further, the Columbia County plan is in a similar state of
16 development as the Luzerne plan has been. It has been
17 served on all the parties to this proceeding, it has been
18 made available to all the municipalities and is, in fact,
19 equally available as the Luzerne plan.

20 CHAIRMAN GLEASON: I know. It has been given to
21 members of the Board.

22 MR. SILBERG: By letter of September 11 to the
23 Board with copies to all the parties, the Columbia County
24 plan was served on everyone in this proceeding.

25 CHAIRMAN GLEASON: The hearings you are referring

1 to, Mr. Adler, are which hearings? The state hearings?

2 (Counsel for the Commonwealth conferring.)

3 MR. CUTCHIN: Mr. Chairman, I might add some
4 clarify there. It is 44 Code of Federal Regulations, 350,
5 as I understand it, calls for a public hearing on those
6 portions of the hearing. If the state does not hold them,
7 then FEMA will.

8 CHAIRMAN GLEASON: FEMA will. That is what I
9 thought. I wondered if these were hearings authorized by
10 the state.

11 MR. ADLER: No, they are required by federal
12 regulations.

13 CHAIRMAN GLEASON: All right, let us proceed
14 please. It is time now to take a brief recess, so let's
15 come back in 15 minutes.

16 (A short recess was taken.)

17

18

19

20

21

22

23

24

25

1 CHAIRMAN GLEASON: Shall we proceed, please.

2 MR. SILBERG: I would ask Mr. Scott McCandless to
3 take the witness stand and be sworn in.

4 Whereupon,

5 SCOTT McCANDLESS,

6 called as a witness by counsel for Applicants, having first
7 been duly sworn by the Chairman, was examined and testified
8 as follows:

9 DIRECT EXAMINATION

10 BY MR. SILBERG:

11 Q Mr. McCandless, I am showing you a two-page
12 document. On the top of the first page it states "Scott T.
13 McCandless." Is this document a statement of your
14 professional and technical qualifications?

15 A Yes, it is.

16 Q Is it true and correct to the best of your
17 knowledge and belief?

18 A Yes, it is.

19 Q And do you adopt it as a statement of your
20 professional qualifications for this proceeding?

21 A Yes, I do.

22 MR. SILBERG: Mr. Chairman, I am handing the
23 document just identified to the reporter. I would request
24 that it be included in the transcript at this point as if
25 read, as Mr. McCandless' technical qualifications.

1 CHAIRMAN GLEASON: Is there objection?

2 (No response.)

3 CHAIRMAN GLEASON: The document will be included
4 in the record as if read.

5 (The document referred to, the statement of
6 qualifications of Mr. McCandless, follows:)

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

(2)
10/20

SCOTT T. McCANDLESS

Education

B.S. Civil Engineering, Worcester Polytechnic Institute, 1971
M.U.A. Urban Affairs, Boston University, 1973
Highway Capacity Workshop Certificate, The Traffic Institute Northwestern University 1974
Adjunct Assistant Professor, Environmental Planning, W.P.I., 1975

Summary of Experience

Mr. McCandless has extensive experience in environmental and emergency planning and management. He has served as project manager or principal investigator for a wide variety of environmental studies and training programs. He has been directly involved in technical studies for urban mixed use developments, transportation projects, and energy development projects. He has worked on emergency planning studies for eight nuclear power plants.

Professional Experience

1978 - Present HMM Associates; principal and project manager. Performing environmental impact studies, emergency planning studies, and permitting analyses. Projects have included management of state EIRs and federal EISs for several urban developments in Boston, including the first to be performed under comprehensive new regulations, Massachusetts Environmental Policy Act and the largest urban commercial development ever proposed for New England. Mr. McCandless has also directed projects with emphasis on noise, air quality and transportation considerations.

Other projects have included emergency planning for several nuclear power stations. For five major nuclear power stations, Mr. McCandless has been project manager for evacuation study reports compiled for submission to NRC.

1972-1978 Environmental Research & Technology, Inc. (ERT). In his most recent position he served as manager of the Environmental Planning Division. In this position, he served as both a senior project manager and as administrative head of a multidisciplinary division of environmental professionals including specialists in acoustics, air quality, archaeology, economics, geology, landscape architecture, planning, socio-economics and transportation planning. During his tenure at ERT, Mr. McCandless was project manager for more than twenty different environmental studies.

SCOTT T. McCANDLESS

Among them were the EIS for the SHERCO coal-fired power plant in Minnesota the EIA for POD 3 of the New Town at Battery Park City in Manhattan, an Environmental Assessment for the Columbia Green Springs SNG plant feedstock allocation, Air Quality Studies for several Washington METRO System EIS efforts, and an Environmental Reconnaissance for an ethylene plant site for the Mobil Chemical Company.

1971-1972 Needles, Tammen & Bergendoff, Staff Planner. Prepared the Route 2 EIS and the Land Use Plan for the Manchester, NH Airport Master Plan.

1969-1971 Robinson & Fox, Staff Planner. Prepared tenant selection and Management Plans for proposed MHFA funded housing development in Worcester, MA.

Professional Affiliations

Member, American Society of Planning Officials

1 BY MR. SILBERG: (Resuming)

2 Q Mr. McCandless, I am handing you a document
3 entitled "Applicant's Testimony of Scott T. McCandless on
4 Contention 6A." Is this a document which was prepared by
5 you or under your direct supervision and control?

6 A Yes, it is.

7 Q Are there any corrections that you would make to
8 this document?

9 A There is one correction on page 11 in the first
10 full paragraph on the page. The sentence that begins with
11 "Maximum predicted ten-mile evacuation times" has been
12 amended. It now reads as follows: "Maximum predicted
13 ten-mile evacuation times increased from six hours or less
14 to less than nine hours."

15 Q In other words, the change you made is from nine
16 hours or less to less than nine hours; is that correct?

17 A That is correct.

18 Q And with that correction is the testimony true and
19 correct to the best of your knowledge and belief?

20 A Yes, it is.

21 MR. SILBERG: Mr. Chairman, I am handing a copy of
22 the document just identified to the reporter. I would note
23 that the change that Mr. McCandless has indicated has been
24 corrected in the version that has been provided to the
25 reporter. I would ask that the document so identified and

1 corrected be included in the transcript at this point as if
2 read as Mr. McCandless' testimony on contention 6A.

3 CHAIRMAN GLEASON: Is there objection?

4 (No response.)

5 Hearing none, the document will be bound into the
6 record as the testimony of Mr. McCandless.

7 (The document referred to, the written testimony
8 of Mr. McCandless on Contention 6A, follows:)

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

3
10/20

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
PENNSYLVANIA POWER & LIGHT COMPANY)	
)	
and)	Docket Nos. 50-387
)	50-388
ALLEGHENY ELECTRIC COOPERATIVE, INC.)	
)	
(Susquehanna Steam Electric Station,)	
Units 1 and 2))	

APPLICANTS' TESTIMONY OF
SCOTT T. McCANDLESS
ON CONTENTION 6(a)

September 29, 1981

EVACUATION TIME ESTIMATE
TESTIMONY OF
SCOTT T. McCANDLESS

HMM Document No. 81-284B

September 18, 1981

Prepared for:

PENNSYLVANIA POWER & LIGHT COMPANY
SUSQUEHANNA STEAM ELECTRIC STATION

Prepared by:

HMM ASSOCIATES
255 Bear Hill Road
Waltham, Massachusetts 02154

1. INTRODUCTION

My name is Scott McCandless. I am Vice President and a co-founder of HMM Associates, Inc., of Waltham, Massachusetts. HMM is a consulting firm that specializes in environmental and emergency planning studies. The firm has been actively involved in emergency planning for the nuclear industry since it was founded three and one-half years ago. To date, HMM has compiled evacuation time estimate studies for 14 nuclear power plant sites in various parts of the country. I have directed seven of these studies over the past three years. In addition, I have worked on related studies for local emergency response and traffic control issues.

2. SITE LOCATION AND STUDY BOUNDARIES

The Susquehanna Steam Electric Station is located in Salem Township, in Luzerne County, Pennsylvania. It is about one-half mile from the northern bank of the Susquehanna River. The plume exposure emergency planning zone (EPZ) boundaries for the Station cover portions of two counties within about 10 miles of the Station. These are Luzerne County and Columbia County. A total of 27 municipalities (townships, boroughs, and a city) are located partially or entirely within the EPZ boundaries.

Figure 1-1 shows the location of the Station and the boundaries of the EPZ in relationship to the Susquehanna River, nearby municipality boundaries and county boundaries. The evacuation studies performed by HMM investigated the time required to evacuate both the entire EPZ, and nine selected sub-areas within the EPZ, under a wide variety of circumstances.



FIGURE 1-1 - MAP OF EFZ

3. GENERAL ASSUMPTIONS AND METHODOLOGY

The evacuation time estimates compiled by HMM are based upon computer simulation modeling of several evacuation scenarios recommended in Appendix 4 to NUREG-0654/FEMA-REP-1 Rev. 1 Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, November 1980. The model used by HMM is the NETVAC model which simulates the movement of evacuating vehicles over a predetermined highway evacuation network. NETVAC is a state-of-the-art computer evaluation simulation model developed by Professor Yosef Sheffi of the M.I.T. Center for Transportation Studies and HMM. The NETVAC model has previously been used by HMM to estimate evacuation times for eight nuclear power plant sites. The model is a dynamic network model which accounts for traffic congestion on the evacuation network, and for route choices by the operators of the evacuating vehicles. Traffic capacities of the streets and highways in the evacuation network are calculated based upon algorithms taken from the Highway Capacity Manual (Highway Research Board Special Report 87, 1965). The NETVAC model has been validated by comparison to field data and by comparison to the Federal Highway Administration NETSIM model.

To apply the NETVAC model to evacuation scenarios within the Susquehanna Station EPZ, HMM staff collected and analyzed a considerable amount of population and highway network data. Best available input data were collected from census records and from the State and County emergency management personnel, who have detailed knowledge of the EPZ, and are responsible for implementing any required emergency response actions. The best available data were supplemented by field survey work undertaken by HMM staff. Where key assumptions were required for evacuation modeling, HMM conferred with the local officials. The following are key data elements and assumptions incorporated in the HMM studies. Population numbers are summarized in Table 1-1.

TABLE 1-1

SUMMARY OF POPULATION TO BE EVACUATED

	<u>Day</u>	<u>Night</u>	<u>Weekend</u>
Permanent Population	71,511	71,511	71,511
School Students	15,587	- -	- -
Employees	6,458	1,208	1,525
Recreational Transients	2,220	120	2,220
Hospital & Nursing Home Patients	509	509	509

- During the evacuation time estimate studies, HMM calculated the time required to evacuate all permanent residents of the EPZ. The permanent population data were taken from the 1980 U.S. Census summaries. In total, the EPZ is estimated to have a permanent resident population of 71,511.

- The evacuation time estimates also included consideration of the time required to evacuate transient population from the EPZ. Transient population, including workers at the Susquehanna site, included a maximum estimated 6458 employees at major employment centers within the EPZ, and a maximum of 2,220 visitors to recreational facilities within the EPZ. The numbers and distribution of transient population were derived by a phone survey undertaken by HMM.

- The evacuation time estimates included the time required to evacuate special facilities within the EPZ. Special facilities included schools, with a total enrollment of 15,587 students, and hospitals and nursing homes with peak patronage of 509 persons. Descriptions of the special facility population were taken from the County emergency response plans and verified by telephone with institutions concerned.

- The evacuation time estimates included consideration of the non-auto-owning population within the EPZ. HMM estimated a total of 9679 people in the EPZ may be members of non-auto-owning households. The estimate is based upon 1970 and 1980 U.S. Census data. Evacuation time estimates for this population group are based upon evacuation by buses to be provided by the County and municipal emergency planners.

- The highway network to be used during an evacuation was defined by HMM based upon routings and instructions in the State, County, and municipal emergency response plans. The network was reviewed by PEMA staff for consistency with evacuation implementation plans. The capacities of the roadways in the network within the evacuation network were determined by the NETVAC model. The model calculations are based upon physical descriptions of the network that were compiled by HMM through field surveys of each roadway link and intersection in the network.
- Evacuation mobilization and preparation times were assumed based on discussions with county officials. It was assumed that the first departures would take place 30 minutes after the initial alert is given. It was assumed that employee departures from the work places would take place over the next 30 to 90 minutes. Permanent and transient population departures were distributed over a 120-minute period beginning 30 minutes after the order to evacuate. School departures are assumed to start 90 minutes after the order to evacuate is given. These departures were staggered to approximate a statistical distribution of departure times.

4. ESTIMATED EVACUATION TIMES

Evacuation time estimates were made for three time periods for the entire EPZ and for each of the nine subareas within the EPZ. The principal time period is the normal weekday. In addition, HMM simulated evacuations representative of a night evacuation and an evacuation during a weekend. The normal weekday case evacuation was modeled with one or more family member in each residence; children in school; work places fully staffed; and recreational facilities at peak use. The night scenario postulated that all permanent residents are at home; schools are empty; work places are staffed with night shift; and recreational facilities are at overnight attendance levels. The weekend scenario assumed at least one family member in each residence; schools empty; recreational facilities at peak capacity; and work places at weekend shift levels.

For both the entire EPZ and for each of the nine subareas, the normal weekday evacuation was more time consuming than the night or weekend evacuation. HMM calculated that the areas within 5 miles of Susquehanna Station could be evacuated in about four hours during the day, and in less than three hours during the weekend or night cases. HMM calculated that areas within 10 miles of the Station could be evacuated in about six hours or less during the day, and in five hours or less during the weekend or night cases.

Evacuation of the plant site itself is the limiting factor for the 5-mile evacuation time estimates. This is the case since the peak construction employment level of 2650 workers was assumed for the normal weekday cases. It should be noted that the normal employment level when both units are operational is 650 workers. At the lower employment level, 5-mile evacuations are estimated to be an hour shorter.

For the 10-mile cases, the evacuation of the high-density population areas, together with the evacuation of the plant site, determines the duration of the evacuation. The

high-density population area in the northwest quadrant is Berwick; the high-density population area in the northeast quadrant is Nanticoke, which is actually more than 10 miles away from Susquehanna Station, but within the EPZ.

5. EVACUATION DURING ADVERSE WEATHER

At the request of Pennsylvania Power & Light Company, HMM studied several adverse weather evacuation scenarios in addition to the normal weather evacuation scenarios. A total of four adverse weather cases were modeled. The first assumed moderate snow or heavy rainfall. To model this case, HMM reduced calculated highway capacities to 70% of their normal capacity, and imposed a 30-mph maximum speed on evacuating traffic.

Three variations to the initial adverse weather case were hypothesized and modeled, based upon discussions of local adverse weather phenomena with local officials and State Police. The first assumes concurrent precipitation and flooding of the Susquehanna River, which results in inundation of a portion of Route 11. To model this condition, the segment of Route 11 between Shickshinny and West Nanticoke and the small bridge between Shickshinny and Mocanaqua were eliminated from the network in addition to the capacity constraints imposed for all adverse weather scenarios, and a 20 mph speed limit.

The second variation of the adverse weather case involves icing. Icing of Interstate 81 as it passes through Butler Township was modeled, since this stretch of roadway is elevated and often freezes after small amounts of snowfall or rain. The State Police close this roadway segment under these conditions. Accordingly, this link was eliminated and traffic was forced to use alternate routes. Again, a 20 mph speed capacity and 30% reduction in capacities were included also.

The third adverse weather variation involved modeling a winter storm. In this case, after discussions with State Police, it was decided to eliminate portions of Route 93 from the evacuation network, since it becomes virtually impassable a few times each winter for two or three hours, as a result of heavy snowfall. The segments between Route 239 in Nescopeck Township and the Route 80 interchange, and the segment of

Route 93 between L.R. 40010 and A-3770 in the southern part of Sugar Loaf Township were closed for modeling purposes. Traffic was assumed not to travel above 20 mph and roadway capacities were reduced by 30%.

With the primary adverse weather assumptions (70% capacity and 30-mph maximum travel speed) imposed, HMM calculated increases of about 40-50% to evacuate the EP2. The evacuation of areas within 5 miles is estimated to take about six hours, rather than the four during normal weather. Maximum predicted 10-mile evacuation times increase from six hours or less to less than nine hours. For the 5-mile cases, evacuation of traffic from the Susquehanna Station remains the limiting factor; for the 10-mile cases, evacuation of the plant, along with Berwick and Nanticoke, remain the limiting factors.

The adverse weather case variations (flooding, icing, and winter storms) result in increases of 10%, or less, from the primary adverse weather case time estimates. This is due to the 30 mph speed ceiling during the primary adverse weather case, vs. a 20 mph ceiling in the variations. In no case does a route closing result in evacuation time estimates of more than nine hours. The conclusion that can be drawn from the adverse weather scenarios is that it is not the isolated roadway closings and rerouting that have significant effects on evacuation time estimates, but rather the network-wide traffic conditions that result from the poor weather.

6. CONCLUSIONS

The evacuation time estimates compiled for Susquehanna Station are comparable to evacuation time estimates for other nuclear power plant sites that HMM has studied. It is estimated that the EPZ or any of its subareas could be evacuated in less than six hours during normal weather, and in less than nine during the most severe adverse weather conditions modeled. The EPZ appears to present no unusual or unmanageable constraints to an orderly evacuation.

1 BY MR. SILBERG: (Resuming)

2 Q Mr. McCandless, would you please summarize the
3 nature of your investigation and the results which you have
4 reached?

5 A I will try to do that briefly. HMM was hired by
6 PPL to do an evacuation time estimate study pursuant to the
7 requirements of NUREG-0654, Revision 1, Appendix 4.

8 CHAIRMAN GLEASON: Excuse me, Mr. McCandless. I
9 am having trouble hearing. If you could try to speak into
10 that microphone, it would be helpful. And I lost you when
11 you said "HMM was hired"; by the Applicant, to do what?

12 THE WITNESS: An evacuation time estimate study,
13 as required by NUREG-0654, Rev. 1, Appendix 4.

14 We set about doing that evacuation time study
15 using a computer simulation technique to simulate the
16 several types of evacuation scenarios that are suggested by
17 the NUREG. The basis for our study is a model called NETVAC
18 3. It is a model that HMM has used in seven other sites
19 prior to this one to simulate a wide variety of evacuation
20 scenarios.

21 And using the information generated by the
22 computer we were able to estimate a range of evacuation time
23 estimates as required by the NUREG. The model works only
24 with a great deal of input data. Some of the key input data
25 that we used in the modeling included permanent population

1 estimates. Permanent population estimates were taken from
2 the 1980 U.S. Census data for the 27 municipalities in the
3 plume exposure EPZ.

4 We estimated permanent resident population of a
5 little more than 71,000 people. In addition to considering
6 permanent population --

7 CHAIRMAN GLEASON: That is within the EPZ?

8 THE WITNESS: That is correct.

9 CHAIRMAN GLEASON: Thank you.

10 THE WITNESS: In addition to considering permanent
11 population, we considered transient population in the EPZ.
12 We considered transient population, we considered the number
13 of employees of the major employers within the EPZ, and we
14 considered the number of visitors to the major recreational
15 facilities within the EPZ.

16 In addition, we investigated the number of people
17 at special facilities within the EPZ. We categorized
18 children at schools and residents of medical facilities
19 within the EPZ as special facility populations.

20 In order to do the actual evacuation simulations,
21 HMM staff under my direction went out and field surveyed the
22 highway network to be used for the evacuation simulations.
23 The highway network itself was taken from the state and
24 county plans.

25 The network that we used was reviewed with PEMA

1 staff and, following review with PEMA staff of the actual
2 links and intersections within the evacuation network, HMM
3 field crews went out and inspected in the field each
4 intersection and each link within the network and compiled
5 the geographic descriptors that go into calculating the
6 capacities of those roadways to handle traffic during an
7 evacuation.

8 Next we came back and we coded the population
9 information and the highway capacity information input into
10 the computer model. In coding that information, we used
11 auto occupancy factors of three people per automobile in
12 order to estimate the number of automobiles that would be
13 required to evacuate the people from the EPZ. In addition,
14 we used an auto occupancy factor of 1.0 in order to estimate
15 the number of automobiles leaving the major employers and
16 the number of automobiles leaving the medical facilities.

17 In estimating the number of vehicles required to
18 evacuate the schools, we assumed 40 students per bus and
19 calculated the number of buses required to evacuate nearly
20 16,000 students.

21 In combining this information, we came up with ten
22 geographic cases that we considered for the evacuation
23 simulation for modeling purposes. The ten cases are those
24 cases suggested by the NUREG, namely:

25 We considered one two-mile evacuation that

1 involves evacuating all the population within two miles of
2 the nuclear power plant site;

3 Next we considered evacuation of four five-mile
4 sectors surrounding the nuclear power plant site, one in the
5 northeast, one in the southeast, one in the southwest, and
6 one in the northwest;

7 Next we considered four ten-mile evacuation
8 sectors, and again in the northeast, southeast, southwest
9 and northwest sectors;

10 In addition, we simulated evacuations of the
11 entire EPZ simultaneously. For each of the ten cases that I
12 have outlined, we simulated an evacuation during the daytime
13 period, during the evening period, and during a weekend
14 period.

15 In addition to the base normal weather cases that
16 we simulated, we looked at several adverse weather cases for
17 evacuating the EPZ. In the first case, we assumed heavy
18 precipitation, either snow or rain, and we assumed in that
19 case that the capacity of the highway network to handle
20 evacuating traffic would be reduced by 30 percent and we
21 assumed that vehicles would not be able to move at speeds
22 greater than 30 miles per hour.

23 In the second adverse weather case, we assumed
24 flooding of the Susquehanna River. In that case, we assumed
25 that a portion of Route 11 between Shickshinny and West

1 Nanticoke would be eliminated from the network and the
2 traffic would have to use other routes to evacuate the EPZ.
3 In the flooding case we also assumed a speed cap of 20 miles
4 per hour, and the capacity restraints for the base adverse
5 weather case were applied to the rest of the network.

6 The third case that we considered for adverse
7 weather was an icing case. In that we eliminated a portion
8 of Route 81 that was reported as being subject to icing for
9 a couple of hours a couple of times per winter by the state
10 police. Again, we eliminated that. We put a speed cap of
11 20 miles per hour on the network and assumed that alternate
12 routes would be used.

13 The last case under adverse weather that we
14 examined was very heavy winter snowfall case, in addition to
15 the icing problems that we simulated. We simulated closing
16 of two pieces of Route 93 to traffic south of the
17 Susquehanna River and the use of alternate routes in those
18 areas.

19 By way of conclusion, we concluded that during
20 normal weather all of the two and five-mile cases could be
21 evacuated in about four hours or less. We concluded that
22 all the ten-mile cases, including the full evacuation of the
23 EPZ, could be evacuated in six hours or less.

24 With respect to the adverse weather cases, we
25 calculated that all the adverse weather cases could be

1 evacuated in nine hours or less.

2 And we further concluded that the route closures
3 were not a major constraint to restricting evacuation.
4 Rather, it was the capacity lost to the roadways associated
5 with the general adverse weather assumptions.

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1 BY MR. SILBERG: (Resuming)

2 Q Does that conclude your summary?

3 A That concludes my summary.

4 MR. SILBERG: Thank you.

5 The witness is available for questions.

6 CHAIRMAN GLEASON: Do the parties have cross
7 examination? Does the State have questions?

8 MR. ADLER: Yes, we have a few questions.

9 CHAIRMAN GLEASON: Go ahead.

10 CROSS EXAMINATION

11 BY MR. ADLER:

12 Q Mr. McCandless, I have a few questions on the
13 assumptions on pages 6 and 7 of your testimony. On page 6,
14 in the third full paragraph, you refer to schools as one of
15 the special facilities considered in your assumptions. On
16 page 7, in the second paragraph, next-to-the-last sentence,
17 you state that school departures are assumed to start 90
18 minutes after the order to evacuate is given.

19 Can you state the basis for that assumption?

20 A That assumption was discussed with the state and
21 local officials. They concurred in that assumption that it
22 would take 90 minutes to get all the buses required to
23 evacuate the children to the schools. They concurred in the
24 assumption that it would take 30 minutes maximum to load the
25 children onto the buses starting from that 90 minute period

1 into the evacuation.

2 Q Can you identify the state personnel who --

3 A I would have to go to my records and dig out a
4 conversation memorandum on that. I can do that for you at
5 the break, if you like.

6 Q That would be helpful. In your assumptions, did
7 you assume that the individual school districts have
8 evacuation plans in place?

9 A I am not sure I understand the question.

10 Q Are you aware of the fact that individual school
11 districts are -- I will rephrase the question.

12 Are you aware of the fact that individual school
13 districts are required to have emergency plans?

14 A Generally, yes, I am aware of the fact that the
15 reception centers are based on the origin of the people
16 within the EPZ by school district.

17 Q Have you determined whether the individual school
18 plans are, in fact, developed and in place?

19 A That is something outside my area of testimony, I
20 believe. We have not been asked to look into the
21 implementation. We have been asked to simulate an
22 evacuation as is described in the state and county plans,
23 and that is what we have done.

24 Q So in determining your 90-minute assumption, you
25 did not consider whether the school plans have been

1 developed and whether they are necessary to meet that
2 assumption?

3 A No, we did not consider that explicitly.

4 Q Going back to page 6 in the last paragraph, you
5 refer to the "non-auto-owning population." Do you have a
6 similar assumption as to when evacuation would be initiated
7 for that segment of the population?

8 A We have not tried to address that as being a piece
9 of the evacuation that would be undertaken separate from the
10 general evacuation by automobile. What we have done is we
11 have talked with some of the other consultants to PP&L, and
12 we have come to the conclusion that there are more than
13 enough buses to evacuate the school children that we have
14 indicated in the report and that there are in fact surplus
15 buses available such that we would expect that the
16 evacuation of the non-auto-owning population could take
17 place probably like about the same time as the evacuation of
18 the schools.

19 Q Let me review the procedures for both cases for
20 school children and for non-auto-owning population. You
21 need to assume the availability of buses; is that correct?

22 A That is generally correct, yes.

23 Q And then you need to assure that some contact,
24 some prior contact has been made between the evacuation
25 planners and the bus companies?

1 A No, I do not think that is correct with respect to
2 my testimony. Again, I am not in a position that I have
3 been working on developing the implementation plans. My
4 work is based on the assumption that the implementation
5 plans will be implemented as they are described in the state
6 and county plans and through my discussions with EMS.

7 We also have a report that I think PEMA has
8 received, and we have indicated that if in fact the
9 assumption with respect to the availability of buses is
10 incorrect and if in fact there is a second round of trips
11 that are required to pick up non-auto-owning population,
12 that that could add at a maximum an hour and 40 minutes to
13 the evacuation time estimates that I have cited for you.

14 We are fairly optimistic that that will not be
15 necessary. I think the body of literature that exists
16 indicates that very little demand for public transportation
17 has taken place during evacuations. Ordinarily, only a few
18 percent of the population has any demand for public
19 transportation. And we have estimated here that a maximum
20 13.5 percent of the population might have that demand. But
21 we really do not think that demand will exist.

22 Q To reiterate, you have made no assumptions
23 regarding the preparation of plans for obtaining buses for
24 non-auto-owning populations?

25 A That is true. We have not.

1 Q You have merely assumed the availability of the
2 buses?

3 A That is true.

4 (Counsel for the Commonwealth conferring.)

5 MR. ADLER: Thank you very much.

6 CHAIRMAN GLEASON: Is there any other
7 representative of the Intervenor who is authorized to cross
8 examine and wishes to do so?

9 (No response.)

10 Mr. Schultz.

11 MR. SCHULTZ: I would like to.

12 CHAIRMAN GLEASON: Is there any other
13 representative from CAND?

14 (No response.)

15 Well, I think I am going to exercise the
16 prerogative of the Chair here in light of the withdrawal of
17 CAND, and allow some cross examination on the part of the
18 party Intervenor.

19 MR. CUTCHIN: I have no objection to a party
20 Intervenor other than ECND or SEA, in light of the Board's
21 prior rulings. I would respectfully request that there be
22 some basis given other than just the general prerogative,
23 Mr. Chairman, if the Board is going to change its prior
24 ruling, which was for cause.

25 CHAIRMAN GLEASON: It was, as you understand, the

1 emergency plans are matters that are of great concern and
2 great interest to the population in toto. It was clearly
3 the understanding of the Chair and the Board that there
4 would be an Intervenor who would be asking questions with
5 respect to those Contentions that have been raised.

6 That Intervenor has withdrawn, that individual has
7 withdrawn from this proceeding. And so that we do have at
8 least some questions coming from Intervenors. I think it is
9 appropriate, in light of the great interest of the public at
10 large on emergency plans and these Contentions to allow some
11 questioning to take place on the part of the Intervenors.

12 MR. CUTCHIN: I understand that, Mr. Chairman. Of
13 course, we will abide by the ruling of the Chair. I just
14 want the record to reflect that indeed the Board is changing
15 its ruling that SEA is forfeiting for cause, the cause being
16 failure to respond to discovery on evacuation questions.
17 Thank you, Mr. Chairman.

18 CHAIRMAN GLEASON: All right, go ahead, Mr.
19 Schultz.

20 BY MR. SCHULTZ:

21 Q Mr. McCandless, did your study take into account
22 what might be happening outside the 10-mile radius?

23 MR. SILBERG: Excuse me. What do you mean? What
24 might be happening outside?

25 MR. SCHULTZ: I would be glad to specify that.

1 BY MR. SCHULTZ: (Resuming)

2 Q Did your study take into account the fact that
3 many people outside the 10-mile radius may be trying to
4 evacuate at the same time?

5 A We considered that implicitly in the studies that
6 we did. What we did is we calculated the capacities of the
7 roadways and the major exit routes that carry traffic, and
8 we looked at whether there was excess capacity to handle
9 spontaneous evacuation, if you will, at the fringe of t
10 EPZ. We found that Routes 93, 80, 81, 93 going to the
11 south, all had excess capacity and therefore we were not
12 concerned about any spontaneous evacuation.

13 The only area where we have any concern at all
14 about limited capacity and how spontaneous evacuation could
15 affect it was 93 westbound. And in that particular area
16 there is not a dense enough population that I have a concern
17 about spontaneous evacuation discrediting our previous
18 studies.

19 Q Are you aware that there are roughly five times
20 as many people from ten miles to twenty miles away from the
21 plant as there are from zero to ten miles?

22 A I do not think I could say I am explicitly aware
23 of population densities beyond ten miles. But on the other
24 hand, I am aware that we include some areas that are beyond
25 ten miles in the estimates that we have come up with. For

1 instance, there are 13,000 people in Nanticoke, which is
2 about eleven miles from the site center, and we have
3 included those. Likewise, if there were any other densely
4 populated areas at or near the edge of the EPZ, we included
5 them per NRC guidance.

6 So I think we have done what we should have in
7 terms of not excluding any particularly susceptible
8 populations.

9 Q In your time estimates did you factor in the
10 possibility of accidents blocking major highways?

11 A We did not explicitly factor in any potential for
12 accidents, but I think we did so -- we left that out as a
13 consideration, for good reasons. In the literature --
14 namely, the Hans & Sell EPA report, they studied 54
15 evacuations in which over a million people were evacuated,
16 and they found the potential for accidents or impedance to
17 flow was not really an issue. So we did not try to
18 specifically model a case that included an accident in it.

19 However, I think some of the adverse-weather
20 scenario assumptions that we have do provide for reduced
21 capacities. And likewise, I think you should probably
22 realize that the evacuation uses only outbound links, such
23 that if there was any kind of evacuation accident, that I
24 think it could be easily bypassed and there would be no
25 unreasonable delay of evacuation traffic.

1 Q Is it not reasonable to assume that people within
2 the EPZ and certainly some people outside the EPZ, if they
3 heard a report about accident at the plant, would be in fear
4 for their health and safety?

5 A Are you sure that is a question you want to
6 address to me? I think that is outside my area of
7 expertise?

8 CHAIRMAN GLEASON: I think that is outside of his
9 testimony.

10 (Pause.)

11 BY MR. SCHULTZ: (Resuming)

12 Q Well, did you consider in your review of the
13 literature and in this study that you did the differences
14 between evacuation that might occur as a result of a nuclear
15 accident as opposed to other kinds of accidents?

16 A Did I consider that, is that what you are asking?

17 Q Yes.

18 A No, I did not consider it. I do not think there
19 is any data base that I can consider to change any opinions
20 I have on that.

21 (Pause.)

22 Q I do not want you to take this question the wrong
23 way. Do you take into consideration things outside data
24 bases in your study? Do you try to factor in reality in any
25 way?

1 MR. SILBERG: I would object to the form of that
2 question. First of all, it so vague.

3 CHAIRMAN GLEASON: What is the nature of your
4 question, Mr. Schultz?

5 BY MR. SCHULTZ: (Resuming)

6 Q Well, do you -- oh, I will withdraw the question.

7 (Pause.)

8 Is it my understanding or am I correct in
9 understanding that your study was done assuming that these
10 bus companies had been contacted and the plan was kind of in
11 place?

12 MR. SILBERG: Asked and answered. I object. We
13 have been over this.

14 CHAIRMAN GLEASON: He has answered that question.
15 Sustained.

16 (Pause.)

17 MR. SCHULTZ: I have no further questions.

18 CHAIRMAN GLEASON: Does the Staff have any
19 questions?

20 MR. CUTCHIN: Staff has no questions of this
21 witness, Mr. Chairman.

22 BOARD EXAMINATION

23 BY MR. BRIGHT:

24 Q Mr. McCandless, your Table I-1 on page 5 --

25 A Yes.

1 Q -- are school students considered to be part of
2 the population?

3 A Yes, they are. If you added the 71,000 per
4 permanent population together with the 15,587 students, you
5 would have a considerable amount of double counting.

6 Q Well, the reason I ask you this, I want to be sure
7 that we have the proper number of people to be evacuated.
8 So would you say that to get the proper number, that
9 three-day case here, you would essentially subtract the
10 15,587 from 71,511?

11 A Let me see if I can just speak to, a minute, the
12 philosophy we used. We tried to use a very conservative
13 philosophy in estimating evacuation clear times. We were
14 more concerned with the number of vehicles to be evacuated
15 than with the number of people in terms of the number -- in
16 terms of the vehicles' abilities to overtake the roadway
17 system.

18 What we did is we calculated the number of
19 vehicles to remove all the permanent population. We
20 calculated the number of vehicles required to move all the
21 school students, employees, recreational transients, and
22 hospital patients, and used that as the maximum number of
23 vehicles that would be required.

24 In so doing, we engaged in a large amount of
25 double counting. For instance, the school students are

1 permanent residents of the EPZ. Most of the employees, we
2 suspect, are permanent residents. Many of the patients in
3 the medical facilities and many of the recreational
4 transients are members of the permanent population.

5 So if you want to come up with an estimate of peak
6 population, it would not be proper to add the columns.
7 Rather, my estimate would be that the peak population number
8 might be on the order of 75,000.

9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

1 MR. SILBERG: Excuse me.

2 BY ADMINISTRATIVE LAW JUDGE BRIGHT:

3 Q But basically what you studied was the number of
4 vehicles that will hit the road, rather than just bodies?

5 A The bodies will be in the vehicles.

6 ADMINISTRATIVE LAW JUDGE BRIGHT: Thank you.

7 MR. SILBERG: Just to clarify that point, the
8 numbers you used to generate the numbers of vehicles were
9 based upon summing all the different values in the A
10 column?

11 THE WITNESS: That is exactly right.

12 MR. SILBERG: Even though the actual number of
13 people would be much less than that function.

14 THE WITNESS: That is correct.

15 MR. SILBERG: Thank you.

16 BY ADMINISTRATIVE LAW JUDGE PURDOM:

17 Q I notice on page 6 --

18 (Pause.)

19 Q I notice on page 6 you say that the pregnant
20 population data is taken from the 1980 U.S. Census
21 summaries. I understand the plant is going to be in
22 existence for 30 years. Did you take into account any
23 possibility of population growth during that period of
24 time?

25 A We did consider that early in the study. But as

1 we looked at the demographic data for the site, we saw that
2 there was little or no growth, and in fact some of the
3 earlier projections for 1980 were not met. So we deemed it
4 reasonable not to try to project a growth within the EPZ for
5 the purpose of evacuation time estimates.

6 Q I believe the FES shows that one of the counties,
7 perhaps Columbia County, did have a 7 percent growth during
8 the period 1970 to some later time. Would that have skewed
9 your calculations if one of those counties did continue to
10 have that growth?

11 A I suspect not. There are only two areas in which
12 population growth in my estimation would serve to increase
13 any of our time estimates. If there were a population
14 growth in Berwick, we might have some slight increases in
15 the evacuation time estimates for the northwest sector. If
16 there was considerable population growth in Nanticoke, we
17 could conceivably have some slight increases in evacuation
18 time estimates.

19 I think, however, that the conservatism in all our
20 other assumptions more than accounts for any potential
21 growth in population.

22 Q Even if it was on the order of 8 percent in some
23 sectors, some county?

24 A Did you say 8?

25 Q 8.

1 A I think so, because several of our other
2 assumptions I think may overpredict by as much as 30
3 percent. For instance, in our highway capacity calculations
4 the maximum highway capacity that we use for any link was
5 less than 2,000 cars per lane, whereas the Hans & Sell
6 report shows that during evacuation you can get as many as
7 4,000 cars per lane in evacuating traffic and that the
8 average is 2600 cars per lane.

9 So I think in other areas we have more than taken
10 care of any potential for growth as small as 8 percent.

11 Q Now, you describe in your introductory summation
12 and some of the discussion the arrangements for removal of
13 school children in their buses. What about hospitals and
14 nursing homes? How did you anticipate those needs? Would
15 they need special kind of vehicles, and did you assume they
16 would be available?

17 A Again, we did not try to get into implementation
18 problems with respect to the plan, with respect to ensuring
19 that the vehicles would be available. What we did do is we
20 assumed that it would require one vehicle to remove each
21 patient of each of those medical special facilities.
22 Whether that vehicle was an automobile, an ambulance, or any
23 other kind of special transportation would not affect our
24 evacuation time estimates.

25 What we did do with respect to the medical

1 facilities is we assumed a deferred loading for those
2 people. Those people did not start to load until 90 minutes
3 into the evacuation. Three of the four medical facilities
4 took half an hour. Nanticoke State Hospital took longer.

5 Q Was the 90 minutes based on getting the vehicles
6 to the facility or was it making arrangement at some other
7 facility for their disposition once they were moved?

8 A It was the former rather than the latter. We
9 preferred to assume that you would need some amount of time
10 to mobilize the vehicles that would be needed for these
11 special facilities.

12 I am sorry, I just made one mistake in terms of
13 loading distribution. We have three of the four facilities
14 loading from beginning at the end of the second hour for
15 half an hour, and Nanticoke State begins loading at the end
16 of the second at the end of the second hour and continues to
17 load for 90 minutes, not the 90 minutes that I referred to.

18 Q And those evacuations, considering those factors,
19 would still be within this time frame that you discussed in
20 your summarization, the four hours to nine hours?

21 A Most definitely. We have added the vehicles from
22 those special facilities to the general flow.

23 Q I notice in your evacuation time estimate on page
24 8 you have the normal weekday and then you have I guess the
25 nighttime and so on. Is it possible that if you needed to

1 do this at a time when there was a shift change that this
2 would be a time when you might have more vehicles on the
3 road than you would at these other times you hypothesized?

4 A I do not believe that is a major issue in this
5 case. The reason I do not believe it is an issue is because
6 the employment levels are a pretty small portion of the
7 overall population. So it could have some small effect, but
8 not one that would change any other result that we have
9 talked about.

10 Q On page 10 -- and you mentioned this in your
11 summary, too, about the flooding of the river. What level
12 flood was assumed for this? Was this a 100-year flood, the
13 worst flood of record? How did you figure out what part
14 would be flooded?

15 A I would have to go back to my notes to get the
16 exact level. My recollection is that it is the 24-foot
17 stage. We chose that stage based on discussions with the
18 state and county officials.

19 Q Is Route 11 the only route that would be flooded
20 by a flood of that magnitude?

21 A Yes, it is.

22 Q I notice on down below there you mention icing of
23 Interstate 81. Is the weather here such that icing would
24 only be on that route and not on the other routes?

25 A We were advised by the state police that that

1 would be the proper assumption, yes.

2 Q In the adverse weather, I guess you considered
3 snow there in the bottom paragraph. I am not personally
4 familiar with the snowfall in this area. Did you get the
5 record snowfalls?

6 And I guess my concern is, how long after you have
7 a heavy snowfall before the plovs get in there and get the
8 roads open? Was that taken into account?

9 A That was not explicitly considered, no. Again, we
10 relied on the judgment of the state and local officials to
11 determine which routes ought to be eliminated from that
12 case.

13 What I also ought to point out is that our
14 attempts here were to define reasonable adverse weather
15 cases. We made no attempt to define the worst possible
16 weather case, and that was the philosophy that we used. I
17 think these do represent as wide a range of adverse weather
18 cases as I have seen examined in an evacuation study.

19 Q I was just thinking of normal conditions, whatever
20 the normal snowfall is, how long does it take to get the
21 snowfalls out and clear the roads where people could travel,
22 and whether or not that time lag was considered in your
23 model, the same as the time lag for getting the school bus
24 to the school.

25 A I do not think I can say we made an explicit

1 consideration of that. But again, we have distributed the
2 departures over about two and a half hours from the original
3 siren, and we have also cut those capacities down by so much
4 for the adverse weather cases that I think we have
5 implicitly accounted for some time to take care of roadways
6 and for taking longer to get over roadways that are not in
7 condition.

8 Q What about automobiles that might not be equipped
9 with chains or snow tires, that might have difficulty
10 negotiating in an evacuation? Is that part of the
11 assumption in adverse weather conditions?

12 A I think it is safe to say that our assumption of a
13 maximum speed of 20 miles per hour during that situation
14 applies some consideration of that condition, yes.

15 Q What kind of removal would there be for an
16 automobile that did get stuck or stalled?

17 A Again, I am going to have to say, in terms of
18 implementation and facilities I am not the proper witness to
19 try to answer that question.

20 ADMINISTRATIVE LAW JUDGE PURDOM: All right, that
21 is all the questions I have.

22 BY CHAIRMAN GLEASON:

23 Q Mr. McCandless, one of the difficulties that I
24 always have with testimony like this is I guess really
25 understanding the assumptions that you used and the case you

1 have been given to hypothesize, where you have discussed
2 things with officials and where you have not.

3 Could you indicate, incidentally, the other
4 facilities that your company has worked on? Is that an
5 appropriate question? I don't know if it is proprietary
6 information.

7 A No, no, I do not mind sharing that information.
8 We have worked on -- I think Susquehanna is our fourteenth
9 nuclear power plant site. Other sites that we worked on
10 include Seabrook, Pilgrim, Midland, Big Rock, Palisades, St.
11 Lucy, Turkey Point, Browns Ferry, Arkansas Nuclear 1, Grand
12 Gulf, South Texas, Allen's Creek.

13 Q Recently the Commission produced a study on
14 evacuation time estimates at one of their facilities. Did
15 you work on that study?

16 A For the Commission?

17 Q Yes.

18 A That study was done by a fellow at Texas
19 Transportation Institute for NRC. Tom Urbanik I think is
20 the principal author of that study.

21 Q How long have you been engaged in doing this study
22 for the Applicant?

23 A We started this study in June of this year.

24 Q June of this year?

25 A Yes.

1 Q And could you give some kind of a feel as to the
2 number of consultations you had, how many you had with local
3 and state officials?

4 A If local officials include data sources, for
5 instance the proprietors of the special facilities, I would
6 say dozens. We have spoken with operators at each of these
7 special facilities, each of the transient facilities, in
8 order to verify our data base with them. We have spoken
9 with the PEMA people repeatedly. We have spoken with the
10 county officials on several occasions, and our unabridged
11 report has been reviewed and I believe approved by PEMA as
12 well.

13 Q And you have talked with the officials of every
14 municipality within this planning zone?

15 A No, I cannot say that. We have not directly
16 spoken with each municipality.

17 Q Is there a reason why not? I can understand --
18 you know, you can answer you think it is not necessary. But
19 if you are talking about the road network, you have roads
20 impacting all of these jurisdictions and presumably they
21 have some legal responsibility with respect to these roads,
22 even to providing perhaps a policeman to direct traffic.

23 A I think I can answer your question. The why not
24 is because the road network that we were considering was a
25 given to us. The road network had already been developed by

1 PEMA. PEMA had already worked with the county and local
2 people and with the state police. So our consultations came
3 from the state agencies responsible for implementing the
4 evacuation.

5 Q So you assumed the road network. You did not look
6 at any problems in connection with that road network, or did
7 you?

8 A I do not think that is fair to say. What we did
9 is, we started with the assumption that we would use the
10 network that was already specified in the state and county
11 plans. I think one of the things that we did is we sent
12 field crews out to travel on each link and go to each
13 intersection that was in that network, and as a result of
14 doing that fieldwork we did not find any problems with
15 adopting the network as suggested by the state and county
16 officials.

17 Q How about roads that feed into that network,
18 because they are part of that too. Would they have done any
19 piloting, if you will, of that network? In other words, if
20 I have -- without picking any particular highway, if I have
21 a highway that is important to evacuate people in case of a
22 radiological accident and I have about five neighborhoods
23 that have to have people move out of to get on there, how do
24 you determine the adequacy of those secondary roads, if you
25 will?

1 A I am not sure I can answer your question.

2 Q All I am asking -- all the question asks for is,
3 did your people look at that area to see whether there was
4 any problem?

5 A Did we look at whether we thought the road network
6 was a reasonable one?

7 Q Let me -- well, I do not like words like
8 "reasonable" in this context. Let me give a hypothetical
9 situation. I do this just from my own traveling around this
10 area. You have the road that you are going to use, that is
11 going to be used with respect to moving people out of the
12 area. You have three or four roads that are going to feed
13 into that, that have to transport, have to be used by people
14 who live in those areas.

15 Let's suppose that one of those streets has
16 parking on both sides of the street. Now, instead of, you
17 know, what you might have is a two-lane highway, you really
18 have a one-lane highway letting people out. Do your people
19 look at that kind of thing?

20 A Yes, they do.

21 Q Do they go and look at the roads?

22 A Yes, they do. In fact, when our crew goes out to
23 the field to examine the network one of the things that we
24 do look for is whether there is parking on one side, whether
25 there is parking on two sides, where there are obstacles at

1 the side of the roadway that will affect the ability of the
2 roadway to carry vehicle volumes. We look at the presence
3 of traffic controls, such as stop signs and traffic
4 signals.

5 And all that information is entered into the
6 computer modeling exercise.

7 Q And how about availability of security forces to
8 move people, move traffic during this emergency period. Has
9 that been done?

10 A Yes. What we have done in our modeling simulation
11 is take the traffic control locations that are outlined in
12 the state and county plans and assume that those locations
13 will be manned.

14 Q You understand we do not have state and county
15 plans before us most of the time, and we are doing this on
16 the basis of the record -- on the basis of your testimony?

17 A Let me expand a little bit, if I can, on that.
18 With respect to the EPZ, there are either 19 or 20 locations
19 that have been specified as areas within the EPZ where
20 manual control would be applied to the network. We think
21 that is a reasonable number, given the size of the EPZ, and
22 we have modeled the evacuation to have those people in those
23 19 to 20 locations.

24

25

1 Q All right.

2 I believe in response to a previous question you
3 had indicated that you did not assume, because of the lack
4 of heavy employment centers, any particular,
5 out-of-the-ordinary problem with respect to the three
6 different scenarios that you looked at.

7 Have you reviewed -- some areas will have an
8 unusual event during -- you know, all communities have at
9 least one unique event -- a beer lust, a Columbus Day
10 celebration, July 4, and so forth. Have you looked at those
11 happenings or asked for a list of those happenings to see
12 whether that might be a complicating factor, even assuming,
13 you know, your three scenarios, or have you just excluded
14 all of those and said these are the three normal periods?

15 A No, I do not think I would say those are three
16 normal periods. In terms of defining the day case, what we
17 did do is we defined peaks for each of the categories in our
18 population table.

19 We defined peak employment. We defined peak
20 attendance at schools. We defined peak attendance at the
21 medical facilities. We defined peak attendance at the
22 recreational facilities. We defined peak attendance at the
23 colleges. So what we have tried to do is not leave any room
24 for underestimating.

25 In terms of the special events that you are

1 talking about, we considered some and we, for instance,
2 considered a football game.

3 Q A championship football game?

4 A And we considered with the EPZs that we knew of no
5 special event that would change the assumptions in any
6 meaningful way with respect to evacuation potential.

7 Q I guess what I was trying to understand is what is
8 the case for not looking at a worst case scenario, I guess,
9 where you have -- and I would define it as a major event in
10 maximum concentration of traffic coming from schools or
11 picking up kids at school, getting school buses out, people
12 leaving employment centers and so forth, and saying, you
13 know, using Murphy's Law that is one that is going to happen
14 if it happens at all.

15 A I think you have misunderstood my comment in that
16 regard. When I said we were to look at an adverse case I
17 was talking about adverse weather.

18 In terms of defining population we did look at
19 what we considered to be a practical worst case core
20 population. The reason, in my opinion, that NRC does not
21 ask for someone to define a worst case weather scenario is
22 because that is just not a reasonable occasion to try to
23 define, and if you were to do it you could guess at that
24 kind of answer better than you could model it anyway.

25 I do not think that is what NRC is asking us to do.

1 Q I am not sure I understand that.

2 A Let me give you an example, if I can.

3 For the Pilgrim power plant we had the blizzard of
4 '78 and we have the empirical data to show that the roadway
5 networks in that area were closed for couple of days. We
6 know that there is a potential for that, but that was a
7 100-year event and we just do not think that is a reasonable
8 event for planning purposes.

9 We are looking for something that is a reasonable
10 basis for planning, so that the estimates that we have done
11 have some utility to them in terms of being a planning
12 tool. We want the local planners to have some idea of how
13 long it would take so they can consider whether evacuation
14 is a reasonable protective action or whether an alternate
15 effective action ought to be taken.

16 Q I believe you did answer the question on
17 population growth to the effect that there were only several
18 areas that you foresaw as having a growth potential, that
19 they would not disturb your traffic findings.

20 A I think what I said is there are only two areas
21 where growth potential could increase our estimate and that
22 was in the Berwick area and the Nanticoke area. Both of
23 those are already pretty well developed.

24 Q Can you tell me what the highest traffic generator
25 is in the Berwick area?

1 A How do you mean the "highest" -- it is the
2 permanent population.

3 Q You know what I am talking about -- a school.

4 MR. SILBERG: Excuse me. Do you mean --

5 BY CHAIRMAN GLEASON: (Resuming)

6 Q A place of employment. For example, where I come
7 from the University of Maryland is the highest traffic
8 generator, the place where most people come and go from at
9 any place in two counties.

10 MR. SILBERG: Mr. Gleason, are you referring to
11 the whole ten mile zone or just the Berwick area?

12 CHAIRMAN GLEASON: Just Berwick.

13 THE WITNESS: In terms of --

14 CHAIRMAN GLEASON: Just testing his knowledge.

15 THE WITNESS: In terms of the modeling we did, far
16 and away the highest generator for all cases is the power
17 plant itself. We assumed that there would be 2,650 cars
18 leaving the power plant.

19 In terms of other facilities in the area,
20 Wise-Borden and Consolidated Cigar both have day employment
21 levels of about 450, which is a fairly small fraction of the
22 number that we assumed for the power plant. Those would be
23 the two largest other than the power plant.

24 BY CHAIRMAN GLEASON: (resuming)

25 Q I do not know much about the weather in this part

1 of the world, except I know it gets fairly severe at times.
2 And when I was reading over your several cases that you
3 tested, I noted in, I think, all of them you reduced the
4 capacity to seventy percent or you reduced it by thirty
5 percent to seventy percent capacity.

6 And it struck me that that really, and once again
7 I'm going back to my own experiences in the Washington area,
8 when the snow hits there everybody panics. How do you face
9 that as a reasonable assumption? Why do you use that figure
10 rather than fifty percent? -

11 A We have done some literature search along that
12 line to find out if there are technical publications that
13 document reductions in capacity and we found that the
14 literature in that regard is quite limited. We were only
15 able to come up with two references, in fact, that dealt
16 with reductions of capacity associated with adverse weather.

17 One was the Highway Research Report and the other
18 was a report done by Texas Transportation Institute. Both
19 of them dealt with highway capacity reductions associated
20 with heavy rainfall. They estimated reductions in capacity
21 of between 14 and 90 percent.

22 When we made our assumptions we chose to be more
23 conservative than that. We merely doubled the largest
24 documented capacity reductions and on top of that we added
25 speed caps to simulate slower speeds associated with snow

1 and ice.

2 We do not know of any better to simulate adverse
3 weather conditions for the northeast. We do not think there
4 is any better way.

5 Q At least none has been found.

6 A To date, not to the best of my knowledge, no.

7 Q I gather that such questions of availability and
8 evacuation time for students at school in using school buses
9 that you just take the estimates of time that school
10 officials give you and use that.

11 I mean questions like: I do not know. Are there
12 school buses all in a centrally-located place or do the
13 people go and take them home and then come back to take kids
14 away from schools? Do you get into questions like that?
15 That is what I am trying to get at. Is that factored in
16 some way?

17 A In this case we did not get into that
18 specifically. However, another consultant of PPL did and
19 our assumptions are based on a small report that they did
20 based on actual discussions with school officials of how
21 many buses were available, where they were and how long it
22 would take to get them there.

23 So we think that those assumptions are quite well
24 founded.

25 Q I assume he will be coming along as one of these

1 witnesses?

2 MR. SILLERG: The witness that prepared that is to
3 testify. However, that was not within the scope of our
4 testimony. The Contention that is dealt with by this
5 testimony deals specifically with the effects of winding
6 roads in adverse weather conditions, and that is the
7 testimony, that is the issue that this testimony is
8 particularly addressed to.

9 CHAIRMAN GLEASON: That is your definition of that
10 Contention. That is not mine.-

11 MR. CUTCHIN: Well, Mr. Chairman --

12 CHAIRMAN GLEASON: Yes?

13 MR. CUTCHIN: I do not want to interrupt.

14 CHAIRMAN GLEASON: You have, so go ahead.

15 MR. CUTCHIN: I apologize for the interruption,
16 sir. If the Board says that that is not its interpretation,
17 the Staff would appreciate having the Board's interpretation
18 of the Contention, Mr. Chairman.

19 CHAIRMAN GLEASON: Well, the Board does not feel
20 like giving that interpretation at the present moment. All
21 I am saying is that the question of availability of school
22 buses I find within Contention A -- 6-A of the Contention.

23 MR. CUTCHIN: At the risk of incurring the Board's
24 ire, Mr. Chairman, I think that the Staff and the other
25 parties are entitled to know the Board's interpretation of

1 the Contention if they are expected to address it with any
2 degree of efficiency in this hearing and if the Board is
3 broadening the Contention beyond what the interpretation is
4 that has been made by the Staff and the other parties, I
5 believe the Board has the responsibility under recent
6 Commission guidance to state its basis for believing that
7 there are serious issues beyond those raised by the
8 Contention.

9 CHAIRMAN GLEASON: Well, I am not raising, in my
10 opinion, any issues beyond those in the Contention and I am
11 really picking up testimony that is from this witness and if
12 you would like to make a point of it with respect to, you
13 know, some other body, you know, go ahead.

14 But, as indicated, I think it is in within the
15 context of this part of the Contention.

16 MR. CUTCHIN: I have no problem with that, Mr.
17 Chairman. I was just asking for an interpretation.

18 CHAIRMAN GLEASON: All right.

19 Let me ask the lawyer for the Applicant now if
20 when your witness comes along will he have that kind of
21 information that he can supply for the record?

22 MR. SILBERG: Yes, he will.

23 CHAIRMAN GLEASON: All right.

24 MR. ADLER: I may ask the name of that witness.

25 MR. SILBERG: That is Mr. Henderson.

1 MR. ADLER: Thank you.

2 (Board conferring.)

3 CHAIRMAN GLEASON: I presume you will be around
4 after lunch?

5 THE WITNESS: Yes, I will.

6 MR. SILBERG: We will not let him leave.

7 BOARD EXAMINATION

8 BY JUDGE PURDOM:

9 Q In making your estimates on evacuation time,
10 estimating capacities under various adverse weather
11 conditions, have you also considered under the circumstances
12 that prevail you may have, shall I say, a temporary
13 overloading of the capacity? That is, can all the cars and
14 vehicles move at once?

15 And it seems like I have read like in the tunnels
16 going into New York City when they get overloaded they have
17 less capacity than they do if you could stagger the entrance
18 of the cars so that they come to the 100 percent capacity
19 under the conditions prevailing at that time.

20 Do you take anything like that into account?

21 A Absolutely. The NETVAC model is a dynamic network
22 model that provides for spillback and queues and some drive
23 choice in terms of routes. We did, in fact, in our modeling
24 see that there would be congestion that limited the ability
25 to leave at some times in some of the denser populated areas.

1 So yes, we did in fact model that kind of dynamic
2 characteristic.

3 CHAIRMAN GLEASON: All right. We will now take --
4 Mr. Schultz?

5 MR. SCHULTZ: I just have a couple of other
6 questions, if I may be permitted to ask them.

7 CHAIRMAN GLEASON: Make them very brief, Mr.
8 Schultz.

9 CROSS EXAMINATION - Resumed

10 BY MR. SCHULTZ: -

11 Q Did you consider in your model the fact that --
12 the assumption that some parents may go to pick up their
13 children themselves at the school rather than having the
14 children come home on buses?

15 A I think our consideration of that issue was
16 implicit. What we assumed was that the parent's car would
17 leave the home and that the children would leave by bus. I
18 think the fact that some children could be picked up at the
19 school would not appreciably change what we estimated.

20 But again we modeled evacuations per the plans,
21 which in most cases call for those children to be evacuated
22 by bus to the reception centers.

23 Q Is your answer no, then?

24 A Try the question and I will try the answer again.

25 Q Have you considered the assumption that some

1 parents may go to the schools to pick up their children
2 rather than have them, you know, transported by bus?

3 MR. SILBERG: Mr. Chairman, the witness stated
4 that he considered it implicitly and then described the
5 nature of that consideration.

6 CHAIRMAN GLEASON: I think he has answered the
7 question.

8 BY MR. SCHULTZ: (resuming)

9 Q Did you study the -- either or both the actual
10 evacuation at Three Mile Island or the test evacuations at
11 Three Mile Island before you did your report?

12 A Did we study that.

13 Q Did you study that?

14 A In what sense?

15 Q Did you see what happened there? Did you take
16 that into consideration?

17 MR. SILBERG: I am sorry. I am unaware of any
18 test evacuation at Three Mile Island.

19 MR. SCHULTZ: I am sorry. I thought there was an
20 exercise, a test exercise that took place after, you know,
21 sometime after the actual accident.

22

23

24

25

1 MR. SILBERG: Not an evacuation.

2 MR. SCHULTZ: Well, then, whatever exercise took
3 place.

4 MR. SILBERG: If it does not deal with an
5 evacuation, then it is outside the scope of this witness'
6 testimony and the contention.

7 MR. SCHULTZ: That is true. I understood that it
8 deal with evacuation, at least testing the procedures.

9 MR. ADLER: Maybe I can clarify. There was a test
10 exercise of the TMI risk county plans and the state plan and
11 the utility plan on June 2 of this year. It dealt with
12 evacuation, although there was no actual practice
13 evacuation. It did not involve members of the general
14 public.

15 BY MR. SCHULTZ: (Resuming)

16 Q So did you study the results of this test exercise
17 and/or the actual evacuation that took place?

18 A No.

19 Q The last question is do your evacuation time
20 estimates include time necessary for people to travel from
21 their homes over secondary roads to the evacuation road
22 network?

23 A Yes, they do. The way we did that was that we
24 assumed a base period of 15 minutes for people to get the
25 original notification message. We assumed a further base

1 preparation period of 15 minutes. And we further assumed
2 that departures from the place of residence would be
3 distributed over the next two hours. So the answer to your
4 question is yes, we did consider that.

5 MR. SCHULTZ: Thank you.

6 CHAIRMAN GLEASON: We will recess now and come
7 back --

8 MR. ADLER: Mr. Chairman, I have a few follow-on
9 questions.

10 CHAIRMAN GLEASON: Would you mind waiting until
11 after lunch?

12 MR. ADLER: No, not at all.

13 CHAIRMAN GLEASON: Thank you.

14 We will come back at 1:30.

15 (Whereupon, at 12:05 p.m., the hearing was
16 recessed for lunch, to be reconvened at 1:30 p.m., the same
17 day.)

18

19

20

21

22

23

24

25

1 AFTERNOON SESSION

2 (1:33 p.m.)

3 CHAIRMAN GLEASON: All right. Mr. McCandless.

4 Go ahead, Mr. Adler.

5 MR. ADLER: Thank you.

6 Whereupon,

7 SCOTT T. MC CANDLESS

8 the witness on the stand at the time of the noon recess,
9 resumed the stand and was further examined and testified as
10 follows:

11 CROSS EXAMINATION - Resumed

12 BY MR. ADLER:

13 Q Mr. McCandless, my first question is really a
14 point of clarification. I believe you misspoke. You
15 stated, "Traffic control points are included in the state
16 plan." Did you mean to say that they are included in the
17 county plan?

18 A Yes, I did.

19 Q County plans, I should say.

20 A Yes, that is exactly right.

21 Q You referred earlier to an alleged agreement by
22 PEMA officials to your 90-minute estimate for evacuation of
23 schools. Have you been able to verify whether any PEMA
24 representative affirmatively agreed with that figure?

25 A I think -- I did look at the break. I looked at

1 the history behind coming up with the mobilization
2 preparation time, and originally HMM was going to select a
3 30-minute time period to begin loading the buses, but we
4 looked at information that was available in July, which
5 included a previous report by Voorhes Associates for
6 evacuation time estimates, and it also included draft copies
7 of the then available county plans.

8 In each case the Voorhes report and the draft
9 county plans, which have since been superseded, indicated
10 that they thought a 90-minute mobilization and preparation
11 period was more appropriated. We bumped our time up from 30
12 to 60 time frame to the 90 to 120 minute time frame in order
13 to be consistent with that more conservative assumption. We
14 still think that is a little bit more conservative than what
15 we would expect, since we have used much lower numbers
16 elsewhere; but we decided to go along with what we thought
17 was reflective of local judgment at that time.

18 We did not explicitly ask any state officials to
19 review that or agree with that. What we did is we reviewed
20 our entire evacuation time estimate report with PEMA staff
21 on August 20, and we got no comment from them on that 90 to
22 120 minute period.

23 Q Do the existing county plans have any numbers
24 attached to school evacuation?

25 A To the best of my knowledge, no.

1 Q And just to reiterate once more, your knowledge
2 does not include any study of the actual implementation of
3 school evacuation, is that correct?

4 A My personal knowledge does not, that is correct.

5 CHAIRMAN GLEASON: Excuse me. Would you repeat
6 that question again?

7 MR. ADLER: I asked whether his personal knowledge
8 that forms the basis for the 90-minute assumption included
9 any study of the actual implementation of a school
10 evacuation, and the answer was no.

11 That is all that I have. Thank you.

12 BOARD EXAMINATION - Resumed

13 BY CHAIRMAN GLEASON:

14 Q Mr. McCandless, did you in the course of carrying
15 out your responsibilities for the Applicant review and look
16 over the safety evaluation report of the Staff?

17 A The staff of HMM, including myself, looked, I
18 believe, at some limited portions only of that report. I
19 think we looked at population numbers in that report, but
20 that was not a major part of our assignment, no.

21 Q Did you look at the climate, the weather?

22 A If we did so, we did so very briefly.

23 Q Would you, just to educate me, go over once again
24 for me the exercise you performed in evaluating, you know,
25 what I call the -- we had some dialogue before about a worst

1 case scenario. I think you referred to it in terms of
2 looking at it in terms of population, total population
3 within the emergency planning zone, although I am not sure
4 and I want to get that clarified.

5 A Okay. I think our dialogue dealt with two
6 pieces. I would like to break that, if I may, into
7 population on the one hand and weather on the other. I
8 think our population estimates are in fact representative of
9 a worst case population density. I think that is the case
10 because of the substantial double counting involved in our
11 estimates.

12 We have taken peak permanent population, peak
13 student involvement, peak employment levels, peak
14 recreational transience, and peak attendance at the medical
15 facilities and come up with an overestimate due to that
16 double counting of peak population. So I think in terms of
17 worst case we have a worst peak population, in my estimate.

18 Q And in that evaluation you did not feed in, you
19 know, a championship football game or whatever you might
20 call an unusual event which would bring in perhaps a lot of
21 people even outside the population area.

22 A I do not think we explicitly planned for an
23 occasion like that, but I think it is implicit in our
24 numbers. I think you would find that the championship
25 football game that you are talking about would most likely

1 occur on an evening or a weekend. Okay. So that I think
2 our day numbers are already larger than the numbers that
3 would be associated with a football game or other athletic
4 event on a night or weekend occasion during which the
5 evacuation is estimated to proceed much more quickly.

6 If you would like, I could get back to the weather.

7 Q Yes, I would.

8 A Okay. In terms of the weather aspect, what I told
9 you we did is we followed the federal guidance, and that is,
10 we postulated adverse weather cases rather than absolutely
11 worst weather cases. Our reason not to try to postulate an
12 absolute worst weather case is that evacuation very likely
13 would not be the appropriate protective action in an
14 absolute worst weather case. For instance, if we did have a
15 100-year snowfall of five feet, I would assume that the
16 officials responsible for determining whether an evacuation
17 was a feasible action would give that considerable thought
18 and determine most probably that sheltering was a more
19 appropriate protective action.

20 Q Would the same hold true for a tornado?

21 A In terms of determining whether evacuation during
22 a tornado was the appropriate protective action? Yes, I
23 would think it would be incumbent upon the public officials
24 to determine whether there was greater risk associated with
25 trying to evacuate during a tornado than there was

1 sheltering the population. I think that is the nature of
2 emergency planning.

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1 Q Had you finished your commentary on the weather
2 conditions?

3 A Again, unless you have any more specifics that you
4 would like to ask me, yes.

5 Q I asked you a question before the break about the
6 largest traffic generator in Berwick, I believe. And
7 somebody has said to me outside during the break that I
8 should have asked you instead about Nanticoke. So I will
9 now ask you about Nanticoke, if it is all right with the
10 Staff's attorney.

11 A Again, in responding to your question the first
12 time, what I looked at was the list of the major employers
13 in the whole EPZ rather than limiting my answer to Berwick.
14 Most of the major employers, however, are in Berwick. At
15 the risk of repeating the answer I gave you earlier,
16 Pennsylvania Power and Light is the largest employer. What
17 we --

18 Q I wanted to ask you before, is that regular
19 employment that is to take place at the time this reactor is
20 in operation, the two units are in operation? Is that the
21 level then?

22 A It is current employment as determined by
23 telephone survey with the employers.

24 Q Current employed and meaning all the construction
25 workers?

1 A No. I am sorry. With respect to Pennsylvania
2 Power and Light, the 2650 represents peak employment, and
3 that would be operating employment for one unit combined
4 with construction employment for the second unit. So that
5 would be temporary peak employment that would subside in the
6 years to come.

7 To finish the response to the question, Wise
8 Foods, Borden's Foods, Consolidated Cigar, and Berwick
9 Hospital are the three largest of the employment generators
10 that we have listed.

11 Q What would be the largest -- this may not be the
12 precise phrase to use, but it is the only one I am familiar
13 with -- traffic generators in Nanticoke?

14 A And Nanticoke itself it would be the permanent
15 population itself in the most densely developed part of
16 town. You have over 13,000 people in a relatively limited
17 area, so you have a fairly dense area type traffic
18 generator. And permanent population itself would be the
19 largest generator by far in Nanticoke.

20 CHAIRMAN GLEASON: All right. Is there any
21 redirect?

22 MR. SILBERG: Just let me have a second. I think
23 some other questions I was going to ask have been covered.

24 (Pause.)

25 REDIRECT EXAMINATION

1 BY MR. SILBERG:

2 Q Mr. McCandless, you had a discussion with the
3 chairman concerning your consideration of secondary and
4 local roads. Are the secondary and local roads in any way,
5 in your judgment, limiting in terms of the time estimates
6 for evacuating the EPZ?

7 A No, they are not. We specifically did not
8 incorporate the smaller roads throughout the EPZ, because
9 they do not in fact affect evacuation time estimates. We
10 did include all the freeways and expressways, the major
11 arteries and the major collectors within the EPZ and the
12 intersections of those three categories of roads
13 specifically because those categories of roads and their
14 intersections are the highway elements that can affect
15 evacuation time estimates.

16 We do not feel that intersections of small roads
17 with the larger roads have any appreciable potential for
18 affecting evacuation time estimates.

19 Q So if you had included in your computer analysis
20 secondary and local roads and their intersections, it is
21 your opinion that that would not have significantly changed
22 the overall results?

23 A That is correct.

24 Q One of the last questions, there was a discussion
25 concerning the basis for your assumption that traffic

1 capacity would be reduced to 70 percent under certain
2 adverse weather conditions. And you cited two studies that
3 were based upon conditions during rain.

4 Since the studies dealt only with rain, what is
5 the justification for applying that assumption to snow
6 conditions?

7 A Again, we did not apply the rain constrictions
8 directly to the snow conditions. As I pointed out this
9 morning, the two studies indicated that there was potential
10 for about 14 to 19 percent reduction in capacity associated
11 with heavy rainfalls. We just about doubled that up to the
12 30 percent for the adverse weather during the winter.

13 In addition, we further limited capacity by
14 putting on speed caps as low as 20 miles an hour, which in
15 fact further reduces the capacity of the roadway to carry
16 traffic. In essence, what that means we did is that we more
17 than doubled capacity productions that have been reported in
18 the available literature.

19 MR. SILBERG: Thank you. That concludes the
20 redirect I have.

21 BOARD EXAMINATION--Resumed

22 BY CHAIRMAN GLEASON:

23 Q If I heard you correctly, you indicated that based
24 on whatever studies that you considered valid, the reduction
25 rate in capacity in rainy periods is somewhere between 14

1 and 19 percent of full capacity. In order to allow for snow
2 conditions, you just in fact doubled, so you allowed 30
3 percent reduction. Is that correct?

4 A That is Part A only.

5 Q I am asking you as Part A.

6 A Okay.

7 Q I really, I guess, should not be asking questions
8 on NUREGs, but I do not have really any factual knowledge of
9 the studies you used. You have cited a couple, I think, for
10 the record.

11 But it is my general impression, just based upon
12 the conditions of paralysis that occur in the Washington
13 metropolitan area, which is not a fairly climatic region as
14 far as snow is concerned, climatic changes, that the
15 capacity would be a great deal less than 70 percent. The
16 speed would be a great deal less than -- what did you use,
17 20 percent?

18 A No. 20 miles per hour.

19 Q 20 miles per hour.

20 A I would contend that if you had a case that was
21 more restrictive than the one that we are talking about
22 right now, you would consider alternate means of protective
23 action, because if you had more constriction to the
24 roadways, conditions under which driving at 20 miles per
25 hour were not safe, I would offer my opinion that you are

1 probably putting people into more risk asking them to
2 evacuate than asking them to shelter.

3 So I think that is just a more adverse case than
4 we would consider as one that might be a candidate for
5 evacuation.

6 Q I believe this to be a fair question, and it may
7 not really -- it perhaps should not be directed at you. It
8 perhaps should be directed at your attorney to see if he
9 would like to respond, or if the Staff's attorney would like
10 to respond.

11 The standard, as I recall it, one has to make a
12 judgment as to whether, in light of this accident that
13 occurs or can occur, whether somebody should evacuate or
14 shelter the population in this zone. And I presume that one
15 of the considerations that has to be evaluated is to, in the
16 light of the then-existing climatic conditions, whether one
17 should follow one course rather than the other. I think
18 this is what your answers have been suggesting.

19 And my question is: Is there to be a witness that
20 is going to testify in this area of what goes into making
21 that decision? And if your answer to that is "No," then I
22 ask you how can I get this information as to whether the
23 roads are adequate?

24 MR. SILBERG: As I understand state law, decisions
25 on whether an evacuation is to be carried out are made by

1 the governor in consultation with the Pennsylvania Emergency
2 Management Agency and the counties. I hate to bounce the
3 question over across --

4 MR. ADLER: That is fine.

5 CHAIRMAN GLEASON: Not recommendation of the
6 Applicant's on-site personnel?

7 MR. ADLER: Perhaps I can briefly tell you what
8 the system is. I would be testifying, but we will have
9 personnel on the stand who can testify to these facts.

10 Essentially, we get, the state, gets a recommended
11 protective action from the Applicant, then the Licensee, BRP
12 also. Bureau of Radiation Protection also gets this
13 information, evaluates it, makes their own judgment.

14 There is also the capability of getting a
15 recommendation from the NRC technical personnel. BRP
16 communicates their judgment to PEMA, who takes it to the
17 governor. And Mr. Silberg is correct in noting that only
18 the governor --

19 CHAIRMAN GLEASON: He has the ultimate
20 responsibility? But again, in exercising the ultimate
21 responsibility, there is some intermediate level of
22 responsibility that carry out, one of which is assumed by --
23 has to be carried out by the Applicant. Is that correct?

24 MR. ADLER: Yes. For recommendations.

25 MR. SILBERG: We would have someone who will be on

1 the stand who would be the appropriate person to ask that
2 question of.

3 CHAIRMAN GLEASON: That is all really I wanted to
4 know.

5 MR. SILBERG: This witness is --

6 CHAIRMAN GLEASON: I understand. I did not want
7 to let him go if I could not ask the question.

8 MR. CUTCHIN: And the Staff will also have a
9 witness who will be able to address that question as well,
10 sir.

11 CHAIRMAN GLEASON: Thank you, Mr. Cutchin.

12 I think you can step down. Thank you very much.

13 (Witness excused.)

14 MR. SILBERG: Mr. Chairman, our next witness would
15 be Oran Henderson, who has sponsored testimony on 6B.
16 Because of the Board's question concerning the availability
17 of buses for school evacuation, what I would like to do is
18 have both Mr. Henderson and Robert Carroll, also of EMS,
19 both take the stand to address that question.

20 I would propose we deal with that matter, and then
21 I would propose to move on to Mr. Henderson's testimony on
22 Contention 6B.

23 CHAIRMAN GLEASON: Is Mr. Carroll a new witness
24 then?

25 MR. SILBERG: Yes, sir. and I do not have a

1 written resume for him, but we will be glad to put that onto
2 the record.

3 At this time I would ask both Mr. Henderson and
4 Mr. Carroll to step forward.

5 Whereupon,

6 ORAN K. HENDERSON
7 was recalled as a witness by counsel for the Applicant and,
8 having previously been duly sworn, was examined and
9 testified as follows; and

10 ROBERT M. CARROLL
11 was called as a witness by counsel for the Applicant and,
12 having first been duly sworn, was examined and testified as
13 follows:

14 DIRECT EXAMINATION

15 BY MR. SILBERG:

16 Q Mr. Henderson, I am showing you a document, a
17 two-page document entitled "Oran K. Henderson." Does this
18 document represent the statement of your professional
19 qualifications?

20 A (WITNESS HENDERSON) It does.

21 Q Is it true and correct to the best of your
22 knowledge and belief?

23 A (WITNESS HENDERSON) It is.

24 Q Do you adopt it as a statement of your
25 professional and technical qualifications in this

1 proceeding?

2 A (WITNESS HENDERSON) I do.

3 MR. SILBERG: Mr. Chairman, I am handing the
4 reporter the document just identified. I would ask it be
5 incorporated in the transcript as the professional
6 qualifications of Oran K. Henderson.

7 CHAIRMAN GLEASON: Is there objection?

8 (No response.)

9 Hearing none, the document will be so put in the
10 record.

11 (The document referred to, the professional
12 qualifications of Oran K. Henderson, follows:)

13

14

15

16

17

18

19

20

21

22

23

24

25

(4)
10/20

ORAN K. HENDERSON

Business Address: Emergency Management Services, Inc.
111 State Street
Harrisburg, Pennsylvania

Education: B.S., Military Sciences, University of Maryland, 1962.
Graduate, Armed Forces Staff College, 1959.
Graduate, Naval War College, 1963.

Experience: Executive Vice President for Operations, Emergency Management Services, Inc., January 1981 to present.

Consultant, Kline, Knopf & Wojdak
Fall 1980.

Director, Pennsylvania Emergency Management Agency, 1976 - September 1980.

35 years of active Army service, including combat commands in World War II, Korea and Vietnam.

Professional Honors and Affiliations:

President-elect, National Association of State Emergency Management Directors, 1979-80.

Member, Interorganizational Advisory Committee on Radiological Emergency Planning and Preparedness (which assisted the FEMA/NRC Steering Committee in the development and review of NUREG-0654), 1979-80,

Selected to represent the United States at an international meeting on radiological emergency planning in Stockholm, Sweden, October 1980.

Lectured on TMI-2 accident at conference of International Atomic Energy Agency in Vienna, Austria, February 1980.

Other Awards:

Combat Infantry Badge
Five Silver Stars
Five Bronze Stars (two for valor)

Four Purple Hearts
Legion of Merit with Oak Leaf Cluster
Joint Services Commendation Medal
Army Commendation Medal with Cluster
Pennsylvania Distinguished Service Medal
Vietnamese Cross of Gallantry
Vietnamese Medal of Merit

1 BY MR. SILBERG: (Resuming)

2 Q Mr. Carroll, would you please state your full name
3 for the record?

4 A (WITNESS CARROLL) Robert M. Carroll,
5 C-a-r-r-o-l-l.

6 Q By whom are you employed?

7 A (WITNESS CARROLL) By Emergency Management
8 Services.

9 Q And how long have you been employed by them?

10 A (WITNESS CARROLL) About a year and two months.

11 Q Please state your educational background.

12 A (WITNESS CARROLL) I have an associate degree in
13 business administration from the University of
14 Pennsylvania. My background is: retired from the Army,
15 plus during the last several years I was either the
16 operations officer or the deputy adjutant general for the
17 Commonwealth of Pennsylvania dealing with all the
18 emergencies occurring in the Commonwealth of Pennsylvania.

19 Q What was your rank in the Army of your
20 retirement?

21 A (WITNESS CARROLL) At the time I retired I was a
22 brigadier general.

23 Q And what have your functions been at EMS since you
24 joined that organization?

25 A (WITNESS CARROLL) I am a senior consultant

1 working with the boroughs and the townships, the schools,
2 the hospitals, and the homes in the development of emergency
3 plans primarily for the nuclear generating station at
4 Berwick.

5 Q Thank you. Mr. Carroll, have you had any
6 conversations with the school districts in the ten-mile
7 emergency planning zone surrounding the Susquehanna nuclear
8 station?

9 A (WITNESS CARROLL) Yes, I have.

10 Q Have those conversations concerned the
11 availability of school buses to carry out evacuations in the
12 event that such evacuation was needed because of an
13 emergency condition at the Susquehanna plant?

14 A (WITNESS CARROLL) Yes, those conversations have
15 included the bus resources since, as far as the school
16 district is concerned, that is the core of their evacuation
17 planning.

18 Q And during your conversations, did you establish
19 whether the school districts had determined the number of
20 buses that they would need to carry out such an evacuation?

21 A (WITNESS CARROLL) In general terms, yes. They
22 know how many buses they need to carry out their
23 evacuations.

24 Q And do they also know whether such buses would be
25 available if needed?

1 A (WITNESS CARROLL) In all cases except the Berwick
2 School District, they have the bus resources already under
3 their control. In the Berwick School District they must go
4 outside the school district in order to get the number of
5 buses they need to evacuate total school population.

6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

1 Q Where would those buses come from for the Berwick
2 school district?

3 A (WITNESS CARROLL) They come from surrounding
4 school districts -- the Berwick school district, the Benton
5 school district, southern Columbia school district,
6 primarily.

7 Q Do you know whether the Berwick school district
8 has had conversations with these other school districts
9 concerning the availability of those buses?

10 A (WITNESS CARROLL) Yes. There was -- they have
11 had direct communication with them. In addition, the
12 transportation officers from all the school districts met
13 together in, I think it was, the latter part of August or
14 early September to discuss the school problems, particularly
15 as far as buses were concerned.

16 Q Have you had conversations with the school
17 districts concerning their estimates of the time needed to
18 mobilize school buses?

19 A (WITNESS CARROLL) Mobilize the school buses,
20 yes. We have discussed the figure which has been previously
21 mentioned here in this room, that 90-minute mobilization
22 time, and this has been discussed with the transportation
23 officers in the school districts.

24 That ninety minutes includes the time the
25 transportation officer calls a contractor, the contractor

1 gets to his bus from wherever he is located, and brings the
2 bus to the school and loads the children. That is the
3 90-minute period that we are talking about.

4 Q And that 90-minute period is, in the opinion as
5 communicated to you by the school districts, a reasonable
6 time estimate to be used?

7 A (WITNESS CABROLL) Yes, sir.

8 Q Now have the school districts had on previous
9 occasions experience in mobilizing school buses to remove
10 the students from the schools during school days?

11 A (WITNESS CARROLL) As you know, particularly in
12 this area, during the winter months, with snow, this is a
13 common occurrence to mobilize their bus assets to clear
14 schools. And so to answer your question, yes, they have
15 experience in this.

16 Q And what is the time estimate that they use for
17 that purpose in mobilizing the buses?

18 A (WITNESS CARROLL) Well, again they are concerned
19 with the time it takes to get the buses to the school, and
20 that is the ninety minutes that we are talking about.

21 Q And their experience has been that ninety minutes
22 is adequate under those weather conditions?

23 A (WITNESS CARROLL) Yes.

24 MR. SILBERG: I have no further questions, Mr.
25 Chairman.

1 CHAIRMAN GLEASON: Does the State have some
2 questions?

3 MR. ADLER: Yes, sir, we do.

4 CHAIRMAN GLEASON: Go ahead, Mr. Adler.

5 CROSS EXAMINATION

6 BY MR. ADLER:

7 Q You stated that you had discussions with the
8 school district personnel. Can you identify who you talked
9 to and how many discussions you had?

10 A (WITNESS CARROLL) Yes. To go over my record, I
11 discussed with Mr. Zinc in the Hazelton School District.

12 MR. SILBERG: You probably should spell the names
13 for the court reporter.

14 BY MR. ADLER: (resuming)

15 Q Title is sufficient.

16 A (WITNESS CARROLL) Transportation officer, and in
17 all cases I am trying to think -- there are one or two
18 exceptions that I will mention.

19 The transportation officer is not only responsible
20 for the transportation but the school superintendent has
21 given him the responsibility for developing the whole plan,
22 so in the case of the Hazelton School District, Mr. Zinc,
23 Nanticoke, Mr. Roke -- R-o-k-e -- Northwestern School
24 District, Mr. Rishkofski, who is the principal supervisor.
25 He is -- they do not have a transportation officer there --

1 Mr. R-i-s-h-k-o-f-s-k-i.

2 In the Berwick School District, Mr. Bailey, the
3 transportation officer, and in Central Columbia, Ms. Hock --
4 H-o-c-k. Those are the five school districts within the
5 EPZ.

6 In addition, I have talked to the school districts
7 -- Benton School District, Southern Columbia School District
8 -- who are supporting the Berwick plan.

9 Q And in each case these are the personnel vested
10 with the responsibility to conduct evacuation?

11 A (WITNESS CARROLL) That is correct.

12 Q Do you know if there are any alternates to those
13 personnel?

14 A (WITNESS CARROLL) The alternate to the
15 transportation officer is the school superintendent himself.

16 Q Have you spoken to them?

17 A (WITNESS CARROLL) I have spoken to the school --
18 Mr. Quak in Nanticoke, Mr. Rishkofski in the Northwest
19 School. I have spoken to him. I did not speak to the
20 school superintendent of Berwick, although Mr. Biaki, who is
21 also the mayor of Berwick, is the one that is responsible
22 there. But he is not the school superintendent.

23 Q Before we leave that, would the mayor of Berwick
24 have other responsibilities during a nuclear emergency at
25 Susquehanna?

1 A (WITNESS CARROLL) Yes, he has a dual
2 responsibility. He is both mayor of Berwick and responsible
3 for the evacuation plan of the Berwick school district.

4 Q Go on. I am sorry I interrupted you.

5 A (WITNESS CARROLL) I think I have -- there are no
6 other alternates that I am familiar with.

7 Q For the five school districts in question are
8 there now in existence written plans to deal with a nuclear
9 emergency at Susquehanna?

10 A (WITNESS CARROLL) To my knowledge, no.

11 Q In your opinion should they be prepared prior to
12 plant operation?

13 A (WITNESS CARROLL) Yes. That is, if I can qualify
14 that, they should be prepared. Whether they will be or not
15 I do not know.

16 Q Why should they be prepared?

17 A (WITNESS CARROLL) Well, the evacuation of school
18 children is one of the primary concerns of any evacuation
19 scheme that we have and certainly consideration of
20 evacuating schools should enter into that.

21 Q You stated that for all school districts with the
22 exception of Berwick the buses are "under the control" of
23 the school district. What do you mean by that? Do they
24 have a private contractor?

25 A (WITNESS CARROLL) Yes, yes. They are under --

1 for example, take the Northwest School District. Let me get
2 back to my notes here. He needs -- they need thirty buses
3 to evacuate the entire school population. He has 26 buses
4 under contract at this time to move those.

5 You know, in that thirty -- in that total school
6 population there are many that walk home, so he does not
7 need a total of thirty all the time. But if he had to
8 evacuate the whole school he needs thirty buses.

9 Q I think you are over-interpreting my question. I
10 just wanted to know whether the arrangement is a private
11 company that contracts with the school district.

12 A (WITNESS CARROLL) Yes.

13 Q Do you know if there is any written agreement
14 between the school district and the companies as to the
15 responsibility of the company to provide buses during a
16 nuclear emergency?

17 A (WITNESS CARROLL) I do not know that there is
18 such an agreement.

19 Q Since there are no written plans, I presume that
20 there is no written identification of bus drivers, is that
21 correct -- of the bus drivers responsible for responding
22 during an emergency?

23 A (WITNESS CARROLL) As far as the school is
24 concerned, there is none that I am aware of.

25 Q And there is no written identification of

1 alternate drivers?

2 A (WITNESS CARROLL) I am not aware of any.

3 Q Are you aware of any identification of alternate
4 drivers?

5 A (WITNESS CARROLL) I think the bus companies
6 themselves have those arrangements.

7 Q You think, based on what?

8 A (WITNESS CARROLL) Just good business, I guess.
9 They have a contract.

10 Q You do not know that for a fact?

11 A (WITNESS CARROLL) No.

12 Q Do you know if there are any written routes to
13 instruct the bus drivers where they should go to the student
14 pre-allocated student pickup points?

15 A (WITNESS CARROLL) There are none. There are no
16 written instructions at this point.

17 Q I just have one more line of questions.

18 I am interested in your comparison between an
19 early school closing due to adverse weather and the case of
20 a nuclear emergency and whether that in fact is a fair
21 comparison on your part.

22 Isn't it true that the bus drivers have other
23 concerns during an emergency and the two situations are not
24 necessarily comparable?

25 A (WITNESS CARROLL) All I am saying is that the

1 schools themselves have practice in putting into effect a
2 plan for quickly getting the buses to the schools.

3 Now the availability of the drivers under that
4 situation and under a nuclear situation, I did not comment
5 on that.

6 (Pause.)

7 Q I am sorry. Just one more thing. With respect to
8 Berwick you referred to conversations between the Berwick
9 School District and the surrounding school districts.

10 To your knowledge, is there any written
11 arrangement or agreement?

12 A (WITNESS CARROLL) To my knowledge there is no
13 written agreement.

14 MR. ADLER: Thank you. I have no more questions
15 on this topic.

16 CHAIRMAN GLEASON: Does the Staff have any
17 questions?

18 MR. CUTCHIN: One, maybe two, Mr. Chairman.

19 CROSS EXAMINATION

20 BY MR. CUTCHIN:

21 Q Mr. Carroll, could you tell me what county Berwick
22 lies in?

23 A (WITNESS CARROLL) Columbia.

24 MR. CUTCHIN: Thank you.

25 CHAIRMAN GLEASON: Would you like to represent SEA

1 for a few questions?

2

CROSS EXAMINATION

3

BY MS. MERRILL:

4

Q There is a school complex in Nanticoke where there
5 are about 2,000 children from kindergarten through high
6 school in several schools very near each other and is the
7 current plan to not evacuate them by bus but have their
8 parents pick them up?

9

A (WITNESS CARROLL) That is correct.

10

Q Do you have any idea of the feasibility of the
11 traffic conditions under those -- that situation -- parents
12 picking up 2,000 children?

13

A (WITNESS CARROLL) I have talked to Mr. Roke, who
14 is the transportation officer there. We drove around
15 Kosciusko Street. I talked with Mr. Roke concerning this
16 problem and, as I say, we reviewed what -- we drove through
17 Nanticoke to look at the routes coming into the school
18 complex.

19

We drove around the school complex and he has
20 devised a traffic plan to accommodate that problem. That is
21 all I can tell you.

22

Q How far is that school complex from the
23 Susquehanna plant?

24

MR. SILBERG: Could you repeat that?

25

BY MS. MERRILL: (resuming)

1 Q How far in miles is that school complex from the
2 Susquehanna plant?

3 A (WITNESS CARROLL) I think it is eleven miles.

4 Q Could you possibly foresee a problem with that
5 being a safe location for those children?

6 MR. SILBERG: Objection, Mr. Chairman. We are
7 getting into matters that are covered by NRC regulations.

8 CHAIRMAN GLEASON: That is outside the scope of
9 this person's testimony.

10 MS. MERRILL: Okay, okay.

11 BY MS. MERRILL: (resuming)

12 Q All right. I would like to ask about in Berwick
13 where school districts, other school districts, will come in.

14 A (WITNESS CARROLL) The Berwick School District
15 includes schools outside the county of Columbia. Is that
16 what you mean?

17 Q Yes, but where you send -- the idea is buses will
18 be coming in from outside the ten-mile radius. Do you see
19 any problems with some of those school districts perhaps
20 wanting to have an early dismissal as just a precautionary
21 measure themselves and so not wanting to give the buses to
22 the districts within the ten-mile radius?

23 A (WITNESS CARROLL) Well, again, this is my
24 opinion. I would think they would recognize the emergency
25 and the priority of it and on that basis provide the buses

1 to the Berwick School District.

2 Q Would you want your children stranded at your
3 school if the buses were off somewhere else in case the area
4 had to be enlarged?

5 A (WITNESS CARROLL) Knowing that they were safe.

6 (Counsel for SEA conferring.)

7 MS. MERRILL: Okay, that is all.

8 CHAIRMAN GLEASON: Thank you.

9 BOARD EXAMINATION - Resumed

10 BY CHAIRMAN GLEASON: -

11 Q Mr. Carroll, I believe the attorney for the
12 Commonwealth asked several questions that I was interested
13 in.

14 You indicated, I believe, that with respect to the
15 private bus contractors who would carry out this service for
16 the other school districts that you either did not know or
17 you knew there was not in existence a contract for the
18 service during the emergency.

19 What was your testimony -- that you did not know
20 or --

21 A (WITNESS CARROLL) I know the school has a
22 contract, of course, with those bus owners and it does
23 include the normal emergencies. Now whether it includes
24 particularly a nuclear emergency I do not know.

25 Q So is it fair to assume that you concluded this

1 would just be included in their regular responsibilities to
2 provide for emergencies?

3 A (WITNESS CARROLL) I -- I would assume that.

4 Q All right. In the -- I do not know how far you
5 went with your questioning with respect to the operation of
6 the bus facilities by the private contractor, but did you
7 ascertain whether these were -- the bus drivers were in most
8 bus systems were housewives or retired people that were
9 available to drive these buses during the daytime or during
10 school hours?

11 A (WITNESS CARROLL) Most of them are employed other
12 places. They are farmers. They are employed in a factory
13 or some other pursuit.

14 Q Now I would presume that even though one could
15 equate, perhaps, many of the conditions that would exist in
16 the snow emergency to emergencies that could happen in a
17 nuclear reactor, there are dissimilarities.

18 And one of those dissimilarities, I would suggest,
19 is the fact that when weather is threatening everybody knows
20 it in those circumstances, and there is a kind of personal
21 alert, if you will, that one gets placed on, I presume, if
22 one is a bus driver, which is not in existence, may not be
23 in existence in the event of a radiological accident at a
24 nuclear reactor.

25 And, therefore, what my question comes down to is

1 did you investigate as to -- I am back here on this
2 90-minute period -- did you investigate as to what kind of
3 telecommunications systems or communications system that the
4 private contractors had with their bus drivers in the event
5 of emergencies? Did you ascertain that?

6 A (WITNESS CARROLL) I --

7 Q Do you see the point I am driving at?

8 A (WITNESS CARROLL) You want to make sure there is
9 communication capability.

10 Q I am just saying it seems to me there is a natura
11 communication when the weather is threatening, that it may
12 snow. You know, the people -- the new commentators do not
13 do much else these days at times except tell you about the
14 weather every eighteen seconds, and everybody knows that.
15 So if you are a bus driver you say, gee, I may have to go
16 early or late or something.

17 That is not the condition if something blows at a
18 nuclear plant, a serious accident. It may not be. And,
19 therefore, it seems to me there is a very relevant question
20 as to what the communication is that one is looking at, that
21 aspect of the issue. What is the communication system with
22 respect to the drivers on the part of the contract operators
23 in that eventuality?

24 A (WITNESS CARROLL) I did not look at it
25 specifically.

1 About half of the contractors are individual bus
2 owners. They have one bus and -- which was surprising to me
3 -- that they have one bus. The wife is at home and he is
4 away working somewhere. So there is someone at home and
5 they seem to be able to have the communications at any time
6 from the school to that driver.

7 I do not know how else to answer your question.

8 Q Do they do it by telephone?

9 A (WITNESS CARROLL) Yes.

10 Q Just call them? -

11 A (WITNESS CARROLL) Yes.

12 Q Are these buses stored at the residences of these
13 --

14 A (WITNESS CARROLL) Many times they are right at
15 the home of the owner, yes.

16 Q And where are they stored if they are not at the
17 home of the driver?

18 A (WITNESS CARROLL) There are some bus companies
19 that have garages -- a few. They have maybe five or ten
20 buses. But, as I say, about half of them own only one or
21 two buses. They are stored at home in the barn or in a shed
22 and some even have other kinds of arrangements with their
23 wives where they shift around as far as driving the bus and
24 storing is concerned.

25 Q The wife does the driving that day?

1 A (WITNESS CARROLL) Yes.

2 (Board conferring.)

3 BOARD EXAMINATION

4 BY JUDGE BRIGHT:

5 Q Mr. Carroll, in connection with the Berwick School
6 District being the only one that doesn't have a sufficiency
7 of buses under its direct control to take out all of the
8 children in the district, most places where I have lived
9 have a minimum distance bus service.

10 That is, if you live, I think, back in Oklahoma
11 where I grew up it is about two miles. In Montgomery County
12 where I am living now I think it is about four blocks.

13 (Laughter.)

14 How times change. This implies to me that the
15 buses are not needed because so many of the children are
16 within walking distance of the school that they are going
17 to. Have you ever heard a figure on how many do not ride
18 the bus at all?

19 A (WITNESS CARROLL) No, sir. I have not.

20 There is a part of that answer. There is a total
21 requirement to move all the children in the Berwick school.
22 It would require 76 buses. The buses that are current
23 available under contract are 23, so a great number of the
24 Berwick students would be commuters or the parents taking
25 them to school.

1 (Board conferring.)

2 JUDGE BRIGHT: Thank you.

3 BOARD EXAMINATION

4 BY JUDGE PURDON:

5 Q I understood you to say that the plans at these
6 schools are not reduced to writing at the present time, but
7 with respect to Berwick in particular these buses would come
8 from another jurisdiction. Has that understanding been put
9 in writing?

10 A (WITNESS CARROLL) No, sir, it has not.

11 Q So what is the understanding -- a handshake or
12 something, or --

13 A (WITNESS CARROLL) Well, it is a verbal agreement
14 between the school district, primarily between the
15 transportation officers of the school districts involved.

16 Q Would you think it would be a matter of prudent
17 policy to have such an agreement in writing?

18 A (WITNESS CARROLL) In my judgment, yes.

19 Q When we speak of these other schools you mentioned
20 something just a moment ago with respect to Berwick, that
21 when we talk about taking all the children all at once from
22 the other schools, similar analyses were made that the bus
23 capacity and the number of students to be moved -- the bus
24 capacity is at least equal to the number of students to be
25 moved. Is that what I understand in your testimony?

1 Maybe it was the other gentleman's testimony.

2 A (WITNESS HENDERSON) Yes. There are an adequate
3 number of buses to move the other students in the other
4 school districts in a single lift -- those from within the
5 EPZ.

6 Q Now sometimes some school districts I am familiar
7 with, they might use a bus to take some children to one
8 school or certain grades at a certain time, and then later
9 on in the morning they take another group of students and
10 such as that.

11 So you are saying that even if they might have
12 some arrangement like that that the seats and standing room
13 and so forth on the bus would be able to accommodate all the
14 students?

15 A (WITNESS HENDERSON) That is correct. Our effort
16 here was merely to determine that there was an adequate
17 number of buses in a reasonable area around the Susquehanna
18 Steam Electric Station that would satisfy the need to move
19 students in one lift.

20 Q Now did you figure on maintenance? Sometimes a
21 bus might be out while an engine is overhauled. I do not
22 know what they do at a school when that happens. I suppose
23 when the contractor has four or five buses maybe they have
24 more than they need, but did you figure on having all the
25 buses available?

1 A (WITNESS HENDERSON) All of the buses that are
2 under contract to be provided. Some of the larger providers
3 of buses do have this capability of having one or two or
4 more buses standing down while they are being maintained.

5 The single owner bus driver -- bus owner -- I am
6 not sure what he does when his bus breaks down. Hopefully
7 it breaks down, perhaps, on weekends when he does not need
8 it, but I do not know what provisions are made by them.

9 Q When the bus breaks down it will be a weekend and
10 the school will not be in session. Is that what you are
11 saying?

12 A (WITNESS HENDERSON) I assume it happens even
13 today in the day-to-day operation of school children being
14 delivered home where school buses -- I have seen them
15 occasionally sitting along the highway and the school kids
16 are not there. The transportation officer has some
17 provision for getting an additional bus or taking the bus
18 off of a run that is already completed.

19 I am not testifying -- I did not intend to testify
20 to that extent, but it is just my sensing of it. We did not
21 get into the implementing procedures to a great degree and
22 how the scheme would be implemented.

23 Q I am not suggesting you get into that, but I was
24 wondering, if you had a capacity factor that assumed that a
25 certain percent of the buses were undergoing maintenance and

1 if it were not available.

2 A (WITNESS HENDERSON) The school districts that are
3 supporting the evacuations have -- supporting what we are
4 coming up with here, have more buses than we are committing
5 against those schools for the evacuation, so there is
6 additional buses.

7 This -- this -- we are not trying to say that
8 every school bus in the Northwest School District is being
9 committed to the EPZ. That is not what we are intending to
10 say.

11 BOARD EXAMINATION

12 BY CHAIRMAN GLEASON:

13 Q Mr. Carroll, just a cleaning up question. You
14 indicated you worked for the State up until a couple of
15 years ago dealing with the State's emergency problems. Is
16 your background transportation?

17 A (WITNESS CARROLL) No, no. I pointed out my
18 background was primarily military.

19 Q I know, but there is a transportation service in
20 the military.

21 A (WITNESS CARROLL) That is right, and in any
22 emergency transportation is always central. But I am not a
23 transportation expert.

24 Q And the company that you are a consultant with,
25 EMS --

1 A (WITNESS CARROLL) Emergency Management Services.

2 Q They are under contract with the Applicant?

3 A (WITNESS CARROLL) Correct.

4 CHAIRMAN GLEASON: Okay, thank you. You may step
5 down, please.

6 MR. SILBERG: Excuse me. I have a few redirect
7 questions.

8 MR. ADLER: I have some follow-on also, based on
9 the Board's questions.

10 MR. SILBERG: You first.

11 CROSS EXAMINATION - Resumed

12 BY MR. ADLER:

13 Q You referred to the fact that some buses are kept
14 at home and some are kept at depots. Do you have any
15 numbers on those?

16 A (WITNESS CARROLL) I think if I went through my
17 records I could pull them out, but I do not have anything
18 quickly available.

19 Q When a driver works during the day, where does he
20 store the bus?

21 A (WITNESS CARROLL) Normally at home.

22 Q So he would have to go from work to home and then
23 to the school to pick up the students?

24 A (WITNESS CARROLL) Yes.

25 Q You referred to telephone communications. Are

1 there any alternative communications systems worked out?

2 A (WITNESS CARROLL) No, sir.

3 Q To clarify your response to Mr. Bright's question
4 about certain students walking to school, are you aware of
5 the fact that it is both PEMA and Pennsylvania Department of
6 Education policy that during a nuclear emergency no students
7 are under any circumstances to be sent home or taken home?

8 A (WITNESS CARROLL) Yes, sir, and the schools know
9 that also. There is no question there. The entire student
10 population will be evacuated. -

11 Q So the fact that some students normally walk to
12 school is really irrelevant?

13 A (WITNESS CARROLL) That is right.

14 Q Do you know if any of the buses from these
15 companies are contracted out during the day for field trips,
16 to take various trips out of the area?

17 A (WITNESS CARROLL) By the school under which they
18 work, yes.

19 Q The other people with the company?

20 A (WITNESS CARROLL) Beg your pardon?

21 Q Is there any contracting by outside persons with
22 the bus company to use the bus during the day and then
23 return it before --

24 A (WITNESS CARROLL) Not that I am aware of.

25 Q You do not know one way or the other?

1 A (WITNESS CARROLL) No, no.

2 Q Do you know if any of the buses are -- whether all
3 the buses are equipped with radios?

4 CHAIRMAN GLEASON: I did not hear the last
5 question.

6 BY MR. ADLER: (resuming)

7 Q I asked if he knows whether all the buses are
8 equipped with radios.

9 A (WITNESS CARROLL) The ones I have seen are not
10 equipped with radios.

11 Q Mr. Henderson, you repeatedly referred to the fact
12 that buses are committed. I think you used the words "we
13 are committing." Who is committing the buses to this use,
14 and I emphasize the word "commit"?

15 A (WITNESS HENDERSON) That was our term here for us
16 committing available buses against a requirement. It is not
17 in anybody's plan. It is merely our exercise to determine
18 the adequacy of buses to support school evacuation.

19 Q So no bus company has actually made a commitment?

20 A (WITNESS HENDERSON) That is correct.

21 MR. ADLER: Thank you.

22 CHAIRMAN GLEASON: Mr. Cutchin?

23 MR. CUTCHIN: No further questions, Mr. Chairman.

24 REDIRECT EXAMINATION

25 BY MR. SILBERG:

1 Q A few clarifying questions. The Nanticoke school
2 complex that you were talking about with Ms. Merrill, that
3 is outside the ten-mile EPZ?

4 A (WITNESS CARROLL) Yes.

5 CHAIRMAN GLEASON: Is that true? I thought we had
6 information that --

7 WITNESS CARROLL: I guess -- I need a
8 clarification of what the EPZ is. It is outside the
9 ten-mile radius.

10 CHAIRMAN GLEASON: It is within the EPZ.

11 WITNESS CARROLL: It is within the EPZ.

12 BY MS. SILBERG: (resuming)

13 Q There was a discussion before about whether there
14 were written agreements between the school districts and the
15 bus companies and written identification of drivers,
16 alternate drivers, et cetera.

17 Do you think -- is it your opinion that -- well,
18 strike that.

19 I think you also stated in your judgment there
20 should be these kinds of agreements. Is it your
21 understanding that school districts intend to prepare those
22 agreements?

23 A (WITNESS CARROLL) First, I did not say that I
24 thought there should be agreements between the school
25 districts and the bus companies and drivers. I said that

1 the school districts ought to have plans. I think that was
2 the statement I made.

3 Q I am sorry. That is correct. I misspoke.

4 Is it your understanding that the school districts
5 intend to prepare such plans?

6 A (WITNESS CARROLL) Oh, yes, sir. They certainly
7 do.

8 Q Do you think, based on the matter of your opinion,
9 that school evacuations could successfully be completed
10 within the time constraints that we are talking about?

11 MR. ADLER: Objection. I am sorry. The question
12 was whether in the witness' opinion he believes that school
13 evacuation could be accomplished absent written agreements.

14 My objection is that the witness has in essence
15 testified that he has no basis to answer that question. We
16 have asked a series of questions concerning whether the
17 witness knows where the buses are, whether he knows there
18 are radios, whether he knows where the drivers are, whether
19 there are alternate drivers, et cetera. And he did not know
20 the answers to these questions.

21 I do not think he has the information necessary to
22 give an expert opinion to that question.

23 MR. SILBERG: Mr. Chairman, evacuation --

24 CHAIRMAN GLEASON: Without argument we are going
25 to let it in and we will consider it for what it is worth.

1 Answer the question.

2 WITNESS CARROLL: Did you say answer the question?

3 CHAIRMAN GLEASON: Yes.

4 WITNESS CARROLL: Can I have the question again,
5 please?

6 MR. SILBERG: I will try to rephrase it.

7 BY MR. SILBERG: (resuming)

8 Q I think you agreed that written plans should be
9 prepared and I think you stated that such plans were not now
10 in existence. Do you think, based on your experience, that
11 in the absence of such plans school evacuations could
12 successfully be carried out within the general time
13 constraints that we have been discussing here?

14 A (WITNESS CARROLL) Yes, sir. I think so, based on
15 the fact that the school districts have competent people who
16 are already experienced in marshalling resources for an
17 emergency and the fact that buses are available in
18 sufficient quantity within a reasonable distance to
19 accomplish the central part of the evacuation, which is
20 transportation.

21 MR. SILBERG: Thank you. I have no further
22 questions.

23 CHAIRMAN GLEASON: Any recross on the redirect?

24 MR. ADLER: No, sir.

25 CHAIRMAN GLEASON: All right. Mr. Carroll, you

1 can step down, please.

2 (Witness Carroll was excused.)

3 DIRECT EXAMINATION - Resumed

4 BY MR. SILBERG:

5 Q I would now like to proceed with Mr. Henderson's
6 testimony on Contention 6-B.

7 Mr. Henderson, I am showing you a document
8 entitled "Applicant's Testimony of R. N. K. Henderson on
9 Contention 6-B". Was this document prepared by you or under
10 your direct supervision and control?

11 A It was.

12 Q And is it true and correct to the best of your
13 knowledge and belief?

14 A It is.

15 Q Do you adopt it as your testimony on this
16 Contention in these proceedings?

17 A I do.

18 MR. SILBERG: Mr. Chairman, I am handing the
19 document just identified to the reporter. I request it be
20 inserted in the transcript at this point as if read as the
21 testimony of Mr. Henderson.

22 CHAIRMAN GLEASON: Is there any objection?

23 (No response.)

24 CHAIRMAN GLEASON: Let me ask you a question about
25 this testimony. This does not meet the criteria of

1 testimony. It looks like, to me, a summary of a report. I
2 realize testimony does not have to meet any particular
3 format, but --

4 MR. SILBERG: It is considerably more than that,
5 sir. It refers and summarizes information that is in the
6 documents that are cited there. It also cites experience
7 that the agency has had on certain drills. It cites facts
8 concerning the funding that the agency has received and its
9 staffing. It certainly meets the tests of testimony that I
10 am aware of, and I think this witness is eminently qualified
11 to sponsor the evidence.

12 CHAIRMAN GLEASON: Just a minute, please.

13 (Pause.)

14 MR. SILBERG: Perhaps a short summary --

15 CHAIRMAN GLEASON: Just a minute.

16 (Pause.)

17 CHAIRMAN GLEASON: Without objection, the document
18 that has been referred to will be bound into the record as
19 the testimony of the witness as if read.

20 (The prepared testimony of Mr. Henderson follows:)

21

22

23

24

25

5
10/20

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
PENNSYLVANIA POWER & LIGHT COMPANY)
)
 and)
)
ALLEGHENY ELECTRIC COOPERATIVE, INC.)
)
(Susquehanna Steam Electric Station,)
Units 1 and 2)

Docket Nos. 50-387
50-388

APPLICANTS' TESTIMONY OF
ORAN K. HENDERSON
ON CONTENTION 6(b)

September 29, 1981

Contention 6b.

There is considerable question of the ability of Pennsylvania's Office of Radiological Health to fulfill its assigned functions in the event of an emergency. The Director of that office stated at a public meeting that his staff would not be able to respond at all hours to an accident at a nuclear facility. He has also, by affidavit, denied having made such a statement. This question must be resolved. Furthermore, the office has been unsuccessful in obtaining the amount of funding required to provide adequate qualified staff and equipment to be able to expand its capability to monitor and respond to a radiation emergency situation at Susquehanna.

Analysis:

Paragraph A.8., Section VII, "Responsibilities" of Annex E to the Pennsylvania Disaster Operations Plan, assigns to the Bureau of Radiation Protection (BRP), Department of Environmental Resources specific tasks. These tasks include:

1. Maintain plans and procedures to meet criteria established by NUREG 0654.
2. Conduct incident assessment.
3. Provide technical guidance and assistance to State, County and municipal agencies.
4. Coordinate placement of offsite monitoring devices.
5. Provide PEMA periodic evaluations of incident situations.
6. Maintain a watch system during non-duty periods to ensure mobilization of response mechanism.
7. Provide liaison to the SSES Emergency Operation Facility following its activation.
8. Develop, in coordination with Department of Health and PEMA, public educational information regarding radiation.
9. Provide response team member to PEMA Emergency Operation Center upon its activation.

Attachment 1 to the State RERP "Primary and Support Responsibility chart," lists BRP as the lead agency for: 1) Incident Assessment, and 2) Radiological Exposure Control.

Based upon the above tasking, and BRP's normal functions, it prepared Appendix 8 "BRP Plan for Nuclear Power Generating Station Incidents" dated August 1981. Appendix 8, serves as both an instructional and information document as well as describing BRP procedures and operational arrangements.

Paragraph 2.0, App 8, describes BRP organizational scheme for managing the response to incidents at nuclear power stations. It establishes the initial notification responsibilities and provides for the rapid alerting and mobilizing of the BRP staff. It further describes specific responsibilities of each group during the initial notification and the continuing operations phases. Table 2-A (page 7) lists the role agency personnel are to play and their respective locations. Section 8.0 (page 23) describes the BRP facilities and equipment. Figure 6-1 (page 21) shows a radio network between the BRP headquarters, its Regional Offices, its mobile laboratory and its field monitoring teams. The schematic (figure 6-1) also shows dedicated telephone connections from the BRP headquarters to both PEMA and the Utility.

BRP received last year some \$300,000 from the Pennsylvania General Assembly to improve its mobile laboratory capability and for selected monitoring equipment. It has received additional funding through Department reprogramming for further equipment upgrading. The Department of Environmental Resources is presently involved in the development of a statewide radio communications system which will greatly improve communications capability. Since the March 1979 accident at TMI, the BRP staffing has increased from 21 to 27 and its funding has been increased from approximately \$600,000 to \$990,000. (Fiscal Year 82)

During the critique of the 2 June 1981 exercise for the TMI plume exposure emergency planning zone the Bureau of Radiation Protection, Department of Environmental Resources received from FEMA minor critical comments; however, in general the report reflected that BRP met or exceeded the standards. In general, the exercise showed that BRP had the wherewithal to perform its role adequately. Extrapolating this exercise performance to the SSES, even with the time-distance variables factored into the equation, one could reasonably expect BRP could perform its role in an above satisfactory manner.

1 MR. SILBERG: Thank you. If the Board wishes,
2 perhaps Mr. Henderson could give a brief summary of his
3 response to this Contention, if the Board believes that
4 would help.

5 CHAIRMAN GLEASON: Yes. Mr. Henderson, I would
6 like you to do that. I would like you to start with, give a
7 kind of thumbnail capsule of your experience, if you will.

8 THE WITNESS: I am a retired Army officer, having
9 spent 35 years in the Army and retiring in the grade of
10 Colonel approximately seven years ago. While in the
11 military I graduated from the Infantry School, the Commander
12 General Staff College at Ft. Levenworth, Kansas, the Armed
13 Forces Staff College in Norfolk, Virginia, the Naval War
14 College in Newport, Rhode Island.

15 My military experience included command
16 assignments from platoon leader through brigade command. I
17 have had staff assignments in the Pentagon as Chief of the
18 Operations Research Division, Office of Chief of Research
19 and Development. I was G-3 plans office of the 82nd
20 Airborne Division.

21 I was also the Deputy Chief of Staff for Plans,
22 Operation and Training of the First U.S. Army at Ft. Meade,
23 Maryland, providing military support to civil governments
24 during the Agnes disaster here in the Wilkes Barre area and
25 also to the Buffalo Creek disaster in West Virginia.

1 Following my retirement I was deputy or I was
2 director the Pennsylvania Emergency Management Agency for
3 four years, during which time I was directly involved in
4 five presidentially-declared disasters within the
5 Commonwealth of Pennsylvania and I was director during the
6 TMI incident.

7 CHAIRMAN GLEASON: Were you director during the
8 time of -- if I use the word correctly -- the great Wilkes
9 Barre flood?

10 THE WITNESS: No. As I mentioned earlier, I was
11 Deputy Chief of Staff for Operations -- Plans, Operation and
12 Training down at Ft. Meade, Maryland, responsible for
13 providing military support to Wilkes Barre.

14 CHAIRMAN GLEASON: I understand.

15 THE WITNESS: I was the director during the
16 Johnstown disaster.

17 CHAIRMAN GLEASON: All right. Now if you would
18 give your responsibilities with Emergency Management
19 Services.

20 THE WITNESS: For the past year I have been the
21 Executive Vice President of the Emergency Management
22 Services Incorporated, located at 111 -- our offices are 111
23 States Street in Harrisburg, Pa. We are under contract, EMS
24 is under contract with PP&L to provide consultant emergency
25 planning assistance to the townships and boroughs within the

1 plume exposure EPZ of the Susquehanna Steam Electric Station.

2 We have been providing this service since last
3 November.

4 CHAIRMAN GLEASON: And has your firm had prior
5 experience in this specific area?

6 THE WITNESS: The firm has. The firm was also --
7 has been under contract and is under contract with
8 Philadelphia Electric working in the Peach Bottom area and
9 in the State of Maryland and with the GPU working in the TMI
10 area.

11 CHAIRMAN GLEASON: All right.

12 Would you summarize for us how you went about this
13 responsibility for the Applicant?

14 THE WITNESS: Did you say Contention 6-B?

15 CHAIRMAN GLEASON: Yes. In connection with
16 Contention 6-B. Excuse me.

17 THE WITNESS: 6-B questions the ability of the
18 Pennsylvania Bureau of Rad Protection and Toxology, commonly
19 referred to as BRP, to fulfill its mission in times of an
20 emergency and it suggests that due to lack of personnel and
21 lack of money that BRP could not perform its tasks.

22 I reviewed in the State Annex E Radiological
23 Emergency Response Plan the missions and responsibilities
24 assigned to BER -- BRP by the PEMA plan and also reviewed
25 the criteria of NUREG-0654 to determine what additional

1 requirements, if any, were.

2 In addition to reviewing those documents, I also
3 met on a couple of occasions with the Director of the Bureau
4 of Radiation Protection, Mr. Tom Gerusky, with Mrs. -- Ms.
5 Maggie -- Margaret Riley, and with the plans officer of BRP,
6 Dr. Levant.

7 Based on both my understanding of the BRP's
8 operation, the reviewing of the facilities available to the
9 BRP, my discussions as far as the terms of money the BRP has
10 received from the Commonwealth of Pennsylvania in their
11 current budget, I drew the conclusion that BRP was capable
12 of performing its mission satisfactorily.

13 That basically is the sense of my testimony.

14 CHAIRMAN GLEASON: Does the Staff have any cross
15 examination?

16 MR. CUTCHIN: None, Mr. Chairman.

17 CHAIRMAN GLEASON: I am sorry. I am out of order
18 again.

19 Does the Commonwealth have some questions?

20 MR. ADLER: No, sir.

21 CHAIRMAN GLEASON: Mr. Schultz?

22 MR. SCHULTZ: We have no questions, Mr. Chairman.

23 BOARD EXAMINATION - Resumed

24 BY JUDGE PURDOM:

25 Q On the second page of your testimony, in I guess

1 it is the second paragraph, you say BRP received last year
2 some \$300,000. What was the period of time covered by last
3 year? I mean, is that July 1 to some year -- to July 1.
4 What was the period, the time you had in mind there?

5 A I forget the exact date, sir, but approximately a
6 year ago the legislature gave to, or passed a budget item
7 for BRP, an additional budget item of some \$300,000. That
8 is a one-time --

9 Q Was that for the word 1981, or the year 1980 or do
10 you know?

11 A I do not recall, sir.

12 Q You say they passed a budget item. Was that an
13 authorization to appropriate the money or was that an actual
14 appropriation?

15 A It was an actual appropriation, sir.

16 Q You say in the next sentence that it had received
17 additional funding through Department reprogramming for
18 further equipment upgrading. How much was that additional
19 funding? Do you know?

20 A I do not know, sir. There was some monies for
21 communications gear as well as additional equipment for the
22 mobile laboratory.

23 Q You say down in about the last sentence of that
24 paragraph that the BRP staffing has increased from 21 to 27.
25 When was the date of that 27? Is it 1980, 1981 figure or

1 what?

2 A That is within September of this year. All of the
3 -- excuse me. Their present strength is, as of September,
4 was 27 people. It has been over the past year that they
5 have gone up from the 21 to the 27.

6 Q So those are 27 actual bodies on the job?

7 A That is correct, sir.

8 Q Now you do not say anything about the type of
9 personnel involved there, as to whether those are
10 professional people or clerks or physicists.

11 A All of the additional people were professional
12 personnel. Five of their personnel are clerical personnel.
13 Thirteen are health physicists. Two are nuclear engineers,
14 one environmental engineer. I am not certain of the
15 others. But they are professionals except for five.

16 Q So that the 21 to 27 -- the six people were
17 professional personnel?

18 A That is correct, sir.

19 Q They had technical training at least at the
20 college level?

21 A I know one of them is a nuclear engineer, but I am
22 not certain specifically what the other several were.

23 Q You do not know whether they would have had
24 experience in addition to academic training or not?

25 A That is correct. I do not, sir.

1 MR. ADLER: Sir, I believe Ms. Riley will be able
2 to give you accurate and up-to-date figures on those.

3 JUDGE PURDOM: Well, this witness sponsored these
4 figures. I am just trying to see what he knew about them.

5 BY JUDGE PURDOM: (resuming)

6 Q You say you think they have the capability of
7 carrying out this function. Is that based on some analysis
8 you made as to how many people they should have and you came
9 up with the number 27 and they have the number 27? How did
10 you arrive at that determination?

11 A I arrived at that determination by my experience
12 with the BRP office and operations over the past three or
13 four years as the Director of the PEMA and my review of
14 their current operations within the past sixty days -- they
15 moved to new locations; they have established an operations
16 center -- the overall improvements as well as the results of
17 the 2 June exercise that was run down in the TMI area.

18 Q I take it, then, you did not make any task
19 analysis?

20 A I did not.

21 Q Are you aware of any standards as to what their
22 staffing pattern should be?

23 A At the present time they are up to their
24 authorized strength and their Director, Mr. Gerusky, is
25 comfortable with the number of people that he presently has.

1 JUDGE PURDOM: That is all the questions I have.

2 BOARD EXAMINATION

3 BY JUDGE BRIGHT:

4 Q Mr. Henderson, just so we can kind of connect the
5 Contention with your answer here, would you explain to me
6 for the record the difference or sameness of the Office of
7 Radiological Health to the Bureau of Radiation Protection?

8 A Sir, I believe that this is a misname in the
9 Contention. This is -- I am comfortable that this is the
10 Bureau of Radiation Protection to which this allegation has
11 been made. I have no other connection between the Office of
12 Radiological Health.

13 Q So you are stating that you interpreted the
14 Contention as really talking about --

15 A The Bureau of Radiation Protection.

16 Q Bureau of Radiation Protection.

17 A Yes, sir.

18 Q Because that is the one that has the duties that
19 are mentioned here in the Contention?

20 A That is correct. And the director of that office
21 is the one who allegedly made that additional statement
22 there that I am not commenting upon, but that was my way of
23 tying that in, that that was exactly the BRP office which
24 was being referred to.

25 JUDGE BRIGHT: Thank you.

1 CHAIRMAN GLEASON: I just want to -- does the
2 State agree that that is the office that was intended to be
3 covered by that Contention?

4 MR. ADLER: That is correct. About ten years ago
5 or so there was an Office of Radiological Health in the
6 Department of Health, but their functions have now been
7 transferred to the Bureau of Radiation Protection within the
8 Department of Environmental Resources, which was created
9 about a decade ago.

10 MR. SILBERG: Mr. Chairman, in the March 1979
11 prehearing conference, when this Contention was discussed,
12 it was clear from the discussion that it was the Bureau of
13 Radiation Protection that was involved and, indeed, the
14 Environmental Coalition on Nuclear Power, which was the
15 sponsor of this Contention, identified Mr. Gerusky as the
16 person who allegedly made the statement which led to that
17 quote and his name appears in the transcript of that
18 prehearing conference.

19 CHAIRMAN GLEASON: Is Mr. Gerusky still around?

20 MR. ADLER: Yes, he is.

21 THE WITNESS: He is still the Director, yes.

22 CHAIRMAN GLEASON: Do you want to testify or does
23 he want to testify. Please, I am asking the witness.

24 MR. SILBERG: I think Mr. Adler answered the
25 question.

1 MR. ADLER: I am sorry. I thought you were asking
2 general information.

3 CHAIRMAN GLEASON: It is hard for me to test this
4 witness by other answers at times.

5 BOARD EXAMINATION

6 BY CHAIRMAN GLEASON:

7 Q Did you ask Mr. Gerusky about that statement that
8 is in the body of the Contention?

9 A I showed him the statement but I do not recall
10 whether he admitted or denied having made it. I cannot
11 recall now what our conversation was on it.

12 Q Are you -- do you have a good relationship with
13 Mr. Gerusky?

14 A Yes, sir.

15 Q Do you call him on a first-name basis?

16 A Yes, sir.

17 Q What is his first name?

18 A Tom.

19 Q Why didn't you say, hey, Tom, did you make that
20 dumb statement or something? I mean, that seems to be such
21 a natural thing to do.

22 (Laughter.)

23 A I did not.

24 Q I am having a little hard time. I suppose if I
25 read in the right places I would not have such a hard time,

1 but where did -- BRP is part of the Department of
2 Environmental Resources. Where does PEMA sit with respect
3 to that department?

4 A PEMA is a separate office, sir, under the Office
5 of the Governor, reporting directly to the Governor. The
6 Bureau of Radiation Protection is a bureau of the Department
7 of Environmental Resources.

8 Q All right. How many -- do you know -- does PEMA
9 act as a watchdog over the Bureau of Resources -- the Bureau
10 of Radiation Protection? What is their function?

11 A Not as a watchdog. During emergencies of any kind
12 the Pennsylvania Emergency Management Agency activates its
13 emergency operations center, which includes representation
14 from all state agencies having an emergency role, which
15 includes the BRP representation in the --

16 Q The State Police are in there?

17 A State Police and some sixteen agencies.

18 Q It is that agency that you headed up?

19 A That is correct, sir.

20 Q What would be the staffing of that agency? I
21 realize I am a little bit out of the Contention here, but --

22 A Approximately sixty personnel, not all in the
23 Harrisburg office. They also have three area headquarters
24 located eastern, central and western Pennsylvania. They
25 also have a maintenance facility for radiological

1 instruments at Ft. Indiantown Gap and the supply depot at
2 Ft. Indiantown Gap.

3 So I would estimate approximately forty of their
4 personnel are in the Harrisburg office.

5 Q And is it one of the responsibilities of that
6 department to evaluate the capabilities and the resources
7 that are available to meet emergencies?

8 A It is the Governor's emergency management agency
9 and it is the agency through which the Governor exercises
10 his responsibilities for the health, safety and wellbeing of
11 the citizens of Pennsylvania.

12 Q So then when one asks you a question about the
13 increase of resources in the Bureau of Radiation Protection
14 as a result of -- whether it is from Three Mile Island and
15 whatever other needs are assessed to be met, you do not only
16 have to rely on what the head of that agency told you, are
17 you satisfied with an increase from 31 to 37?

18 But you did an evaluation of that. Do you think
19 it is adequate to handle the problems of emergencies that
20 might come up for, well, in this case, a nuclear
21 radiological accident?

22 A Yes, sir.

23 Q How long ago was it that you made this -- you see,
24 I have a hard time evaluating these two pages here, because
25 to me it is not testimony. It is kind of a summary. It is

1 statements.

2 How long ago did you do this work that forms the
3 basis of this statement?

4 A I believe it was in July -- the latter part of
5 July -- and then I updated the financial data in early
6 September.

7 Q Does the -- I do not know what the Government's
8 fiscal year is here in the Commonwealth of Pennsylvania.
9 What is it here? Is it October to October?

10 A That is correct, sir.

11 Q I think I did notice somewhere that the state is
12 in some kind of an economy movement that calls for reduction
13 of personnel. Is this agency -- did you find out whether
14 this agency is going to be subject to any reductions of
15 personnel?

16 A That is information that I am not privy to. I am
17 not aware of it. The agency head believes that he is going
18 to remain at this strength.

19

20

21

22

23

24

25

1 Q When will it have the statewide
2 radiocommunications system in place? I am talking about the
3 Department of Environmental Resources now.

4 A At the present time the link that is missing is
5 the western Pennsylvania link. It has at the present time
6 communications with its Reading office -- I am sorry --
7 Warnersville, I believe -- of the eastern office.

8 Q I'm sorry. Did I get an answer to the question?

9 A I do not know when the final system will be
10 completed. The shortfall at the present time is in western
11 Pennsylvania around the Beaver plant. They do not have the
12 communication line, the radiocommunication extended to
13 western Pennsylvania at the present time.

14 (Pause.)

15 Q Did you in your survey, whatever you term the
16 review of what you did with respect to the Bureau of
17 Radiation Protection's responsibilities, did you review the
18 efficacy of the tasks that they are statutorily or
19 organizationally entrusted to carry out?

20 A I did not. My concerns and the way I address
21 this, I was aware of certain weaknesses, what I considered
22 weaknesses, in the office BRP as during the TMI incident --
23 shortage of manpower, shortage of equipment, lack of liaison
24 personnel availability during the March '79 incident to
25 provide liaison personnel to the PEMA office.

1 The upgrading of their personnel and their
2 capabilities now meet those shortfalls that existed in March
3 of '79 in my judgment, and basically that is what I based
4 this on.

5 Q Shortfalls in what area?

6 A Shortfalls in the ability to have nuclear
7 engineers at the facility, to have liaison personnel with
8 the PEMA office in Harrisburg, and the ability to provide
9 assistance to county governments.

10 There was also at that time a shortage in the
11 ability to communicate between their various agencies or
12 their various personnel and PEMA. And those shortfalls have
13 been corrected. They do have hot line communications now
14 with the facilities. They have communications with their
15 mobile monitoring teams. They have communications with
16 their mobile laboratory. They have hot lines to PEMA and so
17 forth.

18 Q How about their authority to conduct incident
19 assessments?

20 A Yes, they have the ability. Now, I cannot --

21 Q Did you evaluate it?

22 A I cannot evaluate it in terms of what their
23 ability was before.

24 Q How about the coordination of placement of offsite
25 monitoring places?

1 A Yes, sir.

2 Q You evaluated that capability?

3 A And they have the capability. They have the
4 offsite locations for the Susequehanna steam electric
5 station.

6 Q And in your judgment that is an adequate
7 capability.

8 A Yes, sir.

9 Q How about maintaining a watch system?

10 A Yes, sir. It is their term for a designated watch
11 person on duty during off-duty hours subject to being called
12 during off-duty hours who must remain near the telephone.
13 The system does work. It has worked well for a good number
14 of years. And they can rapidly mobilize their forces.

15 Q How about the development of public information
16 programs regarding radiation?

17 A They have the responsibility to assist PEMA in the
18 development of this information. I do not know at this time
19 how much advice and assistance they have provided to PEMA.
20 They do have the capability.

21 Q What responsibilities do they have on radiological
22 exposure control?

23 A They have the responsibility to notify through the
24 PEMA network emergency forces who may be operating in the
25 area and advise them of protective actions that should be

1 taken. They have the responsibility for recording TLDs,
2 receiving records and reports of people who may be exposed
3 to nuclear radiation.

4 Q To they have an organizational structure where
5 there are lead persons for each nuclear facility in the
6 state, or just how have they set themselves up on a
7 functional basis?

8 A Their long-range plan is to have a nuclear
9 engineer on site at each nuclear facility. At the present
10 time they only have two nuclear engineers, and they need to
11 move around.

12 Q So would you once again say they are adequately
13 staffed?

14 A Yes, I would. We have now in the Commonwealth of
15 Pennsylvania three operating plants. They have two nuclear
16 engineers to cover them. I believe that is adequate.

17 (Pause.)

18 Q So it is your testimony, I gather, that you find
19 them adequate to carry out their responsibilities.

20 A That is correct, sir.

21 BY DR. PURDOM:

22 Q One aspect of this Contention 6-B is an allegation
23 that they would not be able to respond at all hours to an
24 accident at a nuclear facility. You responded to a question
25 by the Chairman about nonduty watch system, but did you get

1 into their personnel staffing and matters such as vacations,
2 holidays, things of this kind, as to whether their resources
3 were in enough depth to cover this kind of circumstance at
4 such times?

5 A I believe they have the adequate depth at the
6 present time to cover. Of course, during emergencies
7 personnel, as they always have in state government, have
8 been called back from vacation if they are not immediately
9 available at the initiation of the emergency.

10 Q Are you saying they would not let these two
11 nuclear engineers take a vacation at the same time?

12 A I did not look into that, but I would be highly
13 suspicious if they were to let them both go at the same time
14 on vacation. I do not believe they would.

15 CHAIRMAN GLEASON: Is there further questions?

16 (No response.)

17 CHAIRMAN GLEASON: Is there any redirect?

18 MR. SILBERG: No, sir.

19 BY CHAIRMAN GLEASON. (Resuming)

20 Q Mr. Henderson, I am sure we started out like this,
21 but just to refresh my memory once more, does emergency
22 management services have the responsibility for developing
23 the entire emergency plan for the Applicant?

24 A No, sir. Only for the off site boroughs,
25 townships -- boroughs and townships.

1 Q Boroughs and townships.

2 A Yes. The municipal plans. We have the
3 responsibility for assisting the municipalities. The
4 municipalities actually prepare them themselves.

5 CHAIRMAN GLEASON: All right. You may step down.

6 MR. SILBERG: He will also be our next witness, so
7 I don't know if we have to have him step down.

8 CHAIRMAN GLEASON: I think probably this would be
9 a good time to take a ten-minute break.

10 (Brief recess.)

11 CHAIRMAN GLEASON: If we could come to order,
12 please.

13 If the Applicant would proceed, please.

14 Whereupon,

15 ORAN K. HENDERSON

16 was recalled to the stand and, having been previously duly
17 sworn, was examined and testified as follows:

18 DIRECT EXAMINATION

19 BY MR. SILBERG:

20 Q Mr. Henderson, I am showing you a document
21 entitled, "Applicant's Testimony of Oran K. Henderson on
22 Contention 6-C." Was this document prepared by you or under
23 your direct supervision and control?

24 A It was.

25 Q Is it true and correct to the best of your

1 knowledge and belief?

2 A It is.

3 Q Do you adopt it as your testimony in this
4 proceeding on Contention 6-C?

5 A I do.

6 MR. SILBERG: Mr. Chairman, I am handing the
7 Reporter the document just identified. I would ask that
8 this be incorporated in the transcript at this point as if
9 read as Mr. Henderson's testimony on Contention 6-C.

10 CHAIRMAN GLEASON: Is there objection, please?

11 (No response.)

12 CHAIRMAN GLEASON: Hearing none, the document
13 furnished to the Reporter will be included in the transcript
14 of the proceeding as the testimony of Mr. Henderson as if
15 read.

16 (The document referred to follows:)

17

18

19

20

21

22

23

24

25

101
6
UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
PENNSYLVANIA POWER & LIGHT COMPANY)
)
 and) Docket Nos. 50-387
) 50-388
ALLEGHENY ELECTRIC COOPERATIVE, INC.)
)
(Susquehanna Steam Electric Station,)
Units 1 and 2))

APPLICANTS' TESTIMONY OF
ORAN K. HENDERSON
ON CONTENTION 6(c)

September 29, 1981

Contention 6c.

The plan includes insufficient information with respect to either the training of or the adequacy of radiation hazard safe-guards to protect local emergency units which may be required to participate in emergency evacuation procedures or which may be required to deal with onsite situations. The plan does not state whether the public or the utility will provide the training in protection and procedure required by local emergency units to coordinate a safe, systematic evacuation.

Analysis:

Appendix 10, "Training", to Annex E "Fixed Nuclear Facility Incidents" (February 23, 1981) to the Commonwealth of Pennsylvania Disaster Operations Plan assigns to the Pennsylvania Emergency Management Agency overall responsibility for training. The above cited Appendix identifies currently available and planned courses of instruction, description of the courses, target audience and length of course. The following table reflects these data:

<u>Course Title</u>	<u>Target Audience</u>	<u>*Duration</u>	<u>Responsible Organization</u>
1. Orientation	Adjacent States	3 hours	PEMA
2. Emergency Planning	State and County Planners	1 week	FEMA
3. Emergency Response Teams	Technical personnel	2 weeks	DOE
4. Emergency Responders	Fire and Police	TBA	PEMA/FEMA
5. Accident Assessment	Technical personnel	TBA	FEMA
6. Orientation	Elected Officials	3 hours	PEMA
7. Emergency Medical Technicians	Ambulance Crews	TBA	PA Department of Health
8. Radiological Preparedness-Medical	Hospital Emergency Room Supervisors	TBA	PA Department of Health
9. Radiological Preparedness-Medical	Emergency Room Personnel	TBA	PA Department of Health
10. Radiological Preparedness-Medical	Medical Consultants	1 week	REAC/TS
11. Seminar	USDA County Agents	TBA	PA Department of Agriculture

* TBA - to be announced

The above courses (less orientations), are generally technical and specifically designed to prepare personnel who may be involved in radiological emergencies.

In Section II "General" (page 2) of the cited Annex E, readers and users of the state RERP are reminded of the overall similarities between disasters/emergencies regardless of their cause. Emergency Management and emergency services personnel are involved in other training which contributes to their overall professional development. The Federal Emergency Management Agency conducts both at its Emmitsburg Staff College and through regional training teams, courses which focus on those activities useful to county and municipal emergency coordinators in preparing for emergency operations.

PEMA announces annually the availability of these career development courses. Paragraph "M", Section IV "Purpose" (page 6) of Annex E highlights the importance attributed to training by describing it as one of the several purposes of the RERP. Paragraph "C", Section VI "Concept of Operations," (page 8) assigns the Director, PEMA responsibility for providing guidance to State agencies and political subdivisions for the training of personnel with planning duties. Paragraph "U", Section VI, of the State RERP (page 11) describes the State's commitment to participate in annual full-scale and to support, as required, small-scale exercises. Appendix 14 to the State RERP (page 14-1) describes exercises and drills applicable to all state agencies, municipalities and facilities. It provides for their frequency and scope.

The following cited references to the Commonwealth of Pennsylvania Annex E "RERP" reflects further training activities:

<u>Reference Cite</u>	<u>Responsible Agency</u>	<u>Activity</u>
Section VII A.1.g. (page 11)	State Agencies	participate in tests and exercises
Section VII A.3.j. (page 13)	Dept. of Agriculture	conduct annual seminars
Section VII A.7.g. (page 15)	Dept. of Education	develop educational programs
Section VII A.8.n. (page 16)	BRP, DER	develop public education material
Section VII A.13.a. (page 18)	Governor's Press Secretary	establish policies for I & E programs
Section VII A.14.k. (3)&(4) (page 19)	Dept. of Health	1) conduct medical training 2) develop public education material
Section VII A.17.u. (page 22)	PEMA	conduct annual media orientation
Section VII A.17.v. (page 22)	PEMA	conduct annual exercise
Section VII A.17.w. (page 22)	PEMA	conduct periodic drills
Section VII A.17.x. (page 22)	PEMA	participate in drills and exercises
Section VII A.17.y.	PEMA	coordinate training
Section VII A.17.z. & a.a. (page 22-23)	PEMA	public education
Section VII B.1.g. (page 26)	Risk Counties	develop public information material
Section VII B.1.a.a. (page 27)	Risk Counties	conduct drills and exercises
Section VII B.1.i.i. (page 28)	Risk Counties	participate in training
Section VII B.1.j.j. (page 28)	Risk Counties	participate in news media orientation
Section VII B.1.m.m. (page 28)	Risk Counties	emergency response training
Section VII B.2.v. (page 30)	Support Counties	participate in exercises
Appendix 5.12. (page 5-1)	Utility	participate in tests and exercises
Appendix 5.15. (page 5-2)	Utility	provide training to offsite organization

The above citations and description represent a comprehensive approach to training and reflect an integration of the total training and education requirement in preparation for an incident at any nuclear power facility.

Annex R "Training" to the Columbia and Luzerne County RERPs emphasizes the thrust of the State training scheme and details numbers of persons to participate in the various courses of instruction. The Luzerne and Columbia County RERPs provide for county to train municipal emergency response personnel. Representatives from Columbia and Luzerne County emergency management organizations are scheduled to attend a one week course of instruction on emergency planning offered by the Federal Emergency Management Agency in October 1981.

PEMA has published a Circular, dated September 14, 1981, which is a consolidated listing of its Fiscal Year 1981 (October 1981 - September 1982) training program. The Circular announces the conduct of the following courses directly contributing to radiological emergency preparedness: a Shelter Manager Instructor workshop (July 1982); a Basic Radiological Defense Officers' course (October 1981); and a Radiological Monitoring Practical Instrumentation course (January 1982). The September 14th Circular describes procedures to obtain PEMA assistance in the conduct of special courses desired by counties.

Summary: A review of the several courses of instruction offered emergency management and emergency response personnel by the Federal, State and county governments and by PP&L (SSES) to offsite agencies fully meets or exceeds the standards enumerated in NUREG 0654. The training, drills and exercises will provide county and local governments the capability to "coordinate a safe, systematic evacuation" and will provide adequate "radiation hazard safeguards" for emergency forces.

1 CHAIRMAN GLEASON: Excuse me a minute. Am I
2 operating under the misapprehension that you were to have
3 two witnesses or they are not going to testify at the same
4 point, I gather.

5 MR. SILBERG: No. There are two separate pieces
6 of testimony on this contention.

7 CHAIRMAN GLEASON: Fine.

8 MR. SILBERG: Generally, Mr. Henderson's testimony
9 deals with off site training, Mr. Cantone's testimony with
10 training conducted by PP&L of off site personnel.

11 CHAIRMAN GLEASON: Is the witness available?

12 MR. SILBERG: Yes, sir.

13 CHAIRMAN GLEASON: Would you want to summarize
14 what your responsibilities were, how you carried them out in
15 connection with this part of the contention, please?

16 THE WITNESS: Yes, sir.

17 The contention is there was insufficient
18 information in the plan that was reviewed last February with
19 respect to the training of and the adequacy of radiation
20 safeguards to protect local emergency units. And also it
21 was contended that the state plan or that the plan did not
22 state whether the public or the utility will provide the
23 training in protection and procedures required by local
24 emergency units to coordinate a safe, systematic evacuation.

25 I am addressing that part that deals with off site

1 training as opposed to the on site training. I used again
2 Annex E, the state radiological emergency response plan, and
3 pulled from Annex E Appendix 10, Training, those training
4 courses and periods of orientation and seminars that are
5 listed therein showing the target audience or the course
6 title, the target audience, the duration of the course, and
7 the responsible organization for providing the periods of
8 instruction.

9 This addresses the contention as to whether there
10 is adequate training being planned in order to protect the
11 safety of local emergency organizations.

12 Now, throughout the state's radiological plan,
13 Annex E, there are a number of citations and references in
14 the document to responsible agencies and activities
15 responsible for drills, tests and exercises that further
16 provide a high degree of training to the emergency forces.

17 I also make reference to a PEMA circular which
18 they publish on an annual basis which reviews the fiscal
19 year, the current fiscal year training courses that PEMA is
20 offering, and provides the procedures for counties and
21 municipal governments to receive this training.

22 It is my judgment that based upon this plan that
23 there are adequate courses of instruction and that the
24 training and drills and exercises that is being provided for
25 will provide the emergency management organizations proper

1 training in order that they can coordinate a safe,
2 systematic evacuation and will provide for radiation
3 safeguards -- hazard safeguards for these emergency forces.
4 In essence, that is the basis or that is the thumbnail
5 sketch of what I am testifying to.

6 CHAIRMAN GLEASON: All right. Does the State have
7 any questions it would like to direct to the witness?

8 MR. ADLER: No, sir.

9 MR. SCHULTZ: We have no questions at this time,
10 Mr. Chairman.

11 CHAIRMAN GLEASON: All right.
12 Staff?

13 MR. CATCHIN: Staff has no questions, sir.

14 BOARD EXAMINATION

15 BY CHAIRMAN GLEASON:

16 Q Mr. Henderson, these courses that are listed here,
17 which presumably are under the jurisdiction of PEMA and also
18 the Department of Health, the Department of Agriculture,
19 where are these courses held? How often are they given?
20 And how well have they been attended?

21 A Well, I would say that most of them presently are
22 in the plan, in the draft plan. Many of them have not yet
23 been activated. Many of them have. For example, the
24 orientation of adjacent states, three hours of instruction
25 to be given by PEMA, that is intended to be an annual

1 conference.

2 The number 2, the emergency planning for state and
3 county planners is a one-week course given by FEMA. It is
4 conducted at Emmitsburg, and it is my understanding that
5 both the executive director of Luzerne County and the
6 director, civil defense director of Columbia County are
7 scheduled to attend that course later this month. It is
8 given at least twice a year at the National Emergency Staff
9 College Emmitsburg.

10 The emergency response teams, number 3, protective
11 personnel, given by DOE, that is out in the west, that is
12 given several times a year on request. People eligible and
13 wanting to go to it must put in an application. Personnel
14 from PEMA have attended that course in the past.

15 The emergency responders training for fire and
16 police given by PEMA and FEMA is an ongoing course of
17 instruction. This covers not only radiological by also
18 toxic chemical spills and so forth, and that is an ongoing
19 course given very regularly.

20 The accident assessment --

21 (Pause.)

22 The frequency of it is announced by FEMA in their
23 training catalog, and at the present moment I cannot find
24 it. However, I know that it is in there.

25 The other courses of instruction are given

1 periodically, the orientations and seminars as required.
2 There is one additional course that I am aware of that PEMA
3 is putting on now and will be putting on around this area in
4 the near future, and that is a course on personnel
5 decontamination monitoring, dosimetry, recordkeeping and
6 radiation protection procedures. That is a three-hour
7 course, and it is by provided by county request to PEMA.

8 Have I answered your question, sir?

9 Q Well, how about the rest of them?

10 A All right. The emergency medical technicians --
11 excuse me -- the orientation of elected officials, that is
12 an annual orientation that is given by PEMA usually in
13 January and February.

14 Q Is there an indication as to where these courses
15 are to be held?

16 A Well, this orientation, for example, is given in
17 each of the PEMA regions. Most of the courses that are
18 given by PEMA are given down at the county level or
19 centralized within Pennsylvania. PEMA is divided into three
20 areas and approximately 20 counties in each area, and most
21 of the courses are put on either at the county level or
22 within that region in which that county is associated with.

23

24

25

1 Q Does it say it is going to be in the county
2 courthouse or county library?

3 A It frequently is, or it is at the Holiday Inn or
4 wherever the instructors and -- the -- I can answer your
5 question with a little -- the PEMA circular dated September
6 14 lists, for example, the radiological defense officers
7 course in the Hazelton area. That is as close as they come
8 to a location. It was held on the 3rd and 4th of October
9 and again on the 10th and 11th of October of this year.

10 A hazard mitigation planning workshop in the
11 Reading area, November 16 to the 19th of this year.

12 Another basic radiological defense officers course
13 next June in the Clearfield area.

14 A shelter managers instructor workshop in the
15 State College area in July of '82.

16 In support of these plans the circular does
17 describe where the courses of instruction will be held.

18 Q All right. Why don't you go on with the remaining
19 ones?

20 A The radiological preparedness medical put out by
21 the Department of Health is provided at the hospitals.

22 The radiological preparedness medical consultants,
23 that one-week course that is conducted at Oak Ridge,
24 Tennessee by the radiological emergency assistance training
25 center site.

1 Q Are those one-week courses?

2 A That is a one-week course, yes, sir.

3 The plan for the Department of Agriculture, the
4 seminar for the USDA county agents, I do not know the length
5 of the course, nor where it will be held, nor the frequency
6 of that course.

7 Q And who finances those, those courses?

8 A They are financed in several ways. The federal
9 government, FEMA, provides PEMA an allocation of training
10 funds on an annual basis. PEMA is then permitted within
11 that allocation of funding to pay for food and lodging
12 and/or travel for personnel attending certain of its
13 sponsored courses of instruction.

14 In time -- and I am out of the picture for about a
15 year -- but it was about a year ago the funds, although they
16 amounted to about \$100,000 a year at that time, did not
17 permit us to do all of the training that we would liked to
18 have done and pay for the hotel rooms and motel rooms or
19 food and motel rooms and the travel at the same time. So we
20 would try to schedule the activity as close to the audience,
21 the target audience, as we could to reduce the travel time
22 and not pay for travel; but we did pay for the actual cost
23 of hotel rooms and/or motel rooms and food.

24 (Board conferring.)

25 Q Is there a legal requirement for individuals who

1 have responsibilities to carry out off site to participate
2 in training programs?

3 A The Pennsylvania pamphlet law, 1332, which applies
4 to emergency management -- the Emergency Management Services
5 Act, pamphlet law 1332, provides that municipal or that
6 political -- that county directors will attend periods of
7 instruction scheduled by PEMA. It also requires them to
8 attend professional development courses put on by FEMA or
9 PEMA.

10 There is nothing in the act that specifies that
11 there be emergency management training as far as
12 radiological matters are concerned.

13 Q Do you think this is a deficiency?

14 A Well, at the time in 1978 when that pamphlet law
15 was put out, radiation matters were a little bit far from
16 our mind. I do not believe it is a deficiency. I believe
17 that the state in its plan has recognized the importance of
18 training by the numbers of courses that they are providing
19 and for the selection of the target audience, that it is
20 integrated between the federal agencies and the state,
21 whereas the state is taking advantage of several courses put
22 on by the federal government. I do not believe that is a
23 deficiency.

24 Q Somehow I feel you are departing from your
25 military training when you make that kind of a statement,

1 and I wondered just how good any military operation of yours
2 would be if you allowed the troops to carry it out.

3 A Well, it is not a question of having the troops to
4 carry it out. The question is whether I need to be told by
5 law that I must --

6 Q I assume in general you would not have to tell a
7 soldier more than once that he has to do something and he is
8 going to carry it out. And what is going to make the horse
9 drink in this context, if you understand my use of the
10 vernacular here. What is going to, you know, what is going
11 to -- we are talking about the Annex E plans here, and if
12 you do not have people actually participating in the
13 training who have responsibility, how can you say that is
14 not a deficiency?

15 On what basis do you say that is not a
16 deficiency? You have already said it is not in your
17 judgment, so I cannot contradict what you have said.

18 A Well, since we are referring to the plans, the
19 Luzerne County plan, for example, in its annex on training
20 lists the various training courses that are available,
21 designates the numbers of spaces that it is going to
22 require, the number of people that it is going to be
23 required to be trained this year in X course, and also
24 indicates the number of people that are going to in
25 subsequent years require refresher training.

1 Now, I assume that if PEMA --

2 Q As a part of its own plan, you mean?

3 A This is a part of its own plan.

4 Q Okay.

5 A Which goes on to PEMA so PEMA can plan on its
6 training base.

7 Now, perhaps if the plan does not work in
8 subsequent years, you know, some other action may need to be
9 taken; but at the present time it is my feeling that it is
10 adequately expressed in the plan that Luzerne County,
11 Columbia County will participate with these numbers of
12 people in the various training programs that are being
13 offered.

14 If we find out later that they are not turning out
15 six people or twelve people or twenty, then perhaps some
16 other action may need to be taken. And it is primarily one
17 of incentive. Many of the people that we are trying to
18 train are volunteers, and it is hard to get a volunteer to
19 be able to go to a one-week course of instruction where he
20 is not reimbursed and provided food and lodging, but --

21 Q Many are not volunteers, too. They are paid
22 public servants.

23 A Your county coordinators are; none of the local
24 municipal coordinators are paid for their emergency
25 management jobs in this area.

1 Q Well, I am not saying they are all unpaid.

2 Certainly the state people are not unpaid.

3 A That is right.

4 Q Are they required to take these training courses?

5 A Yes, sir.

6 Q What if they don't?

7 A What have they done?

8 Q I said what if they don't. Do you know what
9 happens if they do not take them?

10 A I can only say -- -

11 Q I mean -- let me reorient the purpose of my
12 question. The contention talks about the inadequacy of
13 information with respect to training, and you said hey,
14 there is lots of training in the plan. And I am saying
15 well, that is a title of a course, but you know, training
16 means a student body there to take the course.

17 Have you evaluated whether they are going to have
18 to take the courses? That is what I am asking you. And I
19 just think, you know, it is kind of a relevant question. I
20 think it is a relevant question, not kind of. It is a
21 relevant question.

22 A To back up again, I do not believe it is required
23 to be in the -- codified in law that the individuals will
24 take any specific courses, these specific courses of
25 instruction. I think by making the courses available,

1 bringing the courses as close to them as you can, that you
2 are going to encourage their attendance. They are
3 volunteers, but that being volunteers they are very
4 dedicated people. They do have problems of being able to
5 take -- I am speaking now of the municipal directors. They
6 do have time problems, taking off for any extensive periods
7 of instruction. They can take off for an afternoon or an
8 evening, fine. And PEMA frequently provides these periods
9 of instruction on weekends and in the evenings to
10 accommodate the municipal directors.

11 Q How about the personnel from Berwick or
12 Nanticoke? Have they participated in these programs? Are
13 they volunteers?

14 A Yes, sir.

15 Q They are?

16 A Yes, sir.

17 Q Well, volunteer or not, obviously you cannot
18 require a volunteer. There is no penalty against a
19 volunteer. But I guess what I am after is your assessment
20 as to whether that is a defect in the adequacy of
21 information with respect to the plan, and you have answered
22 that in the negative.

23 A Correct, sir.

24 (Pause.)

25 CHAIRMAN GLEASON: All right. I have no further

1 questions.

2 (Board conferring.)

3 BY CHAIRMAN GLEASON: (Resuming)

4 Q Is there any requirement for training or any
5 indication of training in the plans with respect to the
6 responsibilities to be carried out by bus drivers in the
7 eventuality of a radiological emergency?

8 A I am not aware of any, sir.

9 (Board conferring.)

10 BY MR. BRIGHT: -

11 Q Mr. Henderson, I hope this does not offer a
12 repetitious question, but you make the statement in your
13 first sentence of the summary that these programs fully meet
14 or exceed the standards enumerated in NUREG-0654. And I
15 would just like to ask you if the basis for that is
16 contained in 0654, specifically on page 75, indicating
17 radiological emergency response training?

18 A Both page 75 and 76, sir?

19 Q Yes. That whole section, sir.

20 A Oh, yes, sir.

21 Q And more specifically, under 1-B on page 75.

22 A Yes, sir.

23 Q I just wanted to know where you evaluated whether
24 it met the requirements of 0654.

25 A Under 6-B the next witness is going to testify.

1 Q On the on site?

2 A On the on site for off site responders.

3 Q I understand that. I just wanted to make sure
4 where your statement came from.

5 A Yes, sir.

6 MR. BRIGHT: Thank you.

7 BY CHAIRMAN GLEASON: (Resuming)

8 Q Are you saying that that training refers to off
9 site personnel who will be carrying on site responsibilities?

10 A I am saying yes to your question. This is
11 provided by on site agencies -- by the PP&L to offsite
12 response organizations with whom they have agreements which
13 to provide ambulances, police and fire.

14 (Board conferring.)

15 Q It has been pointed out that 1-B is only for state
16 and local responses. Did you testify --

17 A As I translate that, it says that each off site
18 response organization -- police, fire, ambulance and so
19 forth -- shall participate and receive training. It tasks
20 the state and local governments to provide those personnel
21 to receive the training. And then in appendix to the state
22 plan, which are the responsibilities of the utility --

23 (Pause.)

24 Appendix 5. I am sorry. Appendix 5 to the state
25 rep which lists facility responsibility, paragraph 15

1 provides site -- this is a tasking by PEMA to the utility --
2 provide site specific response training on an annual basis
3 for offsite organizations who may provide emergency services
4 to the facility in the event of an emergency, to include
5 notification and site access procedures.

6 So what I am saying is that my translation of that
7 responsibility of the state is to provide those personnel
8 with the training which they have resigned the
9 responsibility to the on site organization.

10 Am I translating it wrong?

11 Q I think what is necessary is this is one of those
12 areas which is not the only one that there is a certain
13 degree of ambiguity to. It is very important, at least in
14 my mind as I read it, to clear that ambiguity up. Maybe
15 there is somebody that can clear it up. We may have to get
16 back to this with you after the State testifies.

17 I know we got into the question before about
18 funding assistance for the various training programs. What
19 was your response again? You said somebody got some money
20 from somebody. Would you go over that again?

21 A Yes, sir. The training that is put on by FEMA is
22 paid for, travel and per diem, and I am uncertain now
23 whether it is 75 percent of the total cost or whether it is
24 still 100 percent, but it is in that ballpark.

25 Q This is the one-week course on emergency planning

1 you are talking about?

2 A Yes, sir.

3 Q Okay.

4 A That is paid for by FEMA. These courses -- some
5 of the courses that are put on by PEMA, the orientation for
6 elected officials, there are no expenses associated with
7 that. The elected officials are invited to come to a
8 central location within that area. and they are oriented.
9 The adjacent states, there is no funding for that.

10 Q Do you mean PEMA travels around the state? They
11 will go to a county courthouse and tell all the elected
12 officials to come to this three-hour course?

13 A Yes, sir.

14 Q So there is no expense to that. All right.

15 A Some of the courses of instruction, radiological
16 defense officers courses, etcetera, etcetera, put on by
17 PEMA, the travel and per diem costs of the hotel lodging are
18 paid for by a grant or -- not a grant. It is a contractual
19 arrangement between PEMA and FEMA.

20 Q What does that mean?

21 A Annually PEMA enters into a contract with FEMA for
22 certain phases of training that PEMA can do.

23 Q You say -- PEMA says you put these kind of
24 requirements on us, and you are going to --

25 A FEMA provides funding for those courses of

1 training.

2 Q Do you know which ones?

3 (Pause.)

4 A Under the training and -- you do not have a copy
5 of the circular I am reading from, which is the PEMA
6 circular of September 14 of this year, which is their fiscal
7 year training, basic radiological defense officers training,
8 the career development courses 1, 2 and 3, shelter managers
9 workshops. These are the courses that would be reimbursed.

10 I have no knowledge of the Department of Health
11 and the Department of Agriculture as to whether there are
12 fundings associated with these courses of instruction.

13 Q How about the fire and police course, emergency
14 responders? Is that part of that contract obligation that
15 you are talking about between FEMA and PEMA?

16 A This course of instruction is provided by FEMA at
17 Emmitsburg. Those people who go down there to the Fire
18 Academy -- not the Fire Academy -- the National Emergency
19 Academy, are reimbursed by FEMA for that period of
20 instruction. PEMA has a similar course of instruction in
21 the central part of the state, and personnel there are
22 provided board and room or meals and rooms. I do not know
23 if they are reimbursed for travel.

24 (Board conferring.)

25 CHAIRMAN GLEASON: Do you have any redirect that

1 you would like to --

2 MR. SILBERG: No, sir.

3 CHAIRMAN GLEASON: Any other?

4 MR. SCHULTZ: I just have a couple follow-on
5 questions.

6 CHAIRMAN GLEASON: Let's let the -- go ahead, go
7 ahead.

8 CROSS EXAMINATION

9 BY MR. SCHULTZ:

10 Q Regarding the training of fire and police, it is
11 my understanding that, you know, there are certain aspects
12 of a radiological emergency that are different from other
13 kinds of emergencies. How are these crews going to be
14 trained to handle this?

15 A It is a requirement of the county to identify any
16 training requirements that are not specified or are already
17 isolated and specified by PEMA and to request that training.

18 Q So are you saying it is the county's
19 responsibility to train the local fire and police units?

20 A To train them or to request PEMA that they be --
21 if we are talking -- we are talking now about specialized
22 training such as decontamination. I assume that your
23 question is asking those kinds of questions, not training as
24 a fireman.

25 Q Oh, no, no. Specialized.

1 A And yes. And PEMA has the personnel available to
2 train emergency forces, including police and fire, on
3 personnel decontamination monitoring, on the use of
4 dosimetry, keeping of records and reports, and advice and
5 instructions on radiological protection procedures, personal
6 procedures for individuals.

7 Q Has Luzerne County made arrangements to have these
8 units trained?

9 A I do not know if the training has actually been
10 conducted or if Luzerne County has requested it. However,
11 PEMA plans that it will be accomplished in both Luzerne and
12 Columbia before the 19 March or 18 March exercise.

13 Q And how is this to be accomplished?

14 A PEMA is prepared to provide the instruction.
15 Well, I do not know the details as to whether or where it
16 will be held or anything further except that PEMA will do it
17 before the March exercise, and I presume the earlier the
18 better.

19 Q I am referring to a newspaper article from last
20 year, so I know that the situation may have changed; but can
21 you tell me if Salem Township has a civil defense director?

22 A Salem Township does. Bruce Thomas is his name.

23 Q What about Fairmount Township?

24 A I cannot answer that.

25 Q What about New Columbus Borough?

1 A Yes.

2 MR. SILBERG: Excuse me. What is the relevance of
3 this to his testimony on 6-C?

4 MR. SCHULTZ: I believe he testified that he has
5 worked with the local civil defense directors. I would just
6 like to know who they are if they exist.

7 MR. SILBERG: What is the relevance to the
8 testimony on this contention?

9 MR. SCHULTZ: I believe I have demonstrated the
10 relevance to what he has testified to.

11 CHAIRMAN GLEASON: He is testing the veracity of
12 the witness. Please go on.

13 THE WITNESS: I am sorry. What was the last one
14 you asked me about?

15 BY MR. SCHULTZ: (Resuming)

16 Q New Columbus borough.

17 A Marie Peahoto.

18 (Pause.)

19 MR. SCHULTZ: I have no further questions.

20 CHAIRMAN GLEASON: All right.

21 Mr. Adler.

22 MR. ADLER: Thank you. I think there is a little
23 bit of confusion in the record that I would like to try to
24 clear up.

25 BY MR. ADLER:

1 Q With respect to criterion 1-B on page 75 of
2 NUREG-0654, it refers to mutual aid districts which are
3 established pursuant to mutual aid agreements. Can you
4 define for the record a mutual aid agreement and what it
5 encompasses?

6 A No, I cannot.

7 CHAIRMAN GLEASON: Do you have something else you
8 would like to clear up on the record?

9 MR. ADLER: Yes. One more.

10 BY MR. ADLER: (Resuming)

11 Q On page 3 of your testimony you refer to the basic
12 radiological defense officers course given in October of
13 1981. You also refer to it in your oral testimony. Can you
14 tell me whether that course pertains to incidents at fixed
15 nuclear facilities or whether it refers to nuclear warfare
16 incident --

17 A It refers to nuclear warfare except that -- yes,
18 it refers to nuclear warfare.

19 MR. ADLER: Thank you. That is all.

20 MR. SILBERG: Mr. Chairman, could we just see that
21 newspaper clipping that Mr. Schultz was referring to? It
22 would be useful to determine whether we have any redirect.

23 CHAIRMAN GLEASON: One of you cross the room, get
24 the paper and take a look at it, please.

25 (Pause.)

1 MR. ADLER: Mr. Chairman, while we are waiting,
2 the next scheduled witness is Mr. Cantone on Contention 6-C
3 for the Applicant. It would greatly accommodate Ms.
4 Reilly's schedule if we could get her on today. And I
5 checked this with the Applicant. They have no objections to
6 taking her next.

7 With the Board's permission I would like to do
8 that.

9 CHAIRMAN GLEASON: Let me see. I really -- you
10 are assuming she will be through today?

11 MR. ADLER: I do not know.

12 CHAIRMAN GLEASON: I would not take that risk if I
13 were you. It is 4:30 now. We probably will not go past
14 5:00. So I would just as soon have her available in the
15 morning.

16 MR. ADLER: Okay.

17 (Pause.)

18 CHAIRMAN GLEASON: Is it your move, sir.

19 MR. SILBERG: Excuse me?

20 CHAIRMAN GLEASON: I say it is your move.

21 MR. SILBERG: I am sorry. We were just trying to
22 determine from that article whether Fairmount Township was
23 within or without the ten-mile emergency planning zone. The
24 article does not indicate and FEA does not know. I think we
25 could probably put some -- I can ask the witness.

1 REDIRECT EXAMINATION

2 BY MR. SILBERG:

3 Q Do you know whether Fairmount Township is in the
4 EPZ?

5 A It is not within the plume exposure EPZ.

6 MR. SILBERG: I have nothing further.

7 CHAIRMAN GLEASON: You can step down.

8 (The witness was excused.)

9 CHAIRMAN GLEASON: I would like to suggest to you
10 that you may be recalled later after we hear from some of
11 the State's witnesses. So I presume you will be around some
12 place.13 MR. SILBERG: I would ask that Mr. Steven Cantone
14 take the witness stand and be sworn in, please.
15 Whereupon,

16 STEVEN H. CANTONE

17 was called as a witness by counsel for Applicant and, having
18 been duly sworn by the Chairman, was examined and testified
19 as follows:

20 DIRECT EXAMINATION

21 BY MR. SILBERG:

22 Q Mr. Cantone, I am showing you a document, a
23 one-page document. It says Steven H. Cantone on the top.
24 Is this a statement of your technical and professional
25 qualifications?

1 A Yes, it is.

2 Q Is it true and correct to the best of your
3 knowledge and belief?

4 A Yes, it is.

5 Q Do you adopt it as the statement of your
6 professional and technical qualifications in this proceeding?

7 A I do.

8 MR. SILBERG: I am handing the document just
9 identified to the Reporter.

10 Mr. Chairman, I would ask it be incorporated in
11 the transcript at this point as if read as the testimony of
12 Mr. Cantone on Contention 6-C.

13 CHAIRMAN GLEASON: Is there objection?

14 (No response.)

15 CHAIRMAN GLEASON: If not, the statement will be
16 included in the record, bound into the record as the
17 testimony of Mr. Cantone.

18 (The document referred to follows:)

19

20

21

22

23

24

25

10/20
Steven H. Cantone

Education

Bachelor of Engineering -- Stevens Institute of Technology (1963)

Experience

1979-present -- Pennsylvania Power & Light Company, Manager-Nuclear Support. Responsible for radiological and environmental services, operational and maintenance support services, and project management of Susquehanna retrofit program. Radiological and environmental services responsibilities include off-site dose projections, environmental monitoring and emergency planning activities.

1976-1979 -- Power Authority of the State of New York, Superintendent of Power. Responsible for the functional operation of the Indian Point III Nuclear Power Plant, a 3,025 MWt pressurized water reactor plant, through direction of all operations, maintenance, instrumentation and controls, health physics, chemistry, site engineering and regulatory reporting activities. Emergency planning, outage management and development and implementation of material procurement and budgetary controls were also responsibilities of this position.

1963-1976 -- Consolidated Edison Company of New York. Positions of increasing responsibility starting from cadet engineer and ending with chief operations engineer of the Indian Point Nuclear Power Station. Responsibilities traversed the following functional areas: operator training, refueling supervision, power plant performance, procedure preparation, emergency planning, system chemistry and power plant operations.

Professional Credits

American Nuclear Society
Atomic Industrial Forum - Operations and Maintenance Committee
Electric Power Research Institute - Engineering and Operations Task Force (1979-1980)
Electric Power Research Institute - Nuclear Division Committee (1981-)
Licensed as an NRC Senior Reactor Operator on three different commercial nuclear power plants.
Chairman of the Susquehanna Review Committee (Off-site Nuclear Safety Committee)

1 BY MR. SILBERG: (Resuming)

2 Q Mr. Cantone, I am showing you a document entitled,
3 "Applicant's Testimony of Steven H. Cantone on Contention
4 6-C." Was this document prepared by you or under your
5 direct supervision and control?

6 A Yes, it was.

7 Q Is it true and correct to the best of your
8 knowledge and belief?

9 A With the exception of one typographical error. On
10 page 2, the paragraph headed "III," the next to the last
11 line, the fourth word in should be "projection."

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1 Q With a "J"?

2 A Yes.

3 Q With that correction --

4 CHAIRMAN GLEASON: Excuse me. Which page?

5 THE WITNESS: It is on page two, the very first
6 paragraph, the next-to-the-last line, the fourth word in.

7 CHAIRMAN GLEASON: Okay.

8 BY MR. SILBERG: (Resuming)

9 Q Mr. Cantone, with the correction you just
10 indicated is the document true-and correct to the best of
11 your knowledge and belief?

12 A Yes, it is.

13 Q And you adopt it as your testimony in this
14 proceeding on Contention 6-C?

15 A Yes, I do.

16 MR. SILBERG: Mr. Chairman, I am handing the
17 reporter the document just identified. I would ask that it
18 be incorporated into the transcript at this point as if read
19 as Mr. Cantone's testimony on Contention 6-C.

20 CHAIRMAN GLEASON: Is there objection?

21 (No response.)

22 CHAIRMAN GLEASON: Hearing none, the statement
23 will be bound into the record as the testimony of Mr.
24 Cantone as if read.

25 (The prepared testimony of Mr. Cantone follows:)

12/20
8

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
PENNSYLVANIA POWER & LIGHT COMPANY)
)
and)
ALLIANT ENERGY ELECTRIC COOPERATIVE, INC.)
)
(Susquehanna Steam Electric Station,)
Units 1 and 2))

Docket Nos. 50-387
50-388

APPLICANTS' TESTIMONY OF
STEVEN H. CANTONE
ON CONTENTION 6(c)

September 29, 1981

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
PENNSYLVANIA POWER & LIGHT COMPANY)
)
and) Docket Nos. 50-387
) 50-388
ALLEGHENY ELECTRIC COOPERATIVE, INC.)
)
(Susquehanna Steam Electric Station,)
Units 1 and 2))

TESTIMONY OF STEVEN H. CANTONE
ON CONTENTION 6(c)

1. My name is Steven H. Cantone. I am Manager, Nuclear Support, Pennsylvania Power & Light Co. ("PP&L"). The purpose of my testimony is to address the portion of Contention 6(c) which refers to the training and radiation protection that PP&L will provide to off-site personnel who may come on site during an emergency.

2. Under some emergency situations, State and local authorities and/or personnel may be called upon to provide assistance at the Susquehanna Steam Electric Station ("Susquehanna") site. The agencies whose presence on-site might be required in emergency situations would be the fire departments, the Pennsylvania State Police, and the ambulance companies.

3. Recognizing the need to assure rapid and effective response of off-site agencies, PP&L has undertaken a program to provide training, site-specific emergency equipment, and support/interface personnel for the involved off-site agencies. The training programs will be generally tailored to the agency involved and will cover, as appropriate, the topics of emergency plan overview, dose calculation and projection, protective actions, basic radiation theory, plant layout, contaminated injury, and access control.

4. Those agencies whose role is primarily that of emergency management will be given an overview training regarding the Susquehanna emergency plan and the interface points between PP&L and agency personnel. Topics in this training will include emergency classification, reporting and notification procedures, communication networks, dose assessment, protective and corrective actions, and emergency organization and responsibilities. The following agencies will receive this training:

Pennsylvania Emergency Management Agency

Pennsylvania Department of Environmental Resources/
Bureau of Radiation Protection

Luzerne County Civil Defense

Columbia County Emergency Management Agency

Ten Mile Emergency Planning Zone Municipal/Township
Emergency Management Coordinators.

This training will also be given to:

Shickshinny Fire Department

Salem Township Fire Company No. 1

East Berwick Hose Company No. 2

Shickshinny Area Volunteer Ambulance Association

Pond Hill - Lily Lake Fire Company (Ambulance Service)

Nescopeck Ambulance Association

Hobby Volunteer Fire Company (Ambulance Service)

5. The Pennsylvania Department of Environmental Resources/Bureau of Radiation Protection will receive additional training on the specifics of the Susquehanna emergency plan relating to dose calculation/projection, dose assessment and protective action recommendations.

6. The three fire companies (Shickshinny Fire Department, Salem Township Fire Company No. 1, and East Berwick Hose Company No. 2) will receive additional training in basic radiation theory, plant layout and access control. The intent of this training is to familiarize fire protection personnel with radiation, its detection, its effects, and methods available for minimizing exposure. Additionally, the training will familiarize fire-fighting personnel with the access requirements at the site so as to minimize the time needed to get them to the location of the fire. The plant layout training is intended to familiarize the fire fighters with the functioning of the plant and with how access is gained to the various plant areas. A plant tour is included in this training. In the event of an emergency, plant personnel will assist the fire fighters in determining the best routes to access a particular area and the potential hazards associated with it. Fire fighting personnel would be accompanied by qualified Health Physics personnel during the performance of their duties. Health Physics personnel would be responsible for assuring the radiological safety of all fire fighters.

7. The training given to the various ambulance companies closely parallels that given to the fire departments. In addition, the ambulance company personnel are given training on the care of contaminated injured personnel. PP&L maintains qualified first aid personnel at Susquehanna at all times. These personnel would assist ambulance company personnel in the handling of the injured party. If a radiation injury is involved, qualified health physics personnel are available on site at all times to assist and maintain the radiological safety of ambulance company personnel.

8. Although not specifically called in to report to the plant, the Berwick Hospital personnel would play a vital role in the event of personnel injury. Training for hospital personnel centers about the care and handling of injured individuals who are contaminated with radioactivity.

9. PP&L engages the services of Radiation Management Corporation ("RMC") to provide the training of ambulance and hospital personnel on the handling and medical care to be given to persons injured and contaminated with radioactivity. RMC also supervises practice drills and provides an evaluation of performance. In addition, every year, PP&L sponsors the attendance by members of the Berwick Hospital organization of a week-long course at Oak Ridge Associated University on handling of radiation accidents. This course covers radiation physics, radiation biology, internal radionuclide contamination, and delayed effects of radiation. The course is taught by experts in the fields of health physics and radiation medicine.

10. This extensive and integrated training program is being conducted to ensure that each support agency is cognizant of its role and is capable of carrying it out during any emergency condition that may arise at Susquehanna. Portions of the training program were initiated five years ago. A complete cycle of the program is scheduled to be completed by the end of 1981. The training program will be repeated periodically to assure a sustained level of proficiency by all agencies involved. About two hundred members of the police, fire and ambulance services have participated so far in the training program. In all, training is expected to be given to several hundreds of members of the various agencies.

11. The effectiveness of the training program is tested periodically. Fire drills, contaminated injury drills, and full scale emergency plan drills involving the activation of all emergency management agencies are scheduled throughout the lifetime of the plant.

12. The State Police, fire companies and ambulance services which provide on-site services have the necessary equipment to perform their functions. In addition, PP&L has available on-site additional equipment which may be utilized by its personnel or by members of the off-site agencies. The equipment is maintained at specified locations throughout the site and is inventoried periodically to assure its availability. The equipment available includes, for example, fire hoses, nozzles, axes, fire extinguishers, stretchers, first aid equipment, decontamination equipment, etc. In addition, radiation protection equipment is provided to personnel, such as fire fighters, who may need to reach contaminated areas. During training, the availability

of the PP&L equipment is discussed with the various off-site agencies, as well as the adaptability of PP&L's equipment to that of the off-site agencies.

13. Every member of a responding agency coming on-site in an emergency will be issued a thermo-luminescent dosimeter "TLD", which is a device capable of recording an individual's radiation exposure for subsequent evaluation. In addition, there will be available, for use as required, protective clothing and respiratory equipment. Health physics personnel will estimate the dose which may potentially be received by responding agency personnel and initiate further protective actions, if necessary. The names and social security numbers of all off-site personnel coming on site in response to an emergency will be obtained as they leave the site, and their TLD's collected. A permanent record of each individual's exposure will be established; this record will be made available to the individual upon request.

14. In the very unlikely event of major damage to the reactor core, there is the potential for release of radioactive iodine. If this were to occur, there would be available on site a supply of potassium iodide that could be used to mitigate the consequences of radioiodine inhalation. The site emergency director, in consultation (to the extent feasible) with PP&L's radiological medicine consultants, will consider administration of potassium iodide to personnel on site when the accumulated dose to an individual's thyroid exceeds 25 rem.

15. To expedite handling of a fire emergency and to minimize radiation exposure at Susquehanna approximately 185 fire pre-plans will be established. A fire pre-plan will be instituted for each room or area within the plant and will include primary and secondary access routes, egress information, potential fire hazards

(types, combustible loading, heat generation rates), fire detection systems available, fire extinguishing systems available, general fire-fighting techniques to be employed at that location, available ventilation, available communications, materials of construction, non-fire related hazards (radiological, electrical) and a map of the specific room or area and those adjacent to it. The on-site fire brigade personnel, who are available at all times, will be thoroughly familiar with these fire pre-plans and will convey as necessary the details of the pre-plans to the off-site fire fighting personnel.

16. In summary, the differences between responding to an emergency at Susquehanna versus one at any other industrial complex lie in the areas of physical access and radiation protection. Members of responding agencies will be given training in both these areas to assure their familiarity with the procedures involved and to ensure that their actions meet the requirements of access control and health physics. However, such off-site personnel will never be expected to act without guidance. Susquehanna personnel will escort them to the point of interest in the minimum time possible and in accordance with access regulations. Similarly, qualified health physics personnel will be provided to assure the radiological safety of off-site personnel.

17. In my opinion, PP&L has established a program designed to assure the rapid response and deployment of off-site support personnel during emergency conditions while at the same time protecting the health and safety of the off-site personnel.

1 (Board conferring.)

2 BY MR. SILBERG: (Resuming)

3 Q Mr. Cantone, earlier today there was a question
4 asked concerning recommendations that the Applicant might
5 make to the State of Pennsylvania -- Commonwealth of
6 Pennsylvania concerning protective actions such as
7 evacuation. I believe the question was asked of Mr.
8 McCandless, and it was indicated that you were an
9 appropriate person to whom that question might be addressed.

10 Could you please tell us the factors which PP&L
11 would consider in making its recommended protective action
12 -- its recommendation on protective actions to the
13 Commonwealth?

14 A There are a variety of factors and what I would
15 like to do is go through them all and then go back and
16 attach a relative importance to them because there are two
17 of them that are rather overriding influence.

18 The first deals with the state of the plant,
19 whether or not adequate core cooling has been established
20 and if levels of contingency exists for maintaining that
21 core cooling.

22 Again, still within the confines of the state of
23 the plant, is the radioactive material properly retained?
24 There are three barriers with respect to fission product
25 release -- the fuel clad, the reactor vessel and

1 containment. Are those three barriers intact or is there
2 some level of degradation is the question one must ask.
3 Again, with respect to the state of the plant, you have to
4 look at the potential for further degradation. Does it
5 exist or not?

6 The second factor is the radiological dose
7 projections that have been made. These projections are
8 based on the prevailing meteorological conditions and the
9 source terms at the release points. These source terms are
10 determined by radiation monitoring instruments.

11 The third factor is the existing weather
12 conditions and the forecasted weather conditions for the
13 near-term future. This would impact roadway passages
14 earlier discussed.

15 Another factor is the time of day and the day of
16 week. When I say "time of day" I am looking at daytime
17 versus nighttime. The daylight hours are a little bit
18 easier to carry through an evacuation than nighttime hours.
19 Also, we are looking at the specific time of day. It would
20 a lot more difficult to carry through successfully an
21 evacuation while school children were being transported
22 home. It might be impossible to wait long enough for them
23 to be fully within their own homes rather than try to catch
24 them on the road. Day of week also influences this in the
25 sense that on Saturdays and Sundays we do not have the

1 school factor to consider.

2 The last factor that we consider deals with the
3 exposure that the people would get, radiological exposure,
4 during the evacuation process. This would be based upon the
5 amount of time it takes to evacuate, the plume speed and
6 whether or not the radiological release was a puff release
7 or a continuous release.

8 If you postulate a puff release it just takes a
9 given amount of time to pass over any specific location. If
10 that amount of time is relatively short you then tend to
11 conclude that the individual will get less exposure by just
12 being beneath that puff for that short period of time rather
13 than potentially traveling through it during an evacuation
14 process.

15 So all of these factors must be put together and
16 there is no simple equation that you can put them together
17 in. You have to consider them all and you place particular
18 emphasis, though, on the state of the plant and the exposure
19 of the public during the evacuation process.

20 The reason concern, as I said, is the potential
21 there for conditions to get worse? If that potential is
22 there, then you do think more in terms of evacuation because
23 you can get the populus out before anything happens.

24 Again, you also place high emphasis on the
25 exposure they would be during evacuation. If, in the case

1 of a puff release with high wind speed, you would tend to
2 shy away from evacuation because you imagine they would be
3 spending more time under the plume.

4 Q Does that complete your answer?

5 A Yes, sir.

6 MR. SILBERG: Thank you.

7 I have no further direct and the witness is
8 available for cross examination on his prepared testimony
9 and, of course, on supplemental testimony.

10 CHAIRMAN GLEASON: Mr. Cantone, would you
11 summarize your testimony, if you will, with respect to this
12 Contention?

13 THE WITNESS: Yes, sir.

14 My testimony deals with that portion of the
15 Contention that alleges there has been insufficient
16 information with respect to the training of or the adequacy
17 of radiation hazard safeguards to protect the local
18 emergency units which may be required to respond to on-site
19 situations.

20 It is my judgment that PP&L has put together an
21 effective program to deal with the bringing on of off-site
22 agencies in a rapid and effective manner. This program
23 consists of three parts: first, training; secondly,
24 site-specific equipment; and, third, the interface of the
25 agencies with the site personnel.

1 With respect to the training, we tailor it to the
2 needs of the given organization. The types of training that
3 we do offer are emergency management responsibilities and
4 interfaces, site access procedures, radiation theory, plant
5 layout, a tour of the facility, and dose projection and
6 assessment procedures.

7 With respect to site-specific equipment, we have
8 firefighting equipment, medical assistance equipment and
9 decontamination equipment on site. The equipment we have is
10 peculiar to the operation of Susquehanna itself and is meant
11 not to take the place of the equipment brought in by the
12 fire companies or the ambulance response people.

13 Lastly, with respect to personnel interfaces, we
14 get -- we establish the interfaces between the responding
15 organizations and our security people, who are responsible
16 for site access, as well as between the responding
17 organizations and those who they will be working with in
18 response to a given emergency.

19 In the case of the fire companies, they would be
20 dealing with the fire brigade leader and they work with him
21 to understand the procedures that are in place, the plans
22 that we have established in advance trying to anticipate
23 fires in any given area of the plant.

24 They also work with our health physics personnel.
25 Our health physics personnel bear the responsibility for the

1 radiological health and safety of the responding agencies.
2 We do train the responding agencies on radiation theory, yet
3 we retain the responsibility to assure that they are not
4 going into any unsafe area or acting in any manner contrary
5 to proper radiological controls.

6 A similar set of interfaces exists with the
7 ambulance companies, that they deal with the security people
8 for site access. They also deal with our first aid people.
9 On each shift we have a qualified first aid individual who
10 can provide some immediate assistance to an injured person
11 while awaiting the response of the ambulance companies.

12 They also deal with our health physics personnel
13 as they may have to enter areas where there are some
14 radiological hazards. Again, the health physics personnel
15 retain the responsibility for assuring their health and
16 safety.

17 CHAIRMAN GLEASON: I kind of feel this would be a
18 good place to conclude and start the cross examination of
19 Mr. Cantone tomorrow because it should be wrapped up at one
20 time.

21 Do you have any problems with coming back tomorrow?

22 THE WITNESS: No, sir.

23 CHAIRMAN GLEASON: Is there objection as to that
24 schedule?

25 (No response.)

1 CHAIRMAN GLEASON: Do you have any problems, Mr.
2 Cutchin?

3 MR. CUTCHIN: None, Mr. Chairman.

4 CHAIRMAN GLEASON: Mr. Schultz? The State?

5 MR. ADLER: We will have some questions for Mr.
6 Cantone.

7 CHAIRMAN GLEASON: Let's meet together tomorrow
8 morning at 9:00. Thank you.

9 (Whereupon, at 4:45 o'clock p.m., the hearing was
10 recessed, to reconvene at 9:00 o'clock a.m., Wednesday,
11 October 21, 1981.)

12

13

14

15

16

17

18

19

20

21

22

23

24

25

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

in the matter of: Pennsylvania Power & Light Co., and Allegheny Electric
Cooperative, Inc., (Susquehanna Steam Electric Station, Units 1 & 2)

Date of Proceeding: October 20, 1981

Docket Number: 50-387 & 50-388

Place of Proceeding: Wilkes-Barre, Pennsylvania

were held as herein appears, and that this is the original transcript
thereof for the file of the Commission.

David S. Parker

Official Reporter (Typed)



(SIGNATURE OF REPORTER)