UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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In the matter of: :

METROPOLITAN EDISON COMPANY : Docket No. 50-289 (Restart)

(Three Mile Island Unit 1) :

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25 North Court Street,
Harrisburg, Pennsylvania

Tuesday, March 3, 1981

Evidentiary hearing in the above-entitled matter was resumed, pursuant to adjournment, at 10:00 a.m.

BEFORE:

IVAN W. SMITH, Esq., Chairman,
Atomic Safety and Licensing Board

DR. WALTER H. JORDAN, Member

DR. LINDA W. LITTLE, Member

Also present on behalf of the Board:

MS. DORIS MORAN,
Clerk to the Board

LAWRENCE BRENNER, Esq.
Legal Adviser to the Board

8103110298

APPEARANCES:

On behalf of the Licensee, Metropolitan Edison Company:

GEORGE F. TROWBRIDGE, Esq.
ROBERT ZAHLER, Esq.
DELISSA A. RIDGWAY, Esq.
Shaw, Pittman, Potts and Trowbridge,
1800 M Street, N.W.,
Washington, D. C.

On behalf of the Commonwealth of Pennsylvania:

ROBERT ADLER, Esq.
Assistant Attorney General,
505 Executive House,
Harrisburg, Pennsylvania
WILLIAM DORNSIFE,
Nuclear Engineer

On behalf of the Environmental Coalition on Nuclear Power:

DR. JUDITH JOHNSRUD,
433 Orlando Avenue,
State College, Pennsylvania

On behalf of ANGRY:

GAIL BRADFORD
STEVEN SHOLLY, Esq.
304 South Market St.
Mechanicsburg, Pennsylvania 17055

On behalf of Three Mile Island Alert:

LOUISE BRADFORD
JOHN MURDOCH

On behalf of the Regulatory Staff:

JAMES TOURTELLOTTE, Esq.
JOSEPH R. GRAY, Esq.
Office of Executive Legal Director,
United States Nuclear Regulatory Commission,
Washington, D. C.

APPEARANCES: (Continued)

Petitioners for leave to intervene pro se:

MR. AND MRS. NORMAN AAMOLT,
R.D. 5,
Coatesville, Pennsylvania

C O N T E N T S

PROCEEDINGS

(10:07 a.m.)

CHAIRMAN SMITH: Good morning.

I would like to announce that Mr. Lawrence Brenner has returned to the Atomic Safety and Licensing Board Panel as a legal adviser and will be assisting the Board in legal matters.

Is there any preliminary business?

MR. TROWBRIDGE: Mr. Chairman, I would like to report, with some embarrassment, that I badly misread the Commonwealth brief on emergency planning issues, that the Commonwealth was not proposing that this Board stay in business until everything had been complete and the Board oversee the completion of emergency planning.

The Commonwealth was instead proposing a standard that this Board determine there will be compliance by the time of restart. I particularly wish to retract my statement that the Commonwealth position would add six months to the restart of Three Mile Island 1.

Beyond that, Mr. Chairman, I think we and the Commonwealth are very much in agreement and that we will be able to adopt very closely the Commonwealth's own statement of the issue to be decided by this Board. And I propose that during this week we and the Commonwealth's attorney and staff attorney will attempt a short statement of position,

hopefully where we are in agreement.

Under these circumstances, we no longer request, as Licensee, reply briefing of the briefs filed by the parties. We are prepared to have the Board rule or take other action on the basis of the briefs that exist.

CHAIRMAN SMITH: What is the position of the other parties as far as additional briefing?

MS. GAIL BRADFORD: Sir, we would certainly like to be included in any discussion that takes place among the staff and the Licensee and the Commonwealth about this matter. And I think we would also like to file a reply brief to the briefs that have already been filed.

CHAIRMAN SMITH: All right. I think -- Mr. Sholly, is that your position?

MR. SHOLLY: Yes, sir.

CHAIRMAN SMITH: All right. If we are going to hear again from any party, we should give all parties an opportunity to be heard on that issue. So pick your time. I think there should be simultaneous filings, however.

We have requested filings to be delivered to the Board Thursday morning. Is that still an appropriate time?

MR. TROWBRIDGE: That was a week from this Thursday, the 12th.

CHAIRMAN SMITH: That would have been the 12th. However, it would be helpful if we could have --

MR. TROWBRIDGE: I think it would be better for us, Mr. Chairman, for us to prepare a statement on which we and the staff and the Commonwealth are in agreement, and then look again at whether -- and get that distributed this week to the parties, then look again at whether the briefing -- whatever briefing we want to do.

CHAIRMAN SMITH: The only problem I have is that we must provide some way for the parties that are not submitting a joint statement to address the earlier briefs.

MR. TROWBRIDGE: That was intended, Mr. Chairman. It would be simply a question thereafter of whether we file briefs on -- file briefs or set aside a date for argument. I am perfectly prepared to have further argument on the subject.

I am simply suggesting that if a joint position is possible, we put that on the table and then have our arguments or briefs.

CHAIRMAN SMITH: Okay.

MR. TROWBRIDGE: I would suggest that the Board hold in abeyance for the moment the question of whether it is going to be argument or brief.

CHAIRMAN SMITH: I think we should set now a time by which the parties other than the parties with which you are working should have -- they wish to address the initial briefs filed. I would like to be able to set next -- a week

from Thursday, the 12th.

However, I think it might be very appropriate for you to submit whatever you are going to do in writing before then.

MR. TROWBRIDGE: All right.

CHAIRMAN SMITH: It would be very helpful if we had your position on all the issues raised by the initial briefs in writing before then. And then the other parties, if they elect, can either file in writing or --

MR. TROWBRIDGE: Mr. Chairman, I had intended to address really only the Commonwealth brief at the moment. I think if there is going to be further briefing we might have something to say about the other aspects of the ANGRY and Sholly briefs. But I would think there is time enough to do that at the same time they addressed ours.

CHAIRMAN SMITH: That would be fine. But it would be helpful to the Board if you could get your clarification in as soon as possible.

MR. TROWBRIDGE: Right.

CHAIRMAN SMITH: Is there anything else of a preliminary nature before we begin? Mr. Sholly?

MR. SHOLLY: For those parties that are not aware, it may bear noting, for whatever reason, that Commissioner Hendrie is now the Acting Chairman of the NRC again. I read that in "The Washington Post" this morning and I thought the

other parties might want to know.

And additionally, we would request a brief bench conference before the witnesses are empaneled.

CHAIRMAN SMITH: All right. Shall we adjourn -- do you mean you want a brief bench conference just before the witnesses are called?

MR. SHOLLY: Yes, sir.

CHAIRMAN SMITH: Is there anything else of a preliminary nature, Ms. Bradford?

MS. GAIL BRADFORD: Yes, sir. Today was the day that we were suppose to file testimony on UCS 13 from Dr. Beyea, and we will not be doing that. And we are not asking for an extension.

CHAIRMAN SMITH: All right.

MS. GAIL BRADFORD: We were just not able to meet the deadline.

CHAIRMAN SMITH: Mr. Aamodt?

MR. AAMODT: You had requested my wife by today to have -- by tomorrow to have a brief prepared relative to the relationship between the Three Mile Island accident and the Board order and stress relative to training. And in view of the work involved in this week's work, we would like to have a few days more to put that together, if we might.

CHAIRMAN SMITH: Are there any objections?

(No response.)

CHAIRMAN SMITH: All right. We should have it, then, by Thursday. How much -- give a date certain.

MR. ABBOTT: I would rather say Monday, if that is all right.

CHAIRMAN SMITH: Monday, Tuesday morning.

MR. ZAHLER: Mr. Smith, I would like the record to reflect I am not objecting. I am not in a position to comment on the request. I do not know the background of it.

CHAIRMAN SMITH: This is -- all right.

Anything else?

MR. ADLER: Yes, Mr. Chairman.

CHAIRMAN SMITH: Mr. Adler?

MR. ADLER: I would just like to inquire whether either the staff or the Licensee have made any progress in assessing the schedule following onsite emergency planning testimony.

MR. TROWBRIDGE: Not as much as we would like, Mr. Chairman. I had hoped to report this morning. I will try to report before we adjourn this week as to how much filler we can provide. And I simply cannot do it at the moment. I think -- you know, I would ask the staff.

MR. GRAY: We would also like to be able to report before the end of this week as to that. But I will need to be checking with other staff personnel as far as what can be

filled in.

CHAIRMAN SMITH: Okay.

All right. Now, if there is no other preliminary business, we will assemble in the Board's office and have the bench conference requested by Mr. Sholly; that is, the parties to the proceeding.

(Bench conference.)

CHAIRMAN SMITH: Before the witnesses leave, Mr. Zahler, I guess the Board should instruct them as to what the order is. Why don't we have the witnesses -- why don't you produce your witnesses and get your testimony identified, and then we will address the sequestration request.

MR. ZAHLER: Licensee calls Messrs. Rogan, Giangi and Tsaggaris as its next witnesses.

Whereupon,

ROBERT F. ROGAN

GEORGE J. GIANGI

ALEXIS TSAGGARIS,

called as witnesses by counsel for Licensee, having first been duly sworn by the Chairman, were examined and testified as follows:

DIRECT EXAMINATION

BY MR. ZAHLER:

Q Mr. Rogan, would you state your full name and

business address for the record?

A (WITNESS ROGAN) Robert E. Rogan, General Public Utilities Nuclear Group, Three Mile Island Nuclear Station, Middletown, Pennsylvania.

Q Mr. Giangi, would you state your full name and business address for the record?

A (WITNESS GIANGI) George John Giangi, GPU Nuclear, Metropolitan Edison Company, Middletown, Pennsylvania.

Q Mr. Tsaggaris, would you state your full name and business address for the record?

A (WITNESS TSAGGARIS) Alexis Tsaggaris, Energy Consultants, Incorporated, Pittsburgh, Pennsylvania.

Q Gentlemen, I refer you to a document dated 2/9/81, entitled "Licensee's Testimony of Robert E. Rogan, George J. Giangi, and Alexis Tsaggaris on the Adequacy of Onsite Emergency Preparedness at Three Mile Island Unit 1." Was this testimony jointly prepared under your direction and supervision??

A (WITNESS TSAGGARIS) Yes, it was.

A (WITNESS GIANGI) Yes, it was.

A (WITNESS ROGAN) Yes, it was.

MR. ZAHLER: Mr. Chairman, there are some corrections to the testimony. Would you like them to be done before we do --

CHAIRMAN SMITH: Yes, I think that -- I think you

should take care of all your preliminary business, and then you offer -- you will offer the testimony. And then I presume that Mr. Sholly will seek leave for voir dire first.

Is that what your plan is?

MR. SHOLLY: Yes, sir.

BY MR. ZAHLER: (Resuming)

Q Mr. Giangi, do you have any corrections or supplemental information with respect to the testimony?

A (WITNESS GIANGI) Yes, I do.

MR. ZAHLER: Mr. Smith, the copy of the testimony given to the reporter has the changes marked on it. In addition, we have marked up changed pages and are providing those to the Board and the parties.

Changes appear on pages 26, 31, 41, 62, 86, 94, Table 1 and Table 2. I would not propose to go through and separately identify with these witnesses each of these changes, because they are subject to cross-examination with respect to them.

CHAIRMAN SMITH: However, you should -- the testimony that they have described as being theirs is the corrected testimony?

MR. ZAHLER: I am going to ask Mr. Giangi that in a second.

CHAIRMAN SMITH: All right.

BY MR. ZAHLER: (Resuming)

Q As revised, do you adopt this testimony as your testimony in this proceeding?

A (WITNESS ISAGGARIS) I do.

A (WITNESS GIANGI) I do.

A (WITNESS ROGAN) I do.

MR. ZAHLER: Mr. Smith, I request that the testimony as revised be admitted in evidence and copies be incorporated in the transcript as though read.

CHAIRMAN SMITH: Are there any objections?

MR. SHOLLY: Mr. Chairman, ANGRY wishes to object to the introduction of testimony. We would like to conduct a voir dire and would request that the witnesses be sequestered and directed not to discuss voir dire amongst themselves until it is completed.

CHAIRMAN SMITH: Okay. Are there any other objections?

(No response.)

CHAIRMAN SMITH: All right, gentlemen. This was discussed among the parties during the recess and agreed to in part -- it has been agreed to.

Mr. Rogan will remain. The other two witnesses will leave the hearing room, and you should make no effort to determine or find out what is happening in the hearing room. And you should not consult among each other until the

Board gives you further directions, consult on what is happening in the hearing room. You should not consult about your testimony until you have further directions from the Board.

So Mr. Bogan will remain. Mr. Giangi and Tsaggaris, leave, please.

(Pause.)

MR. TAHLER: Mr. Smith, before Mr. Sholly begins, I would just like the record begins, I would just like the record to discuss that this was previously discussed, that Mr. Sholly is doing this examination not pursuant to the regulations allowing expert cross-examination, but pursuant to a waiver of that regulation.

CHAIRMAN SMITH: Yes. You understand that, Mr. Sholly?

MR. SHOLLY: I believe so.

CHAIRMAN SMITH: This was discussed last week with Ms. Bradford. You do understand that?

MR. SHOLLY: Yes, sir.

CHAIRMAN SMITH: Okay. Mr. Sholly.

VOIR DIRE EXAMINATION

BY MR. SHOLLY:

Q Mr. Bogan, we have some questions to ask you about the qualifications statement which you prepared and which has been submitted with your testimony. Your qualifications

statement indicates you received a master of science degree in nuclear physics from Tulane University. What years were you in attendance at Tulane in this program and what year did you receive the master of science degree?

A (WITNESS ROGAN) I attended Tulane Graduate School 1966 to 1968, and received my degree of master of science in physics specializing in nuclear physics in May of 1968.

Q Did you write a thesis as part of your degree requirement?

A (WITNESS ROGAN) Yes, I did.

Q Could you briefly describe the thesis and the title of the thesis?

A (WITNESS ROGAN) Yes, it was. It was a report on an original experiment relating to the excitation of the state of copper and nickel in a PN gamma reaction done on a linear accelerator. It was subsequently reported in the "American Nuclear Society Magazine."

Q During your tenure with the United States Army from 1977 to October 1980, which you describe as senior strategic analyst and study group manager, did your work involve any facet of emergency preparedness? Of course, if there are any national security interests involved, needless to say you should take that into account in your response.

A (WITNESS ROGAN) Only in the broadest sense that many of the issues that I was charged to address related to

the overall military preparedness and the strategic posture of the United States with regard to the world at large, and in particular with regard to military equipments posture, and in the later stages some discussions of the overall energy strategy relationship during the energy crisis.

Q Did you have primary or secondary responsibility in dealing with any matters related to civil defense, strategic relocation of populations, that sort of thing?

A (WITNESS ROGAN) I did not in that responsibilities, no.

Q Have you attended any training seminars, taken any courses, or otherwise received any additional education or experience in the area of emergency planning and preparedness for civilian nuclear power plants?

A (WITNESS ROGAN) The only specific seminar or training session which I have attended directly related to this issue was one conducted in October of last year by the Institute of Nuclear Power Operations in Atlanta, Georgia.

(Counsel for ANGRY conferring.)

Q Would that be the emergency preparedness workshop that is noted in Mr. Giangi's training?

A (WITNESS ROGAN) No, it is not.

Q What was the subject of that workshop, then, sir?

A (WITNESS ROGAN) I am sorry, I cannot recall the specific topic. But it in actuality resulted in an overview

of many of the common concerns with regard to emergency preparedness at fixed nuclear facilities.

Q Did that training session cover any aspects of NUREG-0654 or the emergency planning regulations which were adopted by the Commission in August of 1980?

A (WITNESS ROGAN) Yes, it did. At that time the NUREG-0654, as I recall it, had not been published in its final form. There was discussion of a variety of issues which appeared in the final guidance, some of which were the subject of our testimony.

Q Did any representatives from the Nuclear Regulatory Commission attend that session?

A (WITNESS ROGAN) Yes, they did. The only name that I recall, if I recall it correctly, was Mr. Frank Pagano.

Q Have you studied the various reports and investigations of the TMI-2 accident?

A (WITNESS ROGAN) Yes, I have.

Q Could you identify which documents you have reviewed?

A (WITNESS ROGAN) I have to some degree lesser or greater looked at the Rogovin report, the Governor's report, and parts of the Kemeny Commission report, as well as other smaller, less well known reports that have been made available.

Q Have you reviewed NUREG-0600, which was the investigation into the accident conducted by the Commission's Office of Inspection and Enforcement?

A (WITNESS ROGAN) I do not recall specifically having reviewed that document.

Q I will try a little bit more of an explanation and description, and perhaps you will recall whether or not you did. It is a rather thick document, I would say an inch and a half to two inches thick, an orange-bound cover. Perhaps the Chairman has a copy of it.

If you could briefly examine that and explain whether or not you have reviewed that document or any portions of it.

(Witness examines document.)

A (WITNESS ROGAN) I do not recall specifically having studied that document, no.

Q Have you reviewed NUREG-0616, which is a report of a special review group, again from the Commission's Office of Inspection and Enforcement?

A (WITNESS ROGAN) Again, I do not recall having specifically seen and studied that document, either.

Q Well, you indicated that you have examined at least parts of the Rogovin report, the Governor's report and the Kemeny Commission. Have you examined any of the revisions of the TMI emergency plan in light of your review

of these accident investigations, particularly with respect to looking for weaknesses which were identified in the investigative reports and checking to your satisfaction that these weaknesses had been addressed in the TMI emergency plan?

A (WITNESS ROGAN) Yes, I believe I have. Both Revision 2 and the Revision 3 which was submitted to the NRC on the 2nd of January. To the extent of a detailed cross-reference, such implication would be improper.

However, as part of our continuing review and my own continuing review, considering those issues which I have gleaned from my own personal review of the reports, they have been considered as part of my review and thought process.

Q Could you briefly describe the major weaknesses which, to your memory and review, were identified by these investigations?

A (WITNESS ROGAN) I would prefer not to attempt to paraphrase the various reports. However, I think there are a couple of issues which seem to loom rather consistent throughout the reports with regard to the initial management of accident assessment, notification of the public, developing the proper response organization. These were among a variety of issues which impressed me as I was reading these reports.

Q And you would say, then, that you have reviewed the Licensee's emergency plan and are satisfied that these issues have been addressed satisfactorily?

A (WITNESS ROGAN) I believe I have, yes.

MR. SHOLLY: Mr. Chairman, that is all the questions we have for Mr. Rogan.

If it is agreeable to the Licensee, we would like to bring Mr. Giangi into the hearing room at this point.

MR. ZAHLER: Mr. Chairman, quite frankly, I do not see the need for sequestration, given the nature of the examination. I guess at this point I would ask that both the witnesses be made available and that the examination proceed in an expeditious fashion.

CHAIRMAN SMITH: Do you need -- no, we are not going to stop the voir dire. I see no need for Mr. Rogan to leave, however.

If you need advise at counsel table, is that satisfactory with you?

MR. SHOLLY: I have no objection to Mr. Rogan remaining. What we thought to avoid would be a situation where Mr. Rogan would go back and join them, say Mr. Tsaggaris, and discuss what sort of examination was conducted.

CHAIRMAN SMITH: You are not objecting to voir dire?

MR. ZAHLER: No, sir. And I am not proposing that Mr. Doran discuss with either Mr. Giangi or Tsaogaris the nature of the voir dire.

What I guess I was proposing is that both Mr. Giangi and Tsaogaris be produced at this time and voir dire continue with both of them present, rather than sequestering them.

CHAIRMAN SMITH: I see nothing to be lost by continuing the sequestration, and still we can accomplish Mr. Sholly's asserted purposes. But I do not see how you are hurt at all.

MR. ZAHLER: I am probably not. It is just that the nature of the examination did not indicate to me the need to sequester witnesses, which is a very exceptional procedure and one not usually followed in NRC proceedings.

CHAIRMAN SMITH: That is incorrect.

(Pause.)

MR. AAMODT: Mr. Chairman, may I introduce Dr. Bruce Molholt, who is our witness, whose testimony you have received.

CHAIRMAN SMITH: Hello, sir.

BY MR. SHOLLY: (Resuming)

Q Mr. Giangi, am I pronouncing your name correctly, first of all? I hate to mispronounce names.

A (WITNESS GIANGI) First of all, I am having

problems hearing you very clear. But I believe you did not pronounce it right. It is "Ciangi."

Q "Ciangi." Thank you.

A "Ciangi." Thank you.

Q We have a few brief questions about your professional qualifications statement and your background in the area of emergency planning that we would like to ask you.

Your professional qualifications statement indicates that you submitted a thesis in connection with fulfilling the program requirements for a master of science degree in inorganic environmental chemistry. What is the title and a brief description of the subject matter of your thesis?

A (WITNESS CIANGI) The subject matter deals with humic acid in lake sediment, Lake George in New York specifically. We looked at inorganic environmental pollutants in Lake George sediment as a result of industry and other manmade factors.

Q Did your investigation incorporate any consideration of radioactive pollutants?

A (WITNESS CIANGI) Not to that great a degree. There really were not very many up in that area. However, we used radioactive and isotopic tracers in the analytical work. We used GeLi's and other spectrometers in the

analysis.

Q Your qualifications statement indicates ten years at both the Salem Nuclear Generating Station and the Knowles Atomic Power Laboratory. During your tenure at those two facilities, did you have any involvement with emergency planning or emergency procedures, speaking in terms of preparing plans?

A (WITNESS GIANGI) No, to the extent of preparing, I did not. I assisted with drills and I was an auditor that evaluated drills, an innumerable number of drills. And I personally performed drills in the naval nuclear power program, the prototypes specifically, such as radiological control drills, spill drills, chemistry sampling drills.

Q In your collegiate course work, both graduate and undergraduate, could you describe briefly the distribution of courses that you took? And I am particularly interested in courses dealing with radiation biology, radiation chemistry, health physics, nuclear engineering, that gamut of course work?

A (WITNESS GIANGI) Okay. My undergraduate studies at Syracuse predominantly consisted of a strong chemistry background, environmental, organic, inorganic, physical, analytical, diversified to some degree in math, biology and physics.

Of course, I have taken some nuclear chemistry

courses. That was not my major. My graduate, as I mentioned, was heavily involved into chemistry, various engineering courses, and again predominantly environmental or inorganic and organic chemistry.

At Knowles Atomic, however, I have taken mechanical operator courses, reactor plant theory courses, health physics and chemistry from a nuclear power plant standpoint. That qualification lasted approximately a year.

Q Are you certified in health physics by any certification organization?

A (WITNESS GIANGI) No, I am not. I am ANSI-qualified.

Q Could you repeat that, please?

A (WITNESS GIANGI) I am ANSI-qualified in the field of radiological controls and chemistry.

MR. ZAHLER: Could you explain what ANSI is.

WITNESS GIANGI: It is the American Nuclear Specification -- I am not sure exactly what it stands for.

BY MR. SHOLLY: (Resuming)

Q I am familiar with the acronym. I just did not --

A (WITNESS GIANGI) Thank you.

CHAIRMAN SMITH: What does it stand for, Mr. Sholly?

(Laughter.)

MR. SHOLLY: American National Standards Institute. I did not know what the last initial stood for, either.

BY MR. SHOLLY: (Resuming)

Q Are you a registered professional engineer?

A (WITNESS GIANGI) No, I am not.

Q Are you, other than the ANSI certification that you mentioned, are you certified in any other profession by any government agency or professional standard setting organization?

A (WITNESS GIANGI) No, I am not.

Q Your professional qualifications statement lists a number of training seminars and courses that you took. I wonder if you could briefly describe for each one of those approximately how many course hours were involved, how your participation in the course was evaluated, and whether or not this course is accredited by any standard-setting organization or government agency.

You can just take them in the order you listed them in your testimony.

A (WITNESS GIANGI) Okay, sure. These were training in the sense that they were courses and workshops or seminars directly related to emergency planning, and those, I limited that area in my testimony. It was quite a bit

more in various other areas.

Radiation emergency seminar was just recently, which dealt with the radiation emergency information dissemination, the issue of proper planning with regards to radiation emergencies, your connections with the media, and how to ensure proper information flow is transmitted. That lasted approximately three days. And again, that was a seminar, as is indicated.

Q That seminar was not accredited or certified?

A (WITNESS GIANGI) No, it was not.

The radiological emergency response course, which was a joint -- a joint effort by the NRC and FEMA, lasted one week, and it involved radiological and meteorological dose projections, looked at protective action guides, went through various chi over Q calculations.

And that lasted one week. And I have a certificate stating that I completed that course.

Radiological emergency course, that was performed by RMC, where Dr. Roger Linneman of RMC discussed various aspects of radiation health and its adverse effects and how to deal with the contaminated injured individual, as well as the overexposed individual from a radiological standpoint.

Q How long did that particular course last?

A (WITNESS GIANGI) That was one day.

Q And again, that would not have been certified by

any type of standard-setting organization?

A (WITNESS GIANGI) No, it was not.

Public notification systems seminar. In the evaluation process of sirens, I have attended quite a few seminars, if you will, on early warning and really put out by the siren manufacturers to help me better evaluate the systems and to see which is the most efficient siren system that we should procure.

The emergency preparedness workshop was based on different areas of emergency action levels, 0654 items, specifically emergency plan implementing procedures, and that is sort of the flavor. That was also not a certified course.

Q And how long did that last? A matter of days or weeks?

A (WITNESS GIANGI) I believe it was two weeks.

Q Fine.

A (WITNESS GIANGI) Emergency planning seminar in Mississagua dealt with the problems encountered at the Mississagua evaluation, the propane tanker, and various aspects that the Mississaguans had encountered in combating the emergency, namely emergency response cards, facilities, communications systems. And that lasted three days.

I think I hit on all of them.

MR. ZAHLER: Mr. Giangi, I do not know you have

discussed the Northwestern University Medical School.

WITNESS GIANGI: That was really a takeoff from the RMC. It was similar to the Radiation Management Corporation's handling of radiation incidents, medically contaminated injured people, and overexposed people.

(Pause.)

BY MR. SHOLLY: (Resuming)

Q Have you study any of the reports or investigations that have resulted out of the TMI-2 accident, specifically in the area of emergency planning?

A (WITNESS GIANGI) I have seen some, yes.

Q Could you describe briefly which reports you have reviewed?

A (WITNESS GIANGI) I have seen the recent Senator Udall investigative report, and I have seen the NRC report by the Inspection and Enforcement people.

Q Would that be NUREG-0600, the thick orange --

A (WITNESS GIANGI) No, this was just recently put out by, I believe, Victor Stello's I&E group.

Q Is that the report which related to the withholding or lack of withholding of information?

A (WITNESS GIANGI) Yes, sir.

Q Have you reviewed the Rogovin report, Special Inquiry Group report which is designated NUREG-CR-1250?

A (WITNESS GIANGI) I reviewed it some time ago.

Q Also the Kemeny Commission and the Kemeny Commission staff reports?

A (WITNESS GIANGI) Yes, sir. It was quite a file.

Q Have you reviewed NUREG-0600?

A (WITNESS GIANGI) Yes, I have.

Q Have you reviewed NUREG-0616? That is a document by the Special Review Group of the Office of Inspection and Enforcement.

A (WITNESS GIANGI) No, sir, I have not.

Q You have not?

CHAIRMAN SMITH: Let's see. What is the title of that? What is the subject of that? That is the information flow initial report?

MR. ADLER: Mr. Chairman, that is the report of the Special Review Group, Office of I&E, on lessons learned from Three Mile Island.

MR. ZAHLER: It was I&E's input, I believe, to the NRC's broadly-based lessons learned. NRR had a short-term and long-term lessons learned, but this was I&E's input.

(Pause.)

BY MR. SHOLLY: (Resuming)

Q In the context of the review of various accident-related reports, have you examined any revisions of the Licensee's emergency plans with the review of those reports in mind, and are you satisfied that the weaknesses

which are identified in those documents have been resolved in the emergency plan which is now before the Board and the Commission?

A (WITNESS GIANGI) Yes, based on reviewing the various reports previously mentioned and that I have reviewed, we have done considerable upgrading in the emergency planning area.

Of course, I want to qualify that by saying it is an ongoing effort and with every emergency drill we find, for example, that logistically we may better various points to more facilitate the accident mitigation process. But to the extent that the reports deal with various problems, we have upgraded communications systems to dedicated phone lines, status boards with predetermined points being logged on the boards, formalized logkeeping and communications recordkeeping.

We have used the information data checklist which ensures that key parameters are transmitted to offsite agencies. We have a CRT system that will be used for onsite centers as well as offsite centers, that ties into the in-plant MODCOM computer which accesses plant information.

That, and I guess I really cannot rule training, which bring out those concepts and their proper use of the equipment I just mentioned.

(Counsel for ANGRY conferring.)

MR. SHOLLY: Thank you.

We would like to bring Mr. Toscaris into the hearing room at this point.

CHAIRMAN SMITH: Okay.

(Pause.)

BY MR. SHOLLY: (Resuming)

Q Mr. Tsaggares, we have some questions regarding the professional qualifications statement which you have prepared. Just initially, if you will look at the bottom of your qualifications statement, the very last sentence where part of the sentence says "qualified as chief engineer," and then in my copy of the testimony there is nothing following that. Is there a missing page or sentence there, or is that the complete professional qualifications statement that you have prepared?

A (WITNESS TSAGGARES) That qualification is chief engineer. It relates to a particular qualification upon naval reactor plants.

Q With that explanation, then, that is your full qualifications statement as presented and explained just now?

A (WITNESS TSAGGARES) That is correct.

CHAIRMAN SMITH: So the statement should end with a period instead of a comma?

WITNESS TSAGGARES: Excuse me?

CHAIRMAN SMITH: The statement should end with a period instead of a comma?

WITNESS TSAGGARES: That is correct.

BY MR. SHOLLY: (Resuming)

Q Mr. Tsaggares, when did you leave your position as

director of site emergency planning with Metropolitan Edison Company?

A (WITNESS TSAGGARES) December 31, 1979.

Q And you left that position to take a position with Schneider, Inc., as corporate quality assurance director?

A (WITNESS TSAGGARES) That is correct.

Q Your qualifications statement of your position with Schneider, Inc. indicates responsibility for quality assurance at nuclear and fossil fuel plants for which nuclear plants were you responsibility for QA/QC?

A (WITNESS TSAGGARES) Schneider, Inc., at the time for which I was responsible were ongoing at the Beaver Valley 1 site, Beaver Valley 2, the Limerick site, the Ginna site, Rochester Gas and Electric, Nine Mile Point, Hope Creek.

Q That is fine, Mr. Tsaggares, unless you have others which you wish to add.

Did your involvement with these plants extend to any areas involved with emergency planning or radiation monitoring?

A (WITNESS TSAGGARES) No, they did not.

Q With regard to your position with Energy Consultants, Inc. as vice president for which nuclear power plants were you involved in emergency planning in any manner?

A (WITNESS TSAGGARES) Three Mile Island Units 1 and 2, Oyster Creek.

(Counsel for ANGRY conferring.)

Q Is Energy Consultants a relatively new firm? How long ago was the firm started?

A (WITNESS TSAGGARES) Energy Consultants was started eight to ten years ago.

Q Eight to ten years ago?

A (WITNESS TSAGGARES) Eight to ten years ago.

Q And your involvement with emergency planning for those three facilities, were there any particular aspects of emergency planning that you concentrated on in your area of responsibility?

A (WITNESS TSAGGARES) I would characterize my concentration on the development of the planning -- assisting in the development of the planning document and in the development and the review of implementing procedures and the development of communications and organizational concepts.

A (WITNESS TSAGGARES) With regard to your education, Mr. Tsaggares, your degree from Princeton, bachelor of science degree, is listed as basic engineering. Did that incorporate any aspects of nuclear engineering?

A (WITNESS TSAGGARES) It did not incorporate any specific courses in nuclear engineering.

Q Are you a registered professional engineer, Mr. Tsaggares?

A (WITNESS TSAGGARES) No, I am not.

Q Are you certified in health/physics?

A (WITNESS TSAGGARES) No, I am not.

Q Are you certified in any other profession by any other government agency or standard-setting body?

A (WITNESS TSAGGARES) No, I am not.

Q During your tenure with the United States Navy, di did you have any involvement in emergency planning or procedures-writing for emergencies?

A (WITNESS TSAGGARES) My principal assignment during my tour in the Navy was as main propulsion assistant for a period of 16 to 18 months. In that capacity, I had total responsibility, among other things, for chemistry and radiological controls. Those responsibilities extended to the development of procedures for dealing with radiological incidents on board ship and the impact of those incidents when the ship was in port.

Q When did you become the director for site emergency planning for Metropolitan Edison Company?

A (WITNESS TSAGGARES) Approximately April of 1979.

Q That was sometime following the TMI-2 accident?

A (WITNESS TSAGGARES) That is correct.

(Counsel for ANGRY conferring.)

Q During your tenure with the company and since that time, have you reviewed any of the various reports or investigations on the TMI-2 accident?

A (WITNESS TSAGGARES) Yes, I have.

Q Could you describe briefly the reports which you have reviewed? I am speaking here primarily towards emergency planning and related matters.

A (WITNESS TSAGGARES) I reviewed sometime ago the Kemeny Commission report, the Rogovin report, and am generally aware of the requirements and NUREG documents issued since the accident.

Q Have you reviewed NUREG-0600, which is the thick, orange-bound covered document to your right?

A (WITNESS TSAGGARES) I have not reviewed that document in detail.

Q Have you reviewed NUREG-0616, which is the report of the special review group to the Office of Inspection and Enforcement of the NRC on lessons learned from the TMI-2 accident?

A (WITNESS TSAGGARES) I am familiar with that document, but I have not reviewed it in detail.

Q Which revisions of the TMI-1 emergency plan did you have involvement in preparing or directing the preparation of?

A (WITNESS TSAGGARES) I was primarily involved in

the development of Revision 1 to the plan and have subsequently been involved in assisting in the development of Revision 2 and Revision 3, to a lesser degree.

Q Based on your review of the TMI accident-related investigations and reports that you have reviewed, are you satisfied that the weaknesses or flaws within the emergency planning spectrum, both Licensee's plan and the interface of that plan with off-site plans, are you satisfied that those weaknesses that which are identified in those documents have been resolved in Licensee's latest plan, which is now before the Board and the Commission?

A (WITNESS TSAGGARES) To the extent of the documents I reviewed in detail and the requirements in NUREG-0654, I am satisfied, yes.

Q Have you reviewed Revision 3 of the Licensee's plan to ensure to your satisfaction that the advice and recommendations which you gave to the Licensee have been incorporated into the plan properly?

A (WITNESS TSAGGARES) Yes, I have.

Q And are you satisfied that that has been done?

A (WITNESS TSAGGARES) Yes, I am.

Q Your professional qualifications statement indicates that you participated in hearings before the Advisory Committee on Reactor Safeguards. What was your involvement with the ACRS in that capacity?

A (WITNESS TSAGGARES) My involvement with the Advisory Committee on Reactor Safeguards was in a consulting capacity to Metropolitan Edison Company. I was present at the hearings and presented some brief comments. It has been a while, and I cannot quite remember what was discussed at that particular hearing.

Q Would that have related to emergency planning?

A (WITNESS TSAGGARES) Yes.

Q Similarly, with the Pennsylvania House Select Committee on Three Mile Island, what was your involvement with that Committee?

A (WITNESS TSAGGARES) At the time of those hearings, I was a Metropolitan Edison employee, and I appeared with Mr. Robert Arnold to discuss, among other things, emergency planning.

Q Were you not also deposed by the NRC special inquiry group?

A (WITNESS TSAGGARES) Would you repeat that, please?

Q Were you not also deposed by the NRC special inquiry group, the Rogovin group?

A (WITNESS TSAGGARES) I was deposed by the NRC, and I believe that was for the Rogovin report.

Q Was that deposition related to emergency planning?

A (WITNESS TSAGGARES) Yes, it was.

MR. SHOLLY: Fine, Mr. Chairman. That is all the questions we have. We are not going to object to the introduction of the testimony, but we do have some reservations based on the voir dire which I believe I note properly address in findings of fact and conclusions of law. At least that is my understanding.

And if that is correct, then I would propose that we move into the receipt of the evidence and proceed with cross examination.

CHAIRMAN SMITH: "Voir dire," as you have used it, customarily goes to the qualifications of the witnesses to present the testimony they have, and their qualifications to serve on the job they are serving on is a distinct consideration. Are you aware of that difference?

MR. SHOLLY: Yes. It was my understanding also that voir dire could serve to address the matter of the reliability and the weight which the evidence is given in the Board's determination of the record.

CHAIRMAN SMITH: Okay.

Gentlemen, you are released from the Board's order not to discuss the testimony, and you can join Mr. Tsaggares.

MR. ZAHLER: Mr. Chairman, I would again request that the testimony as revised be admitted in evidence and copies be incorporated in the transcript as though read.

CHAIRMAN SMITH: All right. That is the testimony and the Volume 2 for the tables. All right. That is Volume 1 and 2.

MR. ZAHLER: Yes, sir.

CHAIRMAN SMITH: Okay. The testimony -- the testimony is received, Volumes 1 and 2.

(The documents referred to, the written testimony of Mr. Tsaggares and attached Volumes 1 and 2, follow.)

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
METROPOLITAN EDISON COMPANY	)	Docket No. 50-289
	)	(Restart)
(Three Mile Island Nuclear Station, Unit No. 1)	)	
	)	

LICENSEE'S TESTIMONY OF ROBERT E. ROGAN, GEORGE J. GIANGI AND ALEXIS TSAGGARIS ON THE ADEQUACY OF ONSITE EMERGENCY PREPAREDNESS AT THREE MILE ISLAND, UNIT 1

Volume 1 -- Testimony

Table of Contents

Outline

This testimony deals with the adequacy of onsite emergency preparedness at Three Mile Island, Unit 1. It addresses short-term action item 3 and long-term action item 4 from the Commission's August 9, 1979 "Order and Notice of Hearing," Board Question 4, and the onsite emergency planning contentions raised by intervening parties in this proceeding. In addition, this testimony demonstrates Licensee's compliance with the Commission's recently revised emergency planning regulations (45 Fed. Reg. 55402-13 (August 9, 1980)) and with the guidance set forth in NUREG-0654 (Rev. 1, November, 1980).

I. Introduction. The witnesses are identified, their involvement with emergency preparedness at TMI is described, the purposes and organization of the testimony are explained, and the guidance used in developing the TMI-1 Emergency Plan is set forth.

II. Development of the TMI-1 Emergency Plan. The historical development of the initial and three revisions to the Emergency Plan is described. The coordination between the Emergency Plan, on the one hand, and other TMI programs, the state emergency plan, the five county emergency plans, and local emergency preparedness, on the other hand, is explained. The status of NRC and FFMA reviews is set forth.

III. Overview -- Concept of Operations. The division of responsibility between onsite and offsite emergency planning is explained. Licensee's emergency preparedness program at TMI,

including the distinction between the Emergency Plan and the Implementing Document, is described. Major elements of the Emergency Plan are summarized through a hypothetical application of the Emergency Plan to a small break loss-of-coolant accident.

IV. Organization and Coordination. There are three parts to this section. The first part describes the various emergency organizations, both onsite and offsite; the letter of agreement between Licensee and certain offsite agencies are discussed in this part. The second part describes the onsite and offsite emergency response facilities. And, the third part describes the communication links between the various emergency response facilities.

V. Initial Accident Assessment. The information necessary to assess an emergency condition at TMI is described. The classification of accidents is explained, including a definition of protective action guides and an analysis of Licensee's emergency action levels. The monitoring and assessment of radiation releases is described. This discussion includes an evaluation of ARAC, Licensee's REMP, and real-time offsite monitoring devices that can be remotely read onsite.

VI. Initial Accident Notification. The initial calls to Dauphin County and PEMA are identified. The reason why the other four risk counties are not called, except in a General Emergency, is explained. The role of BRP in this communication scheme is summarized. Public dissemination of information is described.

VII. Onsite Emergency Response. The mobilization of Licensee's emergency organizations and the onsite equipment available to assist in responding to an emergency is summarized.

VIII. Offsite Emergency Response. This section demonstrates the coordination between Licensee's onsite emergency plan and the offsite emergency response plans. The plume exposure pathway EPZ and the ingestion exposure pathway EPZ for the TMI site are identified. The geographic extent of the plume exposure pathway EPZ is justified in terms of the functions necessary for an adequate offsite response, including public education, early warning, notification to the public about the emergency, and protective action options.

IX. Maintaining Emergency Preparedness. Licensee's program to maintain an adequate state of emergency preparedness at TMI is described. This program consists of training, drills and exercises, and annual audits and reviews of the Emergency Plan.

I. Introduction

Q.1 Please state your name and business address.

A.1 (Witness Rogan): My name is Robert E. Rogan. I am the Manager-Emergency Preparedness for GPU Nuclear, Post Office Box 480, Middletown, Pennsylvania 17057.

(Witness Giangi): My name is George J. Giangi. I am the Supervisor-Emergency Preparedness at Three Mile Island, Post Office Box 480, Middletown, Pennsylvania 17057.

(Witness Tsaggaris): My name is Alexis Tsaggaris. I am a Vice President of Energy Consultants, Inc., 121 Seventh Street, Pittsburgh, Pennsylvania 15222.

Q.2 Have you prepared a statement of professional qualifications?

A.2 We each have prepared a statement of professional qualifications, attached to this testimony as Appendix A.

Q.3 Describe your involvement with emergency preparedness at Three Mile Island.

A.3 (Witness Rogan): I have held the title of Manager-Emergency Preparedness for GPU Nuclear since October 1, 1980. In that position I am generally responsible for emergency preparedness activities at both Three Mile Island ("TMI")[1] and Oyster Creek. With respect

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1 A list of abbreviations used in this testimony is included as Appendix B.

to TMI, I have reviewed and supervised the preparation of Revision 3 to Licensee's Emergency Plan. Currently, I am supervising the preparation of the Emergency Plan Implementing Procedures ("EPIP's") that will be submitted to the NRC on March 1, 1981.

(Witness Giangi): I was appointed Emergency Planning Coordinator at TMI on February 8, 1980. In November, 1980, I became Supervisor-Emergency Preparedness at TMI. In these positions I was directly responsible for the preparation of Revisions 2 and 3 to Licensee's Emergency Plan, and the accompanying EPIP's. In addition, I am responsible for conducting the necessary emergency drills and exercises, assuring that an adequate Emergency Plan training program is implemented, and periodically checking that necessary emergency equipment is properly calibrated and maintained.

(Witness Tsaggaris): Between 1976 and 1977 I held the title Supervisor of Training at TMI. In that position I was responsible for conducting the annual series of emergency drills, developing appropriate drill scenarios, and providing necessary documentation, including drill critiques. On the third day after the Unit 2 accident I was recalled to the site

and designated the senior utility representative in Unit 1 responsible for offsite radiological dose assessment, control of the mobile radiological monitoring teams, and communication of information to the Nuclear Regulatory Commission ("NRC") and the Pennsylvania Bureau of Radiation Protection ("BRP") on airborne and liquid radioactive releases. During the summer of 1979 I was appointed Director of Site Emergency Planning and was directly responsible for preparation of the initial version of Licensee's updated Emergency Plan, and Revision 1 to that plan. On December 31, 1979, I left Metropolitan Edison, but have continued my involvement in the TMI emergency preparedness program as a consultant to the company.

Q.4 What is the purpose of your testimony in this proceeding?

A.4 The purpose of our testimony is to describe the status of emergency preparedness at TMI-1, and to demonstrate compliance with the applicable portions of the NRC's rule on emergency planning. 45 Fed. Reg. 55402-13 (August 19, 1980). This testimony also responds to matters covered by: (a) short-term action item 3 and long-term action item 4 of the NRC's August 9, 1979 Order and Notice of Hearing; (b) Licensing Board Question 4; and (c) the onsite

emergency planning contentions raised by intervening parties in this proceeding.

Q.5 Describe the manner in which you have organized your testimony.

A.5 Generally, we have organized our testimony to follow sequentially the events that might unfold during an actual emergency. Following this introductory section of the testimony, there is a background section that addresses development of the TMI-1 Emergency Plan. The third section of this testimony, entitled Overview -- Concept of Operations, is intended to sketch briefly the entire Emergency Plan by tracing a hypothetical accident scenario. The purpose of this overview is to assist in placing in context each individual element of the Emergency Plan; these elements are described in greater detail in succeeding sections of the testimony. The fourth section of the testimony, on organization and coordination, identifies the relevant emergency organizations and their staffing, the various emergency response facilities, and the communication links that tie the various organizations and facilities together. The next four sections of the testimony address initial accident assessment, initial accident notification, onsite emergency

response and offsite emergency response, respectively. The final section of the testimony describes the methods used to maintain an adequate state of emergency preparedness at TMI. These methods include training programs, drills and exercises, and periodic reviews and updates of the Emergency Plan.

Attached to the testimony as Appendix C is a list of the intervenor contentions addressed in the testimony. Although the testimony does not respond to these contentions seriatim, the testimony has been annotated in the left-hand margin to indicate those parts of the testimony that respond to specific contentions.

Q.6 In developing the TMI-1 Emergency Plan, did you rely on guidance provided by the NRC?

A.6 Yes. Initial guidance on revised emergency planning requirements was provided in NRC-sponsored workshops held during August, 1979. The NRC then published interim acceptance criteria in September, 1979. These interim acceptance criteria were explained and elaborated upon in public technical meetings held with the NRC Emergency Planning Task Force in September, 1979. Additional guidance from the NRC

was contained in draft NUREG-0610 (September, 1979) and draft NUREG-0654 (January, 1980). On August 19, 1980, the NRC published in the Federal Register its final emergency planning rule, and in November, 1980, Revision 1 to NUREG-0654 was issued. In addition, specific comments by the NRC Staff on the TMI-1 Emergency Plan have been incorporated in the latest revision (Revision 3) of the plan.

II. Development of the TMI-1 Emergency Plan

Q.7 How was this guidance used in developing the TMI-1 Emergency Plan?

A.7 (Witness Tsaggaris): The NRC Staff conducted several visits to the TMI site during September, 1979. On September 25 and 26, the NRC Emergency Plan Task Force held public meetings with Licensee's representatives at the Liberty Firehouse in Middletown. At these meetings the NRC explained their upgraded requirements for emergency planning and Licensee's representatives described the methods Licensee anticipated using to satisfy these new requirements. On September 27, the public meeting was expanded to include representatives from the Pennsylvania Emergency Management Agency ("PEMA"), BRP, and the five counties of Dauphin, York, Lancaster, Cumberland and Lebanon.

On the basis of these meetings, Licensee prepared its upgraded Emergency Plan. The initial version of the plan was submitted to the NRC in October, 1979, and Revision 1 of the Emergency Plan was submitted in November, 1979.

(Witness Giangi): The NRC "Status Report on the Evaluation of Licensee's Compliance with the NRC Order Dated August 9, 1979" (January 11, 1980) concluded that Revision 1 of the Emergency Plan complied with the NRC's short-term action items 3(a), 3(b), 3(c) and 3(d) (at p. C3-5) and demonstrated reasonable progress toward completion of the NRC's long-term action items 4(a) and 4(b) (at p. D4-1). It was indicated that a test exercise of Licensee's Emergency Plan would be required to comply with short-term action item 3(e).[2]

In January, 1980, the Federal Emergency Management Agency ("FEMA") and NRC jointly issued "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants -- For Interim Use and Comment" (NUREG-0654/FEMA-REP-1). By letter dated April 28, 1980,

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2 These conclusions were reaffirmed in the "Evaulation of Licensee's Compliance with the Short and Long Term Items of Section II of NRC Order dated August 9, 1979" (NUREG-0680, June, 1980) at pp. C3-5 and D4-1.

Licensee was requested to revise its Emergency Plan to meet the new planning standards of NUREG-0654. Licensee submitted Revision 2 of its Emergency Plan in June, 1980, to comply with the guidance in NUREG-0654.

By letter dated September 9, 1980, the NRC requested Licensee to respond to 23 comments on Revision 2 of the Emergency Plan. On November 3 and December 29, 1980, Licensee responded to these comments. After completing its review of the Emergency Plan against NUREG-0654, the NRC wrote to Licensee on November 5, 1980, authorizing implementation of the plan since it "provides a greater margin for public health and safety." In the meantime the NRC had revised its emergency planning criteria and Licensee was preparing Revision 3 of the Emergency Plan to satisfy these new standards (see discussion in the next paragraph). Therefore, on December 10, 1980, Licensee informed the NRC that it intended to implement Revision 3 of the plan on January 2, 1981, at the same time it submitted the revised plan to the NRC.

Revision 3 of the Emergency Plan was developed to satisfy the requirements of the NRC's new emergency

planning rule, which became effective on November 3, 1980, and the additional guidance in Revision 1 to NUREG-0654, also released in November, 1980.

Q.8 Is the TMI-1 Emergency Plan coordinated with other programs at TMI?

A.8 Yes. The TMI Security Plan, Radiation Protection Plan, Fire Protection Program Plan, Emergency Public Information Plan, and Emergency and Abnormal Operating Procedures all have been closely coordinated with the TMI-1 Emergency Plan. Procedures for the previously referenced programs interface with the EPIP's in such areas as site accountability, emergency action levels, and news releases. Further information on the relationship between the Emergency Plan and other programs at TMI is provided at Section 4.2.2.2 of the Emergency Plan.

In addition, a formalized emergency plan training program currently is being developed which coordinates the TMI-1 Emergency Plan and the EPIP's.

Q.9 Has the Commonwealth of Pennsylvania been involved in development of the TMI-1 Emergency Plan?

A.9 Yes. Throughout the planning process Licensee's personnel have met with various state agencies, including PEMA and BRP. This coordinated planning

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EP-15(E)

process began with agreement on organization and communication concepts and continued throughout the detailed planning stage. Items discussed at these meetings -- for example, initial and continuing notification procedures, early warning systems, evacuation time studies, and the specific support role of the BRP -- assured that the proper interface occurred between onsite and offsite emergency planning agencies. In addition, discussions were held on the nature and extent of planning assistance that Licensee would provide to offsite agencies.

Q.10 Have the emergency response plans for the counties of Dauphin, York, Lancaster, Cumberland, and Lebanon been coordinated with the TMI-1 Emergency Plan?

A.10 Yes. Notification procedures, communication systems, resources available, warning systems and the TMI-1 Emergency Plan were discussed during meetings with the various county emergency management directors. These meetings took place at the TMI site, PEMA headquarters, and in the various local emergency operations centers ("EOC's"). Close interface between PEMA and Licensee has assured effective coordination with the five risk counties since PEMA is the lead offsite coordinating agency. NUREG-0654 concepts and terminology have been accepted as the basis for all emergency response plans.

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EP-15(E)

Q.11 Describe Licensee's involvement in the development of municipal emergency response plans.

A.11 As a result of discussions with PEMA and the county emergency management directors, it was determined that the local municipalities were in need of assistance in completing their emergency plans. The county staffs were, for the most part, fully committed to their own planning effort and could not provide the assistance required. As a result, Licensee retained the services of Kline, Knopf & Wojak (government relations consultants) to assist in the planning effort. After initial meetings with PEMA, team members consulted with county emergency management directors to ascertain needs of the local municipalities. Team members visited each of the local municipalities in the plume exposure pathway emergency planning zone ("EPZ") to offer assistance. In most cases, the consulting team assisted by ensuring that local plans followed certain formats and were coordinated with the county planning effort.

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EP-15(E)

Q.12 What is the current status of NRC review of the TMI-1 Emergency Plan?

A.12 In December, 1980, the NRC published "Emergency Preparedness Evaluation for TMI-1" (NUREG-0746). The abstract to that document states in relevant

part: "The Three Mile Island Unit 1 Emergency Plan generally meets the requirements of 10 CFR 50.47b and conforms to the guidance found in NUREG-0654, Revision 1 except for several specific items which are identified." These exceptions and the status of Licensee's corrective actions are shown on Table 1 to this testimony.

Q.13 Do you know the current status of FEMA's review of the emergency response plans for the Commonwealth of Pennsylvania and the five counties of Dauphin, York, Lancaster, Cumberland, and Lebanon?

A.13 (Witness Rogan): On January 6, 1981, FEMA transmitted to the NRC its "Review of Pennsylvania REP Planning Site-Specific to Three Mile Island Nuclear Station." This interim analysis of the state and five risk county emergency response plans concludes that these plans are "in an initial development stage and that this is an inappropriate time within the planning process to attempt to provide conclusive statements on the adequacy of TMI related planning." FEMA has informed me that this review reflects FEMA's evaluation of the general status of emergency planning in the November, 1980 time frame. Since that time, FEMA has advised me that it has undertaken substantial additional work on the emergency plans.

III. Overview -- Concept of Operations

Q.14 Describe the division of responsibility for emergency planning between Licensee and the Commonwealth of Pennsylvania.

A.14 The assignment of planning responsibilities is clearly defined in state and federal regulations. NUREG-0654 details the objectives and criteria necessary to develop complete and comprehensive emergency plans. Specific areas of responsibility are emphasized. In general, Licensee is responsible for all activities which occur onsite while the state and counties are responsible for offsite activities. In order to fulfill its onsite responsibilities, Licensee relies on various offsite agencies, both governmental and private, to provide assistance beyond that available onsite. Similarly, the Commonwealth of Pennsylvania relies on Licensee to provide necessary information on plant status and radiation releases so that the state and county governments can carry out their offsite responsibilities.

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EP-15(E)

Recognizing the joint nature of their responsibilities, Licensee and the relevant governmental agencies have taken steps to ensure a coordinated response. These steps include coordinated preplanning, redundant communication systems, and

Licensee-conducted training sessions for offsite agencies. Periodic drills test communication links, offsite response of state and county agencies, and coordination among the various agencies.

Q.15 With respect to the onsite responsibilities you referred to, describe the emergency preparedness program at TMI-1.

A.15 The Vice President Nuclear Assurance is responsible for nuclear safety assessment, quality assurance, training and education functions, system laboratories, and emergency preparedness. This Vice President reports to the Executive Vice President, GPU Nuclear. There currently are nine personnel assigned to the Emergency Preparedness Department who are located at TMI, including the Manager-Emergency Preparedness and a site Supervisor-Emergency Preparedness. The Emergency Preparedness Department is charged with overall responsibility for emergency planning and assuring the maintenance of an appropriate state of emergency preparedness at TMI.

In order to carry out these responsibilities, the TMI Emergency Preparedness Department has developed two separate, but coordinated, documents: the TMI-1 Emergency Plan and the Implementing Document.

Q.16 Please explain further the distinction between the TMI-1 Emergency Plan and the Implementing Document.

A.16 The role of the Emergency Plan is as follows:

Pursuant to 10 C.F.R. §§ 50.54(q) and (u), an operator of a licensed nuclear power plant is required to submit a radiological emergency response plan which meets the standards of 10 C.F.R. § 50.47(b) and Part 50, Appendix E. This emergency plan describes the facility's overall state of emergency preparedness. It is a detailed document which includes, among other matters, organization and communication concepts, emergency action levels, assessment actions, emergency facility details, emergency mobilization and response actions, training, recovery, and letters of agreement with outside agencies. The emergency plan provides the basis for developing additional documents, such as the implementing procedures, training program, and equipment inventories.

The role of the Implementing Document is as follows:

The Implementing Document provides a single source of pertinent and significant information related to emergency preparedness at TMI-1. It contains the procedures that would be required to: (a) ensure the operational readiness of the Emergency Plan, and (b) direct the proper response by emergency personnel.

While the Emergency Plan is a basic reference document, the Implementing Document is actually used by station personnel during an emergency.

The Implementing Document is distributed to those individuals, agencies, organizations, and facilities requiring the immediate availability of such information in an emergency. The detailed EPIP's included in the Implementing Document will, as necessary and appropriate, be used to assess conditions, classify the emergency, make required notifications, provide directions for requesting assistance, and provide step-by-step instructions for initiating protective and corrective actions.

Q.17 What are the basic elements in responding to an emergency at TMI-1 that you considered in developing the Emergency Plan?

A.17 The basic elements in responding to an emergency are:

1. Assessment of plant conditions and classification of the emergency following an accident.

2. Notification of offsite agencies and support groups.

3. Mobilization of the applicable portion of the emergency organizations to cope with the situation and continue accident assessment.

These elements were considered in establishing the TMI-1 emergency response organization, communication

capabilities, need for response facilities and equipment.

Q.18 Assume that there was a small break loss-of-coolant accident ("LOCA") greater than make-up capacity at TMI-1. Briefly describe how the Emergency Plan would be implemented.

A.18 A small break LOCA of this magnitude initially would be indicated by makeup tank level decreasing and makeup flow increasing. Reactor coolant pressure would decrease, the reactor and turbine would trip, and the emergency core cooling system ("ECCS") would initiate. Containment pressure would increase such that the cause of ECCS initiation could be either high containment pressure (4.0 psig or greater) or low reactor coolant pressure (1600 psig or lower).

The control room operators initially would be made aware of the situtation by alarms, instrument readings, or reports. The operators would ensure that the shift foreman and the shift supervisor were immediately informed.

The shift supervisor, when inf rmed of the emergency, is responsible for assessing the emergency (e.g., plant systems and reactor core status, and radiological conditions). He would determine what immediate actions must be taken and ensure that the procedure

for "Loss of RC/RC Pressure (Small Break LOCA) Causing Auto HP Injection" (1202-6B) is implemented. The shift technical advisor would advise and assist the shift supervisor on matters pertaining to the safe and proper operation of the plant with regard to nuclear safety. One step in the follow-up action section of procedure 1202-6B would refer the operator to the EPIP on Site Emergency (1004.3), and direct him to inform the shift supervisor or shift foreman that a Site Emergency action level had been reached.

In this case, the shift supervisor would classify and declare the emergency as a Site Emergency and would implement the applicable EPIP. This would set in motion corrective actions and offsite notifications. We believe that the emergency could be assessed and declared within 10 minutes.

Q.19 After the initial assessment function had been completed, what would happen next?

A.19 The shift supervisor would assume the duties of the Emergency Director and announce to all station personnel over the public address system in Units 1 and 2 that a Site Emergency had been declared in Unit 1 and instruct the onsite emergency organization personnel to report to their stations. All non-essential personnel would be instructed to assemble

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at the respective Unit 1 and Unit 2 warehouses. Initial notifications would be made as follows: (1) Dauphin County EOC; (2) PEMA EOC (staff duty officer); (3) unaffected control room; (4) NRC (Bethesda); (5) Institute of Nuclear Power Operations ("INPO"); (6) Babcock & Wilcox ("B&W"); and (7) American Nuclear Insurers ("ANI").

PEMA would immediately notify BRP and all five counties within the ten mile radius. BRP would confirm the existence of an emergency situation at TMI by activating the Radiological Line to the Unit 1 Emergency Control Center (control room). This line would be manned to maintain continuous communication throughout the emergency. Once BRP has verified that all five counties have been notified, it would advise the TMI Emergency Director accordingly.

Parallel to these notifications, the duty section superintendent would be called and informed of the emergency by the Emergency Director (shift supervisor). Callout of duty section personnel required to augment the onsite and offsite emergency organizations would begin.

Q.20 What might Licensee's response be to this situation?

A.20 Upon declaration of a Site Emergency, the entire onsite and offsite emergency organizations would

report to their respective emergency facilities. The onsite emergency facilities include the Emergency Control Center ("ECC"), Technical Support Center ("TSC") and Operations Support Center ("OSC"). The offsite emergency facilities include the Nearsite Emergency Operations Facility ("EOF"), Alternate Emergency Operations Facility ("AEOF"), Environmental Assessment Command Center ("EACC") and Parsippany Technical Functions Center ("TFC").

The ECC, located in the Unit 1 control room and adjacent shift supervisor's office, is the area where the command and control of all site-related emergency efforts and plant operations take place. Key personnel stationed in the ECC would be the Emergency Director, Radiological Assessment Coordinator ("RAC"), Operations Coordinator and the Communicator. Major functions performed in this facility include onsite and offsite radiological assessment, offsite notifications, operational control of the plant and communication of technical data to BRP and NRC.

The TSC, located in proximity to the TMI-1 control room, contains the instrumentation needed to monitor plant status for a safe shutdown of the reactor when the control room is uninhabitable. The key personnel

stationed in the TSC would be the TSC Coordinator and TSC engineers from the various disciplines. The TSC serves as an area outside the control room to accommodate personnel acting in support of the command and control functions by furnishing more in-depth diagnostic and corrective engineering assistance.

The OSC, located at the radiological controls access control point, provides an area in which shift personnel can gather for subsequent assignment to duties in support of emergency operations. Key personnel manning this center would be the OSC Coordinator, Chemistry Coordinator, Radiological Controls Coordinator and Emergency Maintenance Coordinator. The major functions of these personnel are to initially dispatch radiological monitoring teams and to support operations in the areas of chemistry, radiological controls and maintenance.

The EOF, located at the TMI Observation Center, serves as the central point for: (a) providing overall corporate management and direction in responding to an emergency, (b) coordinating administrative and logistical support, (c) interfacing with state and county representatives, and (d)

establishing the basis for long-term recovery efforts. Key personnel located at the EOF would be the Emergency Support Director, Emergency Support Staff, Assistant Environmental Assessment Coordinator, Public Affairs Representative, Emergency Planning Representative, Group Leader Chemistry Support, Technical Support Representative, and NRC and state representatives.

The AEOF, located at the Crawford Station in Middletown, houses key positions of the offsite emergency organizations. Personnel at the AEOF would be the Group Leader Administrative Support, Group Leader Radiological Controls Support, Group Leader Security Support and Maintenance and Construction Manager. Major functions performed at this facility would be security and dosimetry processing of support personnel, maintenance support, call-out of additional support personnel and administrative support. The AEOF also serves as a back-up EOF, should the EOF become uninhabitable.

The EACC, located at Olmsted (Harrisburg International) Airport would be manned by the Environmental Assessment Coordinator ("EAC") and his staff of scientists. The major functions of these

personnel would be to perform and assess all offsite radiological and environmental monitoring.

The TFC, located in Parsippany, New Jersey, is where the Group Leader Technical Support and his staff report. The major functions of these personnel would be to provide technical leadership, guidance, analysis, evaluation and recommendations to the plant staff.

Q.21 What would the offsite response be in this situation?

A.21 Based on the state and county emergency response plans, and our discussions with state and county personnel, the following additional notifications would take place. PEMA would notify BRP and the five risk counties. BRP would immediately call TMI-1 to make an initial radiological assessment and to verify Licensee's call to PEMA. Once the emergency has been assessed, BRP would call PEMA, inform them of plant status, and advise them whether any protective actions need be taken. BRP would then activate its emergency organization and establish an open line of communications with Licensee's RAC located in the ECC.

EP-1
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Q.22 How would the emergency be closed out?

A.22 In the specific case of the small break LOCA, which was initially classified as a Site Emergency, the emergency would be closed out by shutting down and cooling down the reactor and isolating the leak.

The Emergency Director and Emergency Support Director then have joint responsibility for determining and declaring when the emergency situation is stable and has entered the recovery phase. They would evaluate the status of the emergency by monitoring instruments and reviewing all current and pertinent data available from emergency response and radiological monitoring teams. They would consider the emergency under control and in the recovery phase only when the following general guidelines are met:

1. Radiation levels in all in-plant areas are stable or are decreasing with time.
2. Releases of radioactive materials to the environment from the plant are under control or have ceased.
3. Containment pressure is at normal levels.
4. Reactor plant is stable and in a long-term safe shutdown condition.
5. Any fire, flooding, or similar emergency conditions are controlled or have ceased.

Based on the sequence of events, one of the following would occur:

1. A lower class of emergency might be declared by the Emergency Director and the appropriate procedures would be implemented.

2. The Site Emergency might be closed out, with the concurrence of the Emergency Support Director, provided no recovery operations were required.

3. The Site Emergency might be shifted to a recovery mode by implementing the Recovery Operations Procedure (1004.24).

If the emergency is being reclassified, the NRC, Unit 2 control room, and other organizations as specified in the appropriate EPIP would be notified. BRP is in continuous contact with the TMI site and would be updated as necessary. BRP, in turn, would notify PEMA, who would notify the five risk counties.

If the Recovery Operations Procedure is being implemented, the appropriate organizations would be notified of the closeout of the emergency and that recovery operations are about to begin.

Q.23 Would you briefly describe what would happen if, instead of closing out the emergency, the situation continued to worsen?

A.23 Accident assessment would continue throughout the emergency, and if conditions warrant, the Emergency Director would escalate the emergency to a General Emergency. Notifications would be made to the five risk counties and to other organizations as specified in the EPIP for a General Emergency.

The assessment actions for the General Emergency generally would be the same as for the Site Emergency, with some possible shift of emphasis to greater offsite monitoring and dose projection efforts extending to distances farther from the plant. Additionally, since the projected doses are likely to be much closer to the U.S. Environmental Protection Agency's ("EPA") protective action guides ("PAG's"), greater emphasis would be placed on the assessment of release duration for the purpose of making protective action recommendations.

IV. Organization and Coordination

Q.24 Would you describe Figure 1, Licensee's Onsite Emergency Organization?

A.24 The major functional responsibilties within the onsite emergency organization are vested in the Emergency Director, the Operations Coordinator, the OSC Coordinator, the RAC, the TSC Coordinator, and the Security Coordinator. In addition, the Communicator provides communications support for the onsite emergency organization.

The Vice President TMI-1, ~~Manager~~ Operations and Maintenance Director TMI-1, or their designated alternate, performs the duties of the Emergency Director. Until his arrival at the site,

EP-4(J)(2)

the shift supervisor assumes the duties of the Emergency Director. If the shift supervisor is unavailable or becomes incapacitated for any reason, the shift foreman assumes this position. The Emergency Director has the authority and the responsibility to immediately and unilaterally initiate any emergency action, including providing protective action recommendations to authorities responsible for implementing offsite emergency measures. The Emergency Director must classify and declare the emergency, and ensure that all required notifications are made, including those to offsite emergency response organizations. The Emergency Director implements the TMI Emergency Plan through the use of specific EPIP's, activates necessary portions of the emergency organization, and performs the other functions described in Section 4.5.1.3.1 of the Emergency Plan. The Emergency Director would report to the ECC, and communicate with the Operations Coordinator, TSC Coordinator, RAC and Security Coordinator. He also would communicate with the offsite emergency organization through the EOF.

The Operations Coordinator is responsible for directing operations and operations support activities through the shift supervisor and the OSC

Coordinator. The Operations Coordinator reports to the Emergency Director and works closely with him in assessing plant conditions. He has no direct communication links with onsite or offsite agencies.

The OSC Coordinator is responsible for supporting operations in the areas of maintenance, radiological controls and chemistry. He reports to the Operations Coordinator and has the Emergency Maintenance Coordinator, Radiological Controls Coordinator, and Chemistry Coordinator reporting directly to him.

The RAC is responsible for guiding the Radiological Controls Coordinator and the Radiological Analysis Support Engineers. In addition, he is responsible for coordinating the activities of various emergency response teams. As required, he would direct the OSC Coordinator to dispatch onsite and offsite radiological monitoring teams that would report directly back to him. He would coordinate initial radiological assessment activities, review results, and report findings and make recommendations to the Emergency Director. He would interface with the EAC on radiological and environmental matters. The RAC maintains communications with BRP in order to update them on emergency status.

The TSC Coordinator and his staff of engineers report to the TSC. They are responsible for analyzing current and projected plant status and, through close communication with the Emergency Director via the Communicator, providing technical support, in-depth diagnostic and corrective engineering assistance, and recommendations regarding corrective actions. The specific duties of this group are described in Section 4.5.1.3.2.b of the Emergency Plan.

The TMI site security force operates in accordance with requirements established in the Security Plan and associated procedures. In emergency situations, the security force reports to the Security Coordinator, who, in turn, reports to the Emergency Director. The security force is responsible for personnel accountability, site access control, and plant security.

The Communicator functions as a communication liaison between the Emergency Director and the onsite and offsite emergency organizations. He reports to the ECC (shift supervisor's office) and controls the flow of information across the Operational Line and maintains communication between the TSC and the ECC with an intercom. Designated Communications

Assistants are responsible for maintaining communication with the NRC, making necessary notifications to offsite agencies, and keeping a record (log) of all incoming and outgoing communications.

Additional information on the onsite emergency organization is included in Section 4.5.1.3 of the Emergency Plan.

Q.25 How does each member of the TMI-1 staff know what position he is to fill in the onsite emergency organization?

A.25 A duty roster has been developed to ensure that all positions in the onsite emergency organization are fully staffed. One section of the duty roster is always on call. Each individual on the duty roster is preassigned a position in the onsite organization and is instructed as to what his functions are, where he is to report, and to whom he is to report. Duty roster personnel are responsible for maintaining a working knowledge of the current TMI Emergency Plan, Implementing Document, and other related station programs, plans, and procedures. Individuals generally are assigned positions in the emergency organization which closely parallel their normal everyday duties. Particular assignments are based on

the selection criteria included in Table 8 of the Emergency Plan, training received, and driving distance from residence to the site.

Q.26 When an emergency initially is declared, are there sufficient personnel on-shift to staff the onsite emergency organization?

A.26 Yes. Table 2 of this testimony shows the minimum shift complement of 20 onsite at all times, and the onsite emergency organization positions that they would fill upon declaration of an emergency. This is twice the on-shift complement required by Table B-1 of NUREG-0654 (Rev. 1). Moreover, this on-shift complement is more than adequate to promptly perform the initial accident assessment and notification functions of the emergency organization.

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EP-4(J)(2)
EP-4(J)(3)

In particular, there are adequate personnel so that the Emergency Director (shift supervisor) may assign two control room operators to monitor the plant (CRO #1 and Tagging & Switching CRO), a third ~~control room~~ operator to initiate calls to Dauphin County, PEMA, NRC and the unaffected control room, and additional personnel (chosen from the four auxiliary operators, two radiological controls technicians, and four maintenance personnel available) to conduct onsite and offsite radiological surveys.

EP-4(J)(1)

Q.27 How many people with radiological controls (health physics) training will be available to man the onsite emergency organization?

A.27 EP-4(D) EP-4(J)(4) Immediately available would be one radiological controls foreman and three radiological controls technicians. The three technicians can be split up to provide radiological monitoring and in-plant radiological controls. Within sixty minutes of the declaration of an emergency, a senior radiological controls engineer would be available to assume the position of RAC, two Radiological Analysis Support Engineers would be available to assist the RAC, and three additional radiological controls technicians would be available. In summary, four people trained in radiological controls would be available initially and ten (six additional) would be available within sixty minutes.

In addition, the EACC can be manned and operational within six hours after declaration of an emergency. The EACC can supply four one-man teams and a two-man mobile monitoring laboratory. This can be augmented by three additional one-man teams, should it become necessary.

Q.28 Would you describe Figure 2, Licensee's Offsite Emergency Support Organization?

A.28 The key elements of the offsite emergency support organization include the Emergency Support Director, Emergency Support Staff, Public Affairs Representative, Emergency Planning Representative, Group Leader Administrative Support, EAC, Group Leader Radiological Controls Support, Group Leader Chemistry Support, Group Leader Technical Support, Maintenance and Construction Manager, and Emergency Support Communicator. The offsite emergency support organization provides technical and logistics support in the event of a serious or potentially serious emergency and is staffed by personnel from the normal station and technical support organizations.

The Emergency Support Director is the senior utility management representative at the TMI site. He reports to the EOF and is responsible for directing the offsite emergency support organization, and for providing advice and guidance to the Emergency Director on accident management responsibilities. The Emergency Support Director can monitor communications on the Operational and Radiological Lines, and communicates directly with the Emergency Director on the Emergency Director's line.

The Emergency Support Staff reports to the Emergency Support Director at the EOF and assists the Emergency

Support Director by communicating with the offsite emergency support organization Group Leaders and by providing status reports to the Emergency Support Director.

The Public Affairs Representative reports to the Emergency Support Director from the EOF. He is responsible for implementing the Emergency Public Information Plan, preparing technically accurate news releases, and updating GPU Nuclear management on the status of the emergency.

The Emergency Planning Representative reports to the Emergency Support Director from the EOF. He is responsible for providing information relating to onsite, offsite, and state and local emergency facilities, and communication, personnel and resource capabilities. He also provides advice on the procedural requirements of Licensee's Emergency Plan.

The Group Leader Administrative Support reports to the AEOF. He is responsible for administrative and logistics functions required to support the onsite and offsite emergency organizations. In addition, he is responsible for security processing and badge issuance to personnel requiring site access.

The EAC reports to the EACC and is responsible for the radiological environmental monitoring program ("REMP"). Once the EACC is activated, the EAC assumes control of offsite radiological and environmental monitoring and assessment from the RAC. He communicates with the RAC in the ECC on the Environmental Assessment Line.

The Group Leader Radiological Controls Support reports to the Emergency Support Director from the AEOF. He is responsible for all aspects of radiological controls support to the onsite emergency organization, including thermoluminescent dosimeter ("TLD") issuance, whole body counting, and obtaining additional equipment and personnel as necessary. The Radiological Controls Manpower Support and Personnel Monitoring Coordinators report directly to him.

The Group Leader Chemistry Support reports to the Emergency Support Director at the EOF. He is responsible for all aspects of chemistry support, including the establishment of a chemistry monitoring program and for obtaining additional equipment and personnel as necessary.

The Group Leader Technical Support reports to the Emergency Support Director from the Parsippany TFC.

He is responsible for providing technical leadership, analysis, evaluation and recommendations to the onsite TSC Coordinator with respect to plant conditions, reactor core status, and subsequent plant operations. He communicates with the onsite TSC Coordinator and the Technical Support Representative at the EOF on the Parsippany/TMI Line.

The Maintenance and Construction Manager reports to the Emergency Support Director from the AEOF and is responsible for maintenance support to the onsite and offsite organizations. He provides additional maintenance personnel and equipment as required. The Group Leader Maintenance Support reports to him.

The Emergency Support Communicator reports to the Emergency Support Director at the EOF and is responsible for operation of the communication systems at the EOF and for the coordination of requests for outside assistance. He ensures that the primary and back-up communication systems are activated and operational, and maintains records of communications and status boards.

Additional information on the offsite emergency support organization is located in Section 4.5.1.4 of the Emergency Plan.

Q.29 How do personnel know their assignments in the offsite emergency support organization?

A.29 A duty roster has been developed which assigns personnel to specified positions in the offsite emergency support organization. Emergency responsibilities are assigned on the basis of the selection criteria set forth in Table 8 of the Emergency Plan, the individual's overall experience and training, and his current job position. The offsite personnel become familiar with duty stations and responsibilities by attending periodic training sessions and participating in test exercises and drills. Personnel assigned functional responsibilities in the offsite emergency support organization are expected to maintain a working knowledge of the current TMI Emergency Plan, Implementing Document, and other related station programs, plans, and procedures as may be required to perform their functions.

Q.30 How long would it take to staff the offsite emergency support organization?

A.30 Depending on the emergency classification, all or part of the offsite emergency support organization would be directed to report to predesignated locations. Upon arrival at the emergency response facility, personnel initially would activate

emergency communication systems and computer-based data links; inspect, inventory and place in operation as appropriate the emergency equipment present; and complete all tasks directed by the appropriate procedures. As personnel continue to arrive, the various functional areas would become fully operational and would support the onsite organization. The entire offsite emergency support organization can be fully manned within six hours.

Q.31 Would you describe the basic function of the offsite emergency support organization, noting particularly how those functions differ from the responsibilities of the onsite emergency organization?

A.31 The purpose of the offsite emergency support organization is to provide overall corporate management and direction of emergency response, to provide technical advice and assistance, and to coordinate long-term logistical and administrative support for the onsite emergency response organization and activities. In general, the offsite emergency support organization will:

1. Support the onsite emergency organization in engineering and technical matters with accident analysis, assessment, and technical advice on appropriate corrective actions to stabilize the plant.

2. Provide for environmental monitoring and assessment in support of the onsite emergency organization.

3. Provide liaison and communication with the NRC and appropriate state and county agencies.

4. Provide for the dissemination of information to the public and the news media.

5. Provide security support.

6. Acquire materials, equipment, and services necessitated by the emergency.

7. Provide assistance for reentry operations and post-accident planning.

8. Assign post-accident investigation and review responsibilities.

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These functions need not be accomplished immediately after declaration of an emergency. Rather, they are supplementary to, and in support of, the functions being performed by the onsite emergency organization. This characteristic distinguishes the responsibilities of the offsite emergency support organization from the onsite emergency organization.

Q.32 Would you describe Figure 3, Licensee's Long-Term Recovery Organization?

A.32 A long-term recovery organization has been developed, which would assume command of the emergency response from the onsite and offsite emergency organizations in cases where post-accident conditions either would be complicated or would be expected to extend over a long period of time. The key elements in the GPU Nuclear recovery organization are: the Office of the

President GPU Nuclear, Vice President Administration, Vice President Communications, Vice President Radiological and Environmental Controls, Vice President Maintenance and Construction, Vice President Technical Functions, Vice President Unit Operations, Vice President Nuclear Assurance.

The Office of the President GPU Nuclear is responsible for overall recovery operations. This includes overseeing operations of the various functional groups and ensuring that all activities receive proper analysis and coordination.

The Vice President Administration is responsible for providing the necessary administrative/logistics requirements, such as communications, manpower, transportation, commissary arrangements, accommodations, clerical support, and temporary office space and equipment.

The Vice President Communications is responsible for coordinating the exchange of information with public and governmental agencies.

The Vice President Radiological and Environmental Controls is responsible for establishing policy, coordinating and reviewing radiation and

environmental controls, including in-plant radiological controls management, and monitoring and quantifying the degree of contamination of buildings and personnel.

The Vice President Maintenance and Construction has the responsibility for directing the activities associated with major maintenance tasks and accomplishing field work for major modifications.

The Vice President Technical Functions is responsible for providing engineering support, technical planning and analysis, procedure support, control room technical support, data management, and support relating to licensing requirements.

The Vice President ~~Unit Operations (TMI-1)~~ TMI-1 is responsible for performing all plant operations and maintenance activities, limiting and controlling personnel exposures, terminating or minimizing offsite releases, stabilizing plant conditions, restoring the plant's ability to function normally, and responding to any further emergencies. He is responsible for safely and effectively managing the quantities of radioactive gases, liquids, and solids that might exist during the initial phases of recovery.

The Vice President Nuclear Assurance is responsible for implementing the Quality Assurance Plan, all necessary general employee, technical and recovery management training programs, and for review of the Emergency Plan and Implementing Document to ensure that a high degree of emergency preparedness is maintained for potentially hazardous recovery activities.

Additional information on the long-term recovery organization is located in Section 4.5.1.5 of the Emergency Plan.

Q.33 Identify the major agencies at the state level which would respond in the event of an emergency at TMI and the primary functions they would perform.

A.33 All state-level emergency response agencies have some common responsibilities. Briefly, they are: (a) develop and maintain plans for emergencies; (b) prepare and maintain procedures for rapid dissemination of information, quick assembly of key personnel, and timely acquisition of equipment and other resources; (c) maintain resources inventories; and (d) identify critical functions and activities necessary for adequate operational capability during emergency situations.

With respect to a radiological emergency at TMI, the primary state response agencies and their general responsibilities are:

PEMA -- develop, maintain and coordinate emergency plans; coordinate emergency response; assist local governments.

BRP -- develop and maintain a radiological response plan; provide technical expertise to PEMA and, if requested, TMI; ensure that proper information concerning the incident is given to county and local emergency response agencies; provide guidance for protective actions that might be necessary.

Pennsylvania State Police ("PSP") -- provide law enforcement assistance to the site if requested; assist local law enforcement agencies with traffic control, evacuation warnings and other duties as may be required and requested.

Department of Health -- ensure continuity of medical service; provide support as requested by county emergency medical coordinators.

Department of Agriculture -- develop and maintain a radiological response plan; in coordination with

BRP, provide necessary information on protective actions to be taken by farmers; provide technical advice to PEMA; maintain logs (records) of livestock populations in the vicinity of the facility; assess damage.

Department of Military Affairs -- provide equipment and manpower to support local emergency response efforts.

The Departments of Transportation ("PennDOT"), Education and Public Welfare, the Fish and Game Commission, and the State Fire Commissioner also have certain responsibilities to ensure that proper support is provided to local governments where needed and when requested.

Q.34 Identify the major agencies at the county level which would respond in the event of an emergency at TMI.

A.34 The county emergency management agencies of Dauphin, York, Lancaster, Cumberland, and Lebanon would respond in the event of an emergency at TMI. The emergency response plans for these five counties, as well as letters of agreement with local police, fire and ambulance units, are included as appendices to Licensee's Emergency Plan. Support from the local fire, police and ambulance units would be coordinated

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through the Dauphin County EOC. Personnel from these units are invited to attend training sessions conducted by Licensee, to familiarize themselves with TMI procedures, facilities and equipment. All of the counties have listed in their emergency response plans the specific organizations and resources that would be brought to bear in the event of an emergency.

Q.35 Are there other support agencies that TMI might rely upon in the event of an emergency?

A.35 Arrangements for hospital and medical services for injured or contaminated (overexposed) personnel are provided for by letters of agreement with Radiation Management Corporation ("RMC"), Hershey Medical Center, and local physicians.

RMC provides an emergency medical program to TMI that includes a review of plant procedures, consultation on management of radiation accidents, a radiation emergency medical team, a bioassay laboratory, a medical center equipped for the definitive evaluation and treatment of radiation injuries, annual training for the plant, ambulance and hospital personnel, and conduct of radiation medical emergency drills. In addition, RMC provides facilities and services,

including a radiation chemistry laboratory, exposure evaluation services through a mobile whole body counter, and a special van designed to transport contaminated patients.

RMC is under the direction of a physician, certified in both radiology and nuclear medicine, who is also the Associate Professor of Clinical Radiology at the University of Pennsylvania School of Medicine. The RMC staff is comprised of approximately 150 people skilled in health physics, radiation physics and measurement, radiochemistry, environmental sciences, biology, and ecology.

The Hershey Medical Center receives contaminated/injured personnel in a special area designated the radiation emergency area. The Medical Center has detailed plans and procedures for the decontamination and treatment of contaminated patients. It employs a professional staff consisting of a certified health physicist, a master's level health physicist and radiation protection technologists. The Medical Center has over two hundred radioisotope laboratories, receives thousands of radioactive shipments each year and conducts radiation therapy using Cobalt-60 and a linear accelerator. Thus, the

staff is routinely involved in matters requiring radiological controls.

Q.36 Aside from the agencies described in your responses to Questions 33, 34 and 35, have you identified other groups from which you might seek additional emergency assistance?

A.36 Table 11 of the Emergency Plan lists various groups that the TMI Emergency Preparedness Department has contacted to determine whether such groups have personnel or equipment that could be made available to TMI in the event of a radiological emergency. Some of the groups so listed might be contacted during an emergency only if it appeared that long-term, recovery-type support was necessary. As Table 11 demonstrates, there are multiple sources available to supply the specified personnel and equipment.

Q.37 How has Licensee ensured that the support described in your responses to Questions 33 through 36 will be available if needed?

A.37 EP-4(B) EP-15(A) A review was made to determine which groups provided support that was deemed necessary for prompt onsite emergency response and which groups merely provided support that might be helpful as part of a long-term, recovery-type effort, but which need not be immediately available. For those groups whose

support was deemed necessary for prompt onsite emergency response, a further review was conducted to determine whether preexisting contractual arrangements were sufficient to assure the prompt availability of necessary personnel or equipment. Where Licensee did not have appropriate preexisting contractual arrangements, letters of agreement briefly describing manpower and equipment availability and specific response capabilities were sought. Included as Appendix C to the TMI-1 Emergency Plan are such letter agreements from 25 organizations. Telephone numbers for all key support groups are included in an EPIP.

In addition to the letter agreements, local support group participation in Licensee-sponsored training and drills and in actual responses to requests for assistance confirms that necessary support will be available when needed.

For example, pursuant to Licensee's arrangements with RMC, a training session for local emergency medical personnel from offsite organizations was conducted by RMC at TMI on September 10, 1980. This training session was followed by an exercise on September 11. Participation in this training and drill exercise

evidences the willingness of such offsite groups to provide emergency support to TMI.

Licensee has had similar experiences with fire protection organizations. Historically, personnel at TMI have been members of, or otherwise involved in, fire protection organizations and first aid squads in their communities. This relationship has been expanded in the past year or so to include not only TMI-specific training of local fire company personnel, but also training in firefighting sciences that will benefit these companies by permitting them to better serve their communities. For example, a drill was held on October 18, 1980, on Fulling Mill Road in Lower Swatara Township. Emergency preparedness personnel from TMI supervised the planning and coordination of the drill for firefighting and emergency service organizations from the townships of Lower Swatara, Middletown, Hummelstown, Chambers Hill, Highspire, Londonderry and Enhaut. Emergency preparedness personnel also served as safety officers during the exercise, which involved fighting an actual fire, to maximize the safety and protection of the firefighters involved.

In addition to training and drill exercises, there were more than a dozen incidents in 1979 where

offsite medical assistance (ambulance service) was requested and provided to TMI either by Liberty Fire Co. #1 or Londonderry Fire Co. #1. During a fire at TMI on November 6, 1980, five different fire companies responded promptly, three of which were turned away because the fire already was under control.

Q.38 One of the intervenors, ANGRY, has identified what it believes to be various deficiencies in some of the letters of agreement referred to in your last answer. Please respond to each of these alleged deficiencies.

A.38 The various objections of ANGRY to the letters of
EP-4(B) agreement are detailed in ANGRY's answer to interrogatories, dated September 3, 1980, and in its supplemental response of October 1, 1980. Similar objections have been grouped together and our response to each set of objections is presented below.

1. Failure to refer to appropriate legal instruments, such as legislation -- It was never clear to Licensee what emergency preparedness function would be served by including legal references in letters of agreement. Thus, no such references are included in the letters of agreement. The NRC and FEMA have recognized that little purpose

is served by such legal references, and evaluation criterion 3 of planning standard A has been amended in Revision 1 of NUREG-0654 to delete the recommendation that legal references be included in letters of agreement.

2. Failure to include mutually acceptable criteria for implementation -- ANGRY makes this objection with respect to the letters of agreement from PEMA, BRP, the risk counties, and the various police, fire and ambulance organizations. This objection is unwarranted since all offsite governmental emergency response agencies around TMI have accepted the emergency classification system described in Appendix 1 to NUREG-0654 (Rev. 1). Thus, the mutually acceptable criteria for implementation are established without regard to the letters of agreement. Moreover, detailed emergency response plans for PEMA, BRP and the five risk counties are included as appendices to Licensee's Emergency Plan. There is no need for letters of agreement to duplicate information included in these response plans. Similarly, police and firefighting organizations have standard operating procedures which provide guidance for

responding to emergencies. Here too no purpose would be served by duplicating this information in letters of agreement.

3. Failure to obtain binding commitment from the Pennsylvania State Police -- The language used by Commissioner Dunn, and cited by ANGRY, merely states the obvious: that Licensee has no authority to direct offsite governmental agencies to respond to an emergency in any specific manner or with definite amounts of manpower and equipment. The recommendation in NUREG-0654 that letters of agreement be obtained was not intended to require a utility operator to exercise such authority. Rather, such letters demonstrate a utility's contact with relevant government agencies, and the parties' awareness that the utility may call for support from government authorities. Commissioner Dunn's letter certainly establishes these facts. As explained in our response to Question 37, Licensee fully expects the Pennsylvania State Police to respond .f their assistance is needed.

4. Failure to obtain letter from Hershey Medical Center -- The August 12, 1980 agreement between

Licensee and Hershey Medical Center is included in Revision 3 to Licensee's Emergency Plan.

5. Specific commitments from GPU related companies -- Table 11 of the Emergency Plan provides supplementary information on the manpower and equipment available from GPU related companies. Moreover, with the reorganization of GPU Nuclear, the executive authority that supervises operations at TMI also supervises nuclear related operations at the other GPU companies and therefore can assure emergency support from such companies.

Q.39 Would you describe Figure 4, Emergency Response Facilities?

A.39 The emergency response facilities are divided into four categories: onsite, offsite-near, offsite-general area, and offsite-out-of-state.

The onsite facilities are as follows:

1. Emergency Control Center ("ECC") is the Unit 1 control room and shift supervisor's office.
2. Technical Support Center ("TSC") is located in the remote shutdown room, in close proximity to the Unit 1 control room.
3. Operations Support Center ("OSC") is located at the radiological controls access control point.

The offsite-near facilities are as follows:

1. Nearsite Emergency Operations Facility ("EOF") is located at the TMI Observation Center, directly east of the site on Route 441.

2. Alternate Emergency Operations Facility ("AEOF") is located at Crawford Station.

3. GPU Nuclear Media Center is located at Crawford Station.

4. Environmental Assessment Command Center ("EACC") is located at the Olmsted Airport.

5. Dauphin County EOC is located in the courthouse in Harrisburg.

The offsite-general area facilities are as follows:

1. Federal EOC is located at Capital City Airport.

2. BRP is located in the Fulton Bank Building in Harrisburg.

3. NRC Region 1 Office is in King of Prussia, Pennsylvania.

4. PEMA EOC is located in the basement of the Transportation and Safety Building in Harrisburg.

5. EOC's for the four risk counties other than Dauphin are located in the respective county courthouses.

The offsite out-of-state facilities are as follows:

1. NRC headquarters are in Bethesda, Maryland.

2. Babcock and Wilcox ("B&W") is located in Lynchburg, Virginia.

3. Parsippany Technical Functions Center ("TFC") is located in Parsippany, New Jersey.

Q.40 Describe the function of Licensee's three onsite emergency response facilities.

A.40 The ECC, located in the Unit 1 control room and adjacent shift supervisor's office, contains communications equipment, emergency radiological controls equipment, status boards, a dose projection microcomputer and offsite area maps. Command and control of all site-related emergency efforts originate from this center.

The TSC, located at the 322' elevation of the control building, below the control room, is an area where engineers can provide technical support and analysis to emergency response personnel in the ECC. The TSC contains access to key plant parameters that may be used in assessing accident conditions. Records, drawings, technical manuals, communication systems and other information sources also are located at the TSC. This technical information and communications equipment available in the TSC enable personnel at the center to provide a high level of technical assistance to those responsible for command and control of emergency efforts.

The OSC, located at the 306' elevation of the control building, is the normal radiological controls access

control point. The OSC contains communications equipment, emergency radiological controls equipment, offsite area maps and status boards. Shift personnel muster in this area for subsequent assignment to duties in support of emergency operations.

Q.41 Describe the function of Licensee's five offsite emergency response facilities.

A.41 The TMI Observation Center fronting on Highway 441, east of the TMI site, will be the EOF. This facility normally is manned as a public education center and is a well built permanent structure with adjacent parking areas. Sufficient area for helicopter landing is available. The EOF will house the key technical groups of the offsite emergency organization. In addition, BRP will send a liaison representative, and the NRC will locate its senior site emergency team at this location.

Crawford Station, located approximately three miles north of the TMI site, serves as the AEOF. Radiological controls equipment, including decontamination supplies, will be located here. The AEOF also serves as a staging area for personnel preparing to go onsite. Offsite administrative and maintenance support activities will be conducted from this location.

The EACC, located in offices at Olmsted Airport, will be made operational concurrent with the EOF. Once operational, the assessment of all offsite radiological and environmental impacts will be done at the EACC. This includes offsite dose calculations, offsite monitoring of radiological releases via all major pathways, receipt and dissemination of all data received from offsite monitoring teams, and implementation of the REMP.

The Parsippany TFC will be located at GPU headquarters in Parsippany, New Jersey. The Group Leader Technical Support and his staff will report to this center. A representative of this group, designated the Technical Support Representative, will be dispatched to the EOF to make recommendations to the Emergency Support Director.

The Media Center, located at Crawford Station, contains equipment and facilities designed to support timely communications and dissemination of information on plant conditions and emergency operations. Commercial facilities will be used to accommodate large press conferences beyond the capacity of the Media Center. Additional information on the Media Center is provided in the Emergency Public

Information Plan for TMI, which is Appendix B to the TMI-1 Emergency Plan.

Q.42 Are the emergency response facilities of the state and county governments depicted in Figure 4?

A.42 Yes. The state EOC, located in the basement of the Transportation and Safety Building in Harrisburg, contains back-up power equipment, communication systems, and necessary supplies to accommodate the various state government agencies that would operate from this EOC. The risk counties also operate EOC's, located in the basements of the respective county courthouses. All have back-up power and the space and equipment needed to ensure a coordinated response to an incident at TMI. BRP operates from its offices in the Fulton Bank Building in downtown Harrisburg. Personnel from BRP also are located at the state EOC and at Licensee's EOF.

Q.43 Are the emergency response facilities of the various federal agencies also shown in Figure 4?

A.43 Yes. The Capital City Airport is the location of the federal EOC. The Airport, located about 10 miles WNW of the site, is owned and operated by the Commonwealth of Pennsylvania. The Department of Energy and EPA would be two of the key federal

agencies to conduct operations from this facility, which was used for a similar purpose during the Unit 2 accident and proved satisfactory. NRC facilities from which assistance or advice would be requested in the event of an accident are the NRC Region I Office in King of Prussia, Pennsylvania and the NRC Headquarters in Bethesda, Maryland.

Q.44 Would you describe generally the communication systems linking the emergency response facilities you have just identified?

A.44 The communication systems to be utilized at the various locations consist of both two-way radios and land-line telephone systems. Reliability is provided through redundancy, alternate communication methods, dedicated systems, and routine use to ensure operational reliability. Information that would flow over these systems is divided into two major categories: operational data and radiological data. This procedure ensures rapid transmission of information directly to key parties having closely related functions, thus eliminating errors associated with second-hand information. The significant networks are the Operational Line, the Radiological Line, the Environmental Assessment Line, the Parsippany/TMI Line, the Parsippany/B&W Line, the NRC

Emergency Notification System ("ENS"), and the NRC Health Physics Network Line ("HPN"). By providing well-defined and dedicated communication links, effective accident management from physically separate control and support centers is achieved.

Q.45 You referred to an "Operational Line". Please describe this network in more detail.

A.45 The Operational Line is a network of dedicated telephone lines with telephones located in the ECC (shift supervisor's office), OSC, TSC, EOF, AEOF and B&W in Lynchburg, Virginia. See Figure 5(a) of this testimony. The Operational Line permits an unimpeded discussion of plant parameters, system status, core conditions, and other pertinent technical data necessary to resolve problems in accident mitigation and to keep all emergency response personnel apprised of current plant conditions. This capability enhances the accident management function and decision making process.

Q.46 You also identified a "Radiological Line". Would you describe this network in more detail?

A.46 The Radiological Line is a dedicated telephone line with telephones located in the ECC (dose assessment area), OSC, EOF, AEOF, and two different areas at

BRP. See Figure 5(b) of this testimony. This line permits the communication of plant radiological dose projections, offsite radiation monitoring results and liquid effluent release data to BRP and other key emergency response personnel.

Q.47 You also referred to the Environmental Assessment, Parsippany/TMI and Parsippany/B&W Lines. Describe these communication links in more detail.

A.47 Each of these dedicated telephone lines provides a capability for a particular type of communication that is anticipated to occur during an emergency.

The Environmental Assessment Line connects the RAC in the ECC (dose assessment area) with the EAC at the EACC (Olmsted Airport) and the Assistant EAC at the EOF. See Figure 5(c) of this testimony. Dose projection information and radiological assessments will be communicated over this line.

The Parsippany/TMI Line connects the TFC with the EOF and the TSC. See Figure 5(d) of this testimony. This allows for a rapid exchange of information among the Group Leader Technical Support in Parsippany, the Technical Support Representative at the EOF, and the onsite TSC Coordinator.

The Parsippany/B&W Line connects the TFC with the B&W technical functions group in Lynchburg, Virginia.

See Figure 5(e) of this testimony. This establishes a reliable channel of communciation for in-depth diagnostic and corrective engineering assistance between the facility operator and the nuclear steam supply system vendor.

Q.48 Please describe the communication links between TMI and PEMA.

A.48 Basically, there are two communication links. The first is the normal telephone land-line link. The alternate in the event of a telephone system failure is the National Warning System ("NAWAS"). NAWAS is a dedicated radio-telephone line designed to provide an immediate means of emergency information flow. The system is tested daily.

EP-1
EP-15(B)

Q.49 Would you also describe the communication links between TMI-1 and Dauphin County?

A.49 Initial contact with the Dauphin County EOC is normally made by telephone. Back-up communications are through a cross-monitoring radio system. This particular system is tested on a weekly basis.

EP-1
EP-15(B)

Q.50 Is it anticipated that TMI would be in direct communication with the other four counties?

A.50 No, except in a General Emergency, in which event Licensee will contact each county in parallel with

EP-1
EP-4(G)

the notification the counties would receive from PEMA.

Q.51 Previously you identified two communication links with the NRC. Please describe these systems in more detail.

A.51 The two communication systems are the NRC Emergency Notification System ("ENS") and the NRC Health Physics Network Line ("HPN").

The ENS hotline is a dedicated telephone system that connects TMI and all other operating reactors with NRC headquarters in Bethesda, Maryland. It is used to report emergencies. The purpose of this line is to provide reliable notification and communication of operational plant data to the NRC. ENS hotline phones are located in the ECC (control room and shift supervisor's office), OSC, TSC, and EOF. See Figure 5(f) of this testimony. Initial notification and communication with the NRC is made with the ENS phone in the ECC. Once NRC representatives arrived in the ECC, they would take over communications on the ENS line. Senior NRC officials reporting to the site can speak with headquarters from the ENS phone at the EOF. The NRC can patch-in the Region I Office on this network.

In the event of a Site or General Emergency, the HPN line will be activated by the NRC operations center in Bethesda, Maryland. This phone is part of a network that includes all nuclear power plants, the NRC regional offices and the NRC operations center in Bethesda. The HPN is a restricted network and is not to be used by non-government employees except to report a significant event when both the ENS and the commercial telephone lines are out of service. This system is dedicated to the transmission of radiological information by NRC personnel on site to NRC personnel in Bethesda and at the regional office. HPN phones are located in the ECC (shift supervisor's office), the EOF, and the NRC resident site inspector's office. See Figure 5(g) of this testimony.

Q.52 Are there additional means available for communications among the various emergency response centers?

A.52 Other communication systems include: Emergency Director's auto-dialer phone, the Pennsylvania Bell system, GPU microwave system, TMI radio frequencies, the inter-control room hotline, the Emergency Director's hotline, the plant paging system, the maintenance and instrumentation phone system, and various plant alarms (i.e., radiation emergency, fire

and reactor building evacuation). Each of these systems is described further in Sections 4.7.5.9 through 4.7.5.18 and Table 18 of the Emergency Plan.

Q.53 In addition to the flow of information across the communication links you have just described, will these communication links also be used to support the decision making process?

A.53 Yes. There are two primary networks of emergency response decision making.

The first is the protective action network. The Emergency Director receives input and data from the RAC and EAC regarding offsite radiation levels and from the Operations Coordinator regarding plant status. Based on this information, the Emergency Director will make protective action recommendations to BRP. After receiving the protective action recommendation from the site and reviewing data from its own monitoring teams, BRP determines if protective action is warranted, and, if so, advises PEMA of the action to be taken. PEMA communicates with the Governor, or his designee, and with the Governor's consent, initiates the protective action.

The second network consists of decisions to be made regarding plant operations during an emergency. Initially, the Emergency Director provides direction

to plant operators responding to an accident. Once the TSC is activated and B&W is contacted, the Emergency Director begins to receive technical recommendations over the Operational Line. When the Parsippany TFC is manned, the Group Leader Technical Support and his staff assume responsibility for providing technical advice on plant operations.

V. Initial Accident Assessment

Q.54 Please describe the basic components of accident assessment.

A.54 The initial step in accident assessment is awareness of a problem. This determination initiates an investigative process intended to define the nature of the problem with sufficient specificity to permit an evaluation of plant status and potential hazards. Simultaneous with this investigative process, as information is developed, the shift supervisor will implement appropriate response procedures. If conditions warrant, the shift supervisor will classify the emergency as an Unusual Event, Alert, Site Emergency or General Emergency and implement the Emergency Plan in accordance with the appropriate implementing procedure.

Q.55 You identified awareness of a problem as the initial step in accident assessment. Are there different types of information that have to be monitored and analyzed to properly perform this step?

A.55 Yes. In order to assess the emergency, the shift supervisor will monitor plant systems by observing: process monitors which display parameters such as pressure, temperature and flow; radiation monitors which display count rates for certain isotopes in effluent release paths; and, if appropriate, fire alarms, meteorological information, and seismic instrumentation. By analyzing the appropriate instruments for the specific emergency and comparing plant conditions with emergency action levels, the shift supervisor will classify the emergency and implement the applicable EPIP.

After initial classification, the accident assessment process would continue throughout the emergency situation. If radiation releases were anticipated or in progress, meteorological instruments would be monitored to predict offsite impact. Each emergency class imposes a different magnitude of assessment effort which would continue until the emergency has been terminated. If conditions warrant, the emergency might be reclassified.

Q.56 What means are used by the plant operators to monitor the status of TMI-1?

A.56 Plant operators utilize installed instrumentation, system display boards, alarms, physical plant tours,

shift turnover procedures, valve lineup procedures, the switching and tagging procedure, and status boards to monitor the plant.

Plant instrumentation that would be used to promptly detect accidents includes that discussed in the TMI Nuclear Station-Unit 1 Final Safety Analysis Report ("FSAR"). Table 7 of the Emergency Plan lists the accidents discussed in the FSAR and the important instrumentation that would be expected to detect each of these accidents; only major, installed equipment is listed.

Q.57 What means are used to monitor radioactive releases?

A.57 A system of radiation monitors is used to measure and record radiation levels at selected locations throughout the plant. Table 9 of the Emergency Plan lists the various monitors in the radiation monitoring system. These monitors have the ability to alarm at predetermined setpoints when higher than normal radiation levels exist in the plant. Data from these monitors are displayed by meters and strip charts in the control room.

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Monitors RM-G8, RM-A2, RM-A5, RM-A8, RM-A9, and RM-L7 monitor reactor building gamma levels, reactor

building air, condenser off-gas, station vent, reactor building purge, and liquid effluent releases, respectively. Data from these monitors, in conjunction with meteorological information, is used in accordance with an EPIP to estimate projected offsite radiological doses.

Q.58 How is meteorology monitored at the site?

A.58 Wind speed, direction, dewpoint, temperature at the 33 and 150 foot elevations, and precipitation are continuously monitored via sensors mounted on the meteorology tower located at the north end of the island. These parameters are recorded on strip charts in the meteorology building, and data on wind speed, direction and the difference in temperature at the two monitored levels (atmospheric stability) is displayed in the control room. A computer maintained by Digital Graphics Inc. ("DGI"), Rockville, Maryland, stores the measured parameters in a data file that is updated every four hours. This historical information may be obtained by interrogating the data storage facility (DGI) or the onsite computer located in the meteorology building near the weather tower.

Q.59 The next step you mentioned in the accident assessment process is classification. Has TMI-1 adopted a system for classifying accidents?

A.59 Yes. TMI-1 has adopted the four emergency classes listed in 10 C.F.R. Part 50, Appendix E, Section IV, Paragraph C.

The least severe of the four classes is the "Unusual Event". This classification is appropriate for an event that indicates a potential degradation of the level of safety of the plant. An incident is classified as an Unusual Event only if it is a minor one and no radiological releases are expected. Events in this class are based upon a potential to evolve to a more severe situation rather than an actual public hazard.

The next class is "Alert". This classification indicates an actual or potential substantial degradation of the level of safety of the plant. The Alert class includes emergency situations that are expected to be minor but where it has been deemed prudent to notify and mobilize a greater portion of the onsite and offsite emergency organizations. Events that initiate an Alert are those with the potential of only limited radiological release to the environment.

A "Site Emergency" includes incidents in which actual or likely major failures of plant functions needed

for protection of the public have occurred. Although immediate protective actions are not automatically required, declaration of a Site Emergency sets in motion all onsite and offsite organizations and activities that would be required to perform actions up to and including the evacuation of near-site areas.

The most severe class is the "General Emergency". This classification includes accidents which involve actual or imminent substantial core degradation or melting with potential for large releases of radioactive material and/or loss of reactor building integrity, and other accidents that have large radioactive release potential such as fuel handling and waste gas system accidents.

Q.60 Is this system of accident classification also used by state and county governments?

A.60 Yes. The Commonwealth of Pennsylvania and the five counties of Dauphin, York, Lancaster, Cumberland and Lebanon have adopted the emergency classification system described in 10 C.F.R. Part 50, Appendix E, Section IV, Paragraph C.

This classification system is described in the state and county plans as follows:

1. PEMA -- Section VI, Paragraph A
2. Dauphin County -- Section IX, Paragraphs H and I
3. York County -- Section VII
4. Lancaster County -- Section IV, Paragraph F
5. Cumberland County -- Annex D, Section III
6. Lebanon County -- Part II, Paragraph A and Annex A, Part I, Paragraph C

Q.61 What guidance is provided to the plant operators in classifying an accident?

A.61 The Emergency Director classifies the accident. Two major guides are used in determining the proper emergency classification.

The first method relies on Emergency and Abnormal Operating Procedures, which specifically refer the plant operators to the appropriate EPIP when an action level has been exceeded. This is done by an action step in the procedure.

The second method requires the plant operators to compare plant parameters and conditions to the emergency action levels ("EAL's") identified in the EPIP's. When an action level has been exceeded, the emergency class associated with that action level is declared.

Q.62 What approach was used in specifying EAL's for TMI-1?

A.62 EAL's are predetermined conditions or values that, when exceeded, require implementation of the Emergency Plan.

The TMI-1 EAL's, based on guidance contained in NUREG-0654, Appendix 1, were designed to provide an early readiness status on the part of emergency response personnel and organizations. These levels were not selected so as to infer any immediate need to implement protective actions but rather to ensure that a reasonable amount of time is available to evaluate in-plant readings, initiate onsite and offsite assessment actions (if warranted), and allow for anticipatory actions on the part of onsite and offsite emergency response organizations prior to an actual requirement for implementing protective actions (i.e., to go to a high readiness status).

Quantitatively, the EAL's associated with radiation releases were chosen so that exposure to the assumed whole body dose rate or iodine concentration for one hour would result in accumulating the following fractions of the lower limit protective action guides: Alert = 0.01; Site Emergency = 0.05; General Emergency = 0.10.

Q.63 In your last response you referred to protective action guides. Please explain that term further.

A.63 The concept of protective action guides ("PAG's") is set forth in an EPA publication, "Manual of

Protective Action Guides and Protective Actions for Nuclear Incidents" (EPA-520/1-75-001, September, 1975). Numerical limits for exposure to airborne radioactive materials have been recommended by EPA, and similar limits for exposure due to ingestion of contaminated foodstuffs and water have been recommended by the Food and Drug Administration; these recommendations have been adopted by BRP. Table 3 to this tesimony shows the recommended PAG's.

As defined in Licensee's Emergency Plan, PAG's are the projected radiological dose or dose commitment values to individuals in the general population and to emergency workers that warrant protective action before or after a release of radioactive material. Protective actions would be warranted provided the reduction in individual dose expected to be achieved by carrying out the protective action is not offset by excessive risks to individual safety in taking the protective action. Consistent with EPA guidance, PAG's do not include the dose that has unavoidably occurred prior to the assessment. This definition, however, is not intended to imply that the unavoidable dose received prior to the assessment would be ignored in making protective action recommendations.

EP-7

Q.64 Some of the EAL's listed in the TMI-1 Emergency Plan identify "valid" alarms or count rates as trigger mechanisms. In this context, what is meant by the term "valid"?

A.64 The term "valid" means a confirmed alarm. Abnormal situations can be expected to manifest themselves by changes in several measured parameters, alarms or other indicators. Confirmation is accomplished by observing other supporting indications or recorders, by actual sampling, or by ruling out events like instrument malfunctions. Alarms that are expected to activate during instrument checks and calibrations are not considered "valid".

EP-8

Q.65 Other EAL's identify primary system coolant activity as a trigger mechanism. How would such activity be determined, and what is the basis for the various coolant activities identified in the TMI-1 Emergency Plan?

A.65 The primary coolant system activity is determined by daily gamma spectroscopy analysis and by a radiation monitor on the reactor coolant system letdown line (RM-L1). The greater than 50 uCi/ml but less than 130 uCi/ml criterion is the EAL for an Unusual Event. A level of 50 uCi/ml is higher than any normally expected or previously experienced spike in primary coolant system activity. Any activity greater than this would be a positive indication of fuel damage.

EP-8

When coolant activity exceeds 130 uCi/ml, an Alert is declared. This value is approximately one half of the Technical Specification limit and would be a positive indication of some cladding failure. When coolant activity exceeds 300 uCi/ml, the Technical Specification limit has been exceeded and a Site Emergency is declared. This activity level is based on limiting the consequences of a postulated accident involving the double-ended rupture of a steam generator tube.

Q.66 Some of the EAL's direct that adverse meteorology be used. Explain why it was decided to use adverse meteorology for these EAL's.

A.66 Adverse meteorology is defined as the five percent probable meteorology. This corresponds to a Pasquill Stability Category F and a wind speed of 1.5 mph. NUREG-0654, Appendix 1, recommends using adverse meteorology in developing EAL's for a Site Emergency. In setting the EAL's for the TMI-1 Emergency Plan, adverse meteorology was used for the Alert and Site Emergency. There are two main advantages of this approach.

EP-9

First, by targeting a certain fraction of the EPA PAG's at the exclusion area boundary (see response to Question 62), and then back calculating to a control

room meter indication using adverse meteorology, predetermined trigger points for the emergency classifications were derived. This means that the emergency can be declared merely by checking a meter reading and without calculating actual site meteorology.

Second, this method introduces a certain amount of conservatism into the process. By using precalculated EAL's based on adverse meteorology it is likely that the actual dose, based on actual meteorology, will be less than the dose assumed in the EAL. The X/Q value at the exclusion area boundary for adverse meteorology is 6.8 x 10-4 sec./meter3. The historical, median X/Q value at the TMI exclusion area boundary is 9.0 x 10-5 sec./meter3. Thus, by using adverse meteorology, a conservative factor averaging about 87% is introduced into the precalculated dose assumed in the EAL.

Q.67 You previously have testified as to the means used to monitor radioactive releases. How is that information used to make initial projections of potential offsite doses?

A.67 The radiation monitoring system readings for all monitored gaseous effluent release paths are factored into combined source release terms for noble gas and

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iodine by applying the appropriate ventilation flow rates and meter conversion factors. Offsite whole body dose rates and iodine concentrations are then projected by applying the appropriate meteorological dispersion factor for the exclusion area boundary, 2 mile low population zone, 5 mile, and 10 mile EPZ boundaries, and for any other locations of interest.

An EPIP has been developed which contains the information (e.g., meter conversion factors and meteorological dispersion information) and step-by-step method necessary to determine the projected doses. This procedure provides for manual calculation or use of a microcomputer.

If a release is in progress and the monitor for that release path is either out of service or off scale, a contingency calculation method is provided. This conservative calculation utilizes dose release factors based upon expected source terms for several different types of accidents as described in the FSAR.

Q.68 Once initial projections of potential offsite doses are made, what is done next?

A.68 The results of the initial projection calculations provide information indicating the potentially

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EP-4(I)

affected areas and expected radiological impact. Using this information, radiation monitoring teams consisting of trained personnel are dispatched under the control of the RAC. Each team procures predesignated communication equipment, a prepared emergency kit, an assigned vehicle and proceeds to a designated monitoring point and reports readings to the RAC. Concurrently, the RAC begins to set up the dose assessment area. A large area map of the plume exposure pathway EPZ is utilized to track the radiation plume, determine the affected areas, and select future offsite monitoring points. Isopleths (depicted on transparent map overlays) are used to determine the geometry and anticipated dispersion characteristics of the plume. The RAC uses additional input from the plant radiation monitoring and meteorological systems in order to update calculations and refine dose projections.

Q.69 Would you describe in more detail the manner of dispatching and communicating with the mobile radiation monitoring teams?

A.69 The RAC dispatches offsite radiation monitoring teams via the OSC Coordinator. These teams will consist of one to two persons per team (one of which is trained in the use of portable radiation monitoring

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EP-4(I)
EP-18

equipment). When dispatched, the teams will proceed to the processing center, where they will pick up emergency kits containing portable monitoring equipment and portable radios. After an operational check of the equipment, they will pick up an emergency vehicle and proceed to their first monitoring location. They will be controlled by the RAC and report all readings to him. The radiation monitoring teams will transmit on the following assigned frequencies: (a) TMI operations frequency and (b) TMI security frequency.

Once the offsite emergency support organization is manned and the EAC announces his readiness, the responsibility for offsite radiological and environmental assessment will be transferred to the EAC. The decision to transfer responsibility for offsite monitoring will be made by the RAC, who will notify the EAC of this transfer via a dedicated phone line. Additionally, a formal radio announcement at the time of this transfer will be made to all offsite monitoring teams. The RAC will maintain control of the onsite radiation monitoring teams and in-plant radiological controls.

The monitoring teams utilize portable radiation meters to determine whole body exposure rates in

millirem/hour. Portable air samplers and SAM-2 dual channel analyzers are used to determine airborne radioactivity concentrations.

Q.70 How is the information obtained from the mobile radiation monitoring teams used in the assessment process?

A.70 The readings reported by the monitoring teams are compared to the predicted values. Based on the difference in actual versus projected values, the source terms are adjusted and used for further projections. This iterative process is continued in order to determine the actual source release terms as accurately as possible. In addition, the raw field data is forwarded to BRP as soon as it is received in the ECC so that they can use the data to supplement information provided by their field monitoring teams.

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EP-4(I)
EP-1

The initial readings obtained by the radiation monitoring teams primarily are utilized to confirm whether the predicted values are a good estimate of the magnitude of the release. Large deviations from predicted values may indicate the presence of unmonitored release paths, instrument malfunctions, or overly conservative assumptions as to the extent of radioactive releases.

Q.71 Are you familiar with an information analysis system known as the Atmospheric Release Advisory Capability ("ARAC")?

A.71 Yes. This is a forecasting and dose projection computer model developed by the Lawrence-Livermore Laboratories. It was used by EPA and the TMI Environmental Controls Group during the Unit 2 purge of radioactive Krypton-85 gas. ARAC initially was developed to be used at federal government sites with a potential for radioactive releases. It runs only on one computer system, and involves the transfer of information from a classified computer to an unclassified computer.

EP-3(c)(2)

Q.72 Has Licensee considered using such a system, or its equivalent, at TMI-1?

A.72 The system currently utilized at TMI-1 is known as MIDAS, or the Meteorological Information and Dose Acquisition System. This system provides the following functions: collection and storage of meteorological data, plant effluent data and offsite radiation monitoring data; retrieval and processing of this historical data for effluent reports and environmental dose projections; and remote interrogations for display of results. MIDAS satisfies the Class A model described in NUREG-0654, Appendix 2 (Rev. 1). Licensee believes that Another witness will address this matter further.

EP-3(c)(2)

During the Unit 2 reactor building purge the isopleths produced by MIDAS and ARAC were compared with actual offsite measurements. Although this comparison was not intended to be a model verification experiment, ARAC proved not to be as effective as MIDAS. This was because the MIDAS system can be updated every fifteen minutes whereas ARAC only can be updated once an hour. Consequently, MIDAS provided more current meteorological data that was necessary for correct positioning of field monitoring teams.

Q.73 Is information from Licensee's Radiological Environmental Monitoring Program ("REMP") used during the initial accident assessment process?

A.73 No. A REMP for TMI has been in effect since 1974. The program was expanded after the Unit 2 accident and continues to be upgraded. The REMP is not used in the initial accident assessment process. Rather, the REMP is used to confirm initial assessments, determine overall impact on the environment and assist in determining the total integrated radiation exposure received in offsite areas surrounding the site. The general objectives of the REMP are described in Section 4.7.6.2.1 of the Emergency Plan. Additional information on the REMP is provided in

EP-3(c)
EP-18

"Licensee's Testimony of William E. Riethle in Response to Contention Nos. EP-3(C)(1) & EP-18 and Board Question No. 4 (Offsite Radiological Monitoring)," dated February 9, 1981.

Q.74 Does Licensee have any experience with offsite dose rate meters that can be remotely read onsite or at another appropriate emergency response facility?

A.74 Yes. Licensee has purchased and is installing a real-time environmental level gamma radiation monitoring system (manufactured by Reuter Stokes of Cleveland, Ohio). This system is sensitive to one microrem per hour. The data is sent via radio or telephone links to a central processing unit (to be located at the TMI Environmental Controls Group offices at Olmsted Airport) that interrogates the field sensors on a real-time basis. A portable version of this system has been used at TMI since April, 1980, including use during the purge of the Unit 2 reactor building. Additional information on this system is provided in "Licensee's Testimony of William E. Riethle in Response to Contention Nos. EP-3(C)(1) & EP-18 and Board Question No. 4 (Offsite Radiological Monitoring)," dated February 9, 1981.

Q.75 Do you believe it is necessary to install offsite monitoring devices around TMI that can be remotely read onsite in order to properly assess radioactive releases from TMI during an accident?

A.75 No. The goal in assessing radioactive releases during an accident is to make such assessments

EP-3(C)(1) sufficiently far in advance of the actual release so as to permit time for taking protective action if such measures are warranted. This requires that the assessments be predictive in nature, projecting out in time what the most likely release is anticipated to be. Information useful in this analysis is that given by plant process instrumentation (e.g., reactor coolant system temperature and pressure, reactor building pressure), knowledge as to the status of the various engineered safety systems, radiation effluent monitors, and meteorological instrumentation. As explained above (see responses to Questions 54-58 and 67), Licensee's Emergency Plan uses such information to estimate projected offsite doses from actual and potential releases. The accuracy of these projections is checked by sending mobile radiation monitoring teams to onsite and offsite locations (see responses to Questions 68-70). By considering actual site meteorology, the RAC can dispatch the radiation monitoring teams to the areas of principal interest and obtain prompt information for refining the projected dose calculation.

By comparison, an offsite system of radiation monitoring devices that could be remotely read onsite

would not detect a release until the plume was in the area of the dose rate meter. Thus, the plant operators are likely to know about such a release well before the offsite monitor registers. Moreover, the offsite monitor may not be an accurate real-time estimate of the release if the plume does not pass in proximity to the monitor. Nor are such monitors likely to be any better at confirming the projected dose than the radiation monitoring teams dispatched from the site, which can be positioned to the precise areas of interest.

VI. Initial Accident Notification

Q.76 Assume that the reactor coolant system hot leg temperature exceeds 620°F and the Emergency Director therefore declares an "Alert." How would this information initially be communicated to the state and county governments?

A.76 The Emergency Director would direct the person in the ECC designated as the Communicator (an operator) ~~(CRO #2)~~ to make initial notifications in accordance with the EPIP for an Alert. This procedure requires the Communicator to contact the following agencies:

EP-1
EP-4(G)
EP-15(B)

1. Dauphin County EOC is contacted by telephone. If contact cannot be made using this method, the Dauphin County radio system is activated. A

brief, non-technical prepared message is read which identifies the caller by name and title, the nuclear station calling, and that an Alert has been declared, including the time of declaration.

2. PEMA is contacted by telephone or by use of the NAWAS back-up system. A brief, non-technical prepared message, similar to the Dauphin County message, is read to the PEMA duty officer, who in turn notifies BRP and the five risk counties. By procedure, BRP calls TMI to verify the incident, receive a radiological assessment of the emergency, and to open a line of communication. If after 30 minutes, verification of notification is not received from BRP, PEMA is again contacted and notified of the situation.

Q.77 Why are the initial communications to PEMA and Dauphin County brief and non-technical?

A.77 During the meetings between state, county and Licensee personnel, it was determined that PEMA and Dauphin County do not require technical information, but rather simple confirmation that an incident has occurred, the classification of the incident and recommendations for any immediate protective action.

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BRP, which provides technical support to state and county emergency response organizations, is the first agency to establish continuous contact with the site. The purpose of this contact is to obtain details on the accident and any recommendations that the Licensee might provide. BRP personnel have the technical background to assess the plant operating and radiological information they will be given from TMI. It is BRP's responsibility to evaluate this technical data and relay appropriate information and protective action recommendations to PEMA for dissemination to the counties.

Q.78 Why does Licensee not directly contact the counties of York, Lancaster, Cumberland and Lebanon, except in the case of a General Emergency?

A.78 PEMA's normal operating procedure during any emergency is to maintain communciations with the affected county emergency management agency. This system has been successfully used by PEMA on numerous occasions. It was determined that a similar system should be used in radiological emergencies. This has the advantage of maintaining a consistent chain of command for all emergencies. In addition, the counties are likely to receive information from PEMA as rapidly as they would if contacted by TMI site

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personnel. Since personnel in the control room would be involved in stabilizing the emergency situation, there would be a wasteful duplication of effort if site personnel were to make additional notifications to the counties.

Q.79 What role does BRP play in this communications scheme?

A.79 When BRP is notified that an emergency condition exists at TMI, BRP contacts the site for technical information. The applicable EPIP contains as Attachment II an "Emergency Status Report" checklist. This report, which summarizes all key plant parameters and information necessary to assess the radiological impact of the emergency, is communicated to BRP. The report includes a description of the emergency, the status of emergency safeguards systems, and information on radiological releases (i.e., source terms, meteorology, anticipated duration of releases, and projected doses). The objective of this initial contact between BRP amd TMI is to verify the incident and establish the necessity for immediate protective actions. It is the responsibility of BRP to alert and advise PEMA of the need to take protective action, the actions to be taken, the geographic area at risk, and pertinent

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facility conditions that may change the recommendations. PEMA is responsible for passing this information to other state agencies, county and local governments.

Q.80 How are Licensee's emergency response personnel notified of the need to staff the emergency organization?

A.80 Initially, the duty section superintendent is contacted by the Emergency Director (shift supervisor) and plant status is discussed. A Communications Assistant is then assigned to call in the required personnel from the "on-call" duty section and to notify the Public Affairs Representative. This is accomplished by using a card-dialer telephone (located in the shift supervisor's office) to contact each member of the duty section. Cards have been preprogrammed with each duty section member's home telephone and beeper number. An answering service phone, "Code-A-Phone", has been installed in the shift supervisor's office to transmit a prerecorded instructional message to all emergency personnel responding to their beepers. This system can also receive and record messages to verify that the duty section members have responded, thus freeing shift personnel to attend to other matters.

Q.81 At this stage of the emergency, how would the public be informed?

A.81 Licensee would disseminate information to the public through the Manager-Public Information and his staff. Information concerning the emergency would be provided to the news media at the Media Center. Information can be disseminated beyond the immediate TMI area by telecopier, or through a service called "Media Wire", that transmits information to its subscribers. Licensee would conduct news conferences as appropriate. Public information released by Licensee, as well as arrangements for press conferences, would be communicated to the PEMA public information officer and the NRC Region I public affairs officer. Additional information on the dissemination of information to the public is located in Appendix B to the Emergency Plan, the "GPU Nuclear Emergency Public Information Plan for the Three Mile Island Nuclear Generating Station."

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The state would disseminate information through its established procedures.

Q.82 Assume the situation worsens. At least two incore thermocouples now read greater than 700°F and the Emergency Director therefore declares a "Site Emergency." What notifications would now be made?

A.82 At this point, the RAC has established an open line of communication with BRP on the Radiological Line. BRP would receive notification from the RAC of the Site Emergency. BRP will continuously update PEMA, who will keep the five counties informed of the emergency. The NRC would be notified via the Emergency Notification System ("ENS"), which is continuously manned by a Communications Assistant until relieved by the NRC. Other notifications would be made as specified in the EPIP for a Site Emergency.

EP-1

Q.83 If the situation continued to worsen and the projected dose rate at the exclusion area boundary was greater than 100mR/hr (gamma) using actual meteorology and the reactor building design leak rate, then a "General Emergency" would be declared. What additional notifications would be made at this time?

A.83 Upon reclassifying the event from a Site to a General Emergency, the following notifications would be made: (a) BRP, (b) NRC, (c) Unit 2 control room, (d) the five risk counties of Dauphin, York, Lancaster, Cumberland and Lebanon, (e) Pennsylvania State Police, (f) Consolidated Railroad Corp., (g) RMC, (h) ANI, and (i) B&W.

EP-1

Q.84 Anticipating slightly a latter section of your testimony, would an evacuation of the general public necessarily be appropriate in the situation described?

A.84 No. While a precautionary evacuation might be warranted if the status of the plant were unknown or uncertain, a General Emergency does not automatically require an evacuation. The radiation level selected to initiate a General Emergency would result in an exposure (in one hour's time) of 1/10 of the lower limit EPA-recommended PAG. This level has been selected low enough to permit sufficient time to first evaluate the need for and then implement appropriate protective actions.

Consideration would be given to an evacuation if:

1. The release is expected to occur with projected doses approaching or exceeding: 1 R whole body or 5 R to the child thyroid.

2. Release time is expected to be long (greater than 2 hours).

3. Evacuation can be well underway prior to plume arrival, based upon wind speed and travel conditions.

VII. Onsite Emergency Response

Q.85 Returning to the beginning of the scenario, assume that the reactor coolant system hot leg temperature exceeds 620°F, the Emergency Director has declared an "Alert", and the initial accident notifications have been made. Please describe further the mobilization of Licensee's onsite emergency organization.

A.85 Upon recognition of the EAL, the shift supervisor assumes the duties of the Emergency Director. The on-shift personnel staff the onsite emergency organization as indicated in Table 2 of this testimony.

When the duty section superintendent reports to the ECC, he assesses plant conditions, verifies that proper notifications have been made, and relieves the shift supervisor as Emergency Director. The shift supervisor then returns to his normal duties. The Communicator reports to the ECC and assumes the responsibilities of that position. ~~A~~ Two Communications Assistants also report to the ECC, relieves the ~~control room~~ operator ~~(CRO #2)~~ manning the telephones, and maintains communication with the NRC on the ENS. A senior radiological controls engineer relieves the radiological controls foreman as RAC and continues providing radiological assessments to the Emergency Director and BRP. The radiological controls foreman reports to the OSC, relieves the senior radiological controls technician, and assumes the duties of the Radiological Controls Coordinator. The Radiological Analysis Support Engineers report to the RAC and perform dose calculations. The OSC Coordinator relieves the shift maintenance foreman

and directs the support of operations in the areas of maintenance, chemistry and radiological controls. The shift maintenance foreman then reports to the OSC Coordinator as the Emergency Maintenance Coordinator. The Operations Coordinator reports to the ECC and coordinates plant operations and operations support through the shift supervisor and the OSC Coordinator.

Q.86 What type of equipment is available onsite to assist in responding to the "Alert"?

A.86 TMI is equipped with an extensive array of protective facilities and equipment to assist in responding to emergency situations. This equipment includes that necessary to provide first aid and medical assistance; corrective and extraordinary maintenance for damage control; and protective clothing, respiratory equipment and survey instruments for radiological controls. More detailed descriptions of the types and locations of available equipment are given in Sections 4.7.7 through 4.7.10 of the Emergency Plan.

Q.87 What type of support might Licensee require from offsite groups in order to respond to the "Alert"?

A.87 Depending on the nature of the situation, offsite assistance could involve police, fire or medical support. The Emergency Plan and its implementing

procedures detail the types of support that offsite agencies provide and the specific means for requesting such assistance.

VIII. Offsite Emergency Response

Q.88 What responsibilities does Licensee have with respect to offsite emergency response?

A.88 In order for offsite emergency response organizations to fulfill their responsibilities to the population at risk, Licensee will:

1. Make initial notification of the emergency to Dauphin County and PEMA.

2. Transmit plant status and dose assessment information to BRP.

3. Provide protective action recommendations, if warranted.

4. Operate a Media Center to ensure that accurate information concerning plant status is provided to the public and the news media.

5. Conduct periodic training programs for offsite agencies.

Q.89 Who is responsible for directing the general public to take protective action?

A.89 Actual protective measures, if warranted, would be taken by the responsible offsite organizations. NRC and FEMA have identified two predominant exposure pathways -- the plume exposure pathway and the ingestion exposure pathway -- for which specific, preplanned protective measures should be available. With respect to these exposure pathways, NRC and FEMA also have identified emergency planning zones ("EPZ's") defining the geographic extent over which this planning effort should be carried out.

Q.90 In your answer you referred to two different EPZ's. What purposes are served by defining such EPZ's?

A.90 EPZ's are the areas defined about a nuclear power plant for which preplanned emergency response capabilities are required. Based on the factors described in Revision 1 of NUREG-0654 (at pp. 10-13), the NRC and FEMA set an EPZ with a radius of about 10 miles for the plume exposure pathway and an EPZ with a radius of about 50 miles for the ingestion exposure pathway.

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These boundaries of about 10 miles and about 50 miles do not mean that protective actions throughout the entire EPZ would be required in the event of an emergency. Certain actions might be required for

residents within a five mile area of the facility, while not necessary for residents living 6 to 10 miles from the plant. On the other hand, if the situation warrants, protective actions could be taken by residents living beyond the 10-mile plume exposure pathway EPZ. The EPZ concept is to define a geographic area where a degree of specific preplanning is required. This preplanning then serves as the foundation for protective actions beyond the EPZ boundaries, if required.

Q.91 How was the plume exposure pathway EPZ for the TMI site delineated?

A.91 The geographic extent of the plume exposure pathway
EP-17(A) EPZ for the TMI site was determined by PEMA. The initial step was to inscribe a circle, with a radius of 10 miles, around the TMI site. The boundaries of this circle were then extended to a close, recognizable marker. Political boundaries, natural geographic features, roads and other readily identifiable landmarks were used in this process. In this manner, appropriate consideration was given to such factors as demography, topography, land use characteristics, access routes and jurisdictional boundaries. The population included within the plume exposure pathway EPZ drawn by PEMA is about 30%

greater than the population included within a 10-mile circle around the TMI site. The boundaries of this EPZ are shown in Appendix 6A of the State Emergency Plan. Figure 6 of this testimony also depicts the boundaries of the plume exposure pathway EPZ for the TMI site.

Q.92 What are the primary functions that must be carried out by offsite agencies within the plume exposure pathway EPZ in order to assure an adequate response capability?

A.92 The primary functions of offsite agencies are to develop emergency plans, implement a supporting education program to inform the public about those plans, provide early warning/alert of emergencies to the public, develop public notification procedures concerning protective action recommendations, and provide assistance to the public when protective measures are required. Offsite agencies also are responsible for maintaining lists of resources, both available and required, to assist in providing these services.

EP-17(A)

Q.93 Aside from developing the actual emergency plans, the first function you mentioned was educating the public about the emergency plans. What steps has Licensee undertaken to assure this is accomplished?

A.93 The function of educating the public about the emergency plans is being accomplished through a

EP-4(C)

general information program to provide the public with an overview of emergency planning around the TMI site and with specific information on how they will be notified of an emergency and what the available protective action options (e.g., shelter, evacuation) are. Licensee's public information and emergency preparedness personnel are coordinating public information activities with PEMA. The main purpose of this effort is to delineate the type of information to be disseminated by the Governor's office, PEMA, county and local emergency management agencies, and Licensee.

PEMA and the various county and local emergency management agencies have developed a public awareness program concerning emergency plans. This program includes plans published in newspapers, brochures prepared and distributed by county and local emergency management agencies, and printed fact sheets that describe actions to be taken in the event of an emergency. Licensee has assisted in the distribution process by mailing brochures with utility bills and by making public information personnel available for assistance to county and local governments when requested.

This public education program will continue as an ongoing phase of the emergency preparedness process.

Q.94 What is the geographic extent of the area covered by this education program?

A.94 The main thrust of this education program is aimed at residents in the plume exposure pathway EPZ (about 10 miles). In fact, a much larger geographic area is covered given the means used to distribute this information.

EP-17(A)

Q.95 The second function you mentioned was early warning. What steps has Licensee undertaken to assure that this alerting function is accomplished?

A.95 Licensee retained the services of consultants to conduct an engineering study for a proposed early warning system for the plume exposure pathway EPZ. Meetings with county communication directors and site specific sound studies were conducted as part of this effort.

EP-15(F)

Based on the sound surveys, a study of existing communication capabilities and an independent reevaluation of the initial study to ensure conformance with the specific recommendations of NUREG-0654, Appendix 3 (Rev. 1), it is estimated that approximately 80 large-scale sirens will be required

to provide early warning throughout the entire plume exposure pathway EPZ. The overall cost of this project is estimated to be approximately $1.2 million. Licensee is in the process of procuring the equipment. The system being installed has the design capability to provide early warning to the population at risk within 15 minutes of a decision by offsite authorities to sound the alert. It is anticipated that the system will be fully operational by July 1, 1981.

Q.96 What is the geographic extent of the area covered by this early warning system?

A.96 The system will provide total coverage of the full plume exposure pathway EPZ for the TMI site. There are several areas where coverage will extend beyond the established EPZ boundary due to the physical location and signal strength of the sirens.

EP-15(F)
EP-17(A)

Q.97 The third function you mentioned was notification of the public to take protective actions. How will this information be disseminated?

A.97 After activation of the early warning system, conventional radio or television would be used to provide the public with information and instructions, including recommendations to take protective actions. This would be accomplished by use of the Emergency

Broadcast System ("EBS"), supplemented, if necessary, by mobile loudspeakers and local police. Fire, ambulance and police personnel would be advised over the state and county communication networks. Schools, hospitals and other large institutions would receive additional notification by tone alert monitors or land-line telephone. State, county and local emergency management agencies have preplanned the public notification program. Their emergency plans describe the procedures and prepared messages that are to be used for this purpose.

Q.98 What is the geographic extent of the area that would be covered by such notifications?

A.98 While primarily geared toward residents in the plume exposure pathway EPZ, this information would be heard by the general public in areas substantially beyond 10 miles from TMI. This is because radio and television station coverage is not limited by any EPZ boundary definition.

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Q.99 The last function you mentioned was protective action. With respect to the plume exposure pathway, identify the primary protective measures available to the general public.

A.99 Protective actions are those actions taken in order to minimize radiation dose. The most appropriate

protective action for a particular situation will depend on the magnitude of the release, duration of the release, wind speed, wind direction, time of day and transportation constraints. For the plume exposure pathway the available protective actions include sheltering, thyroid prophylaxis, evacuation, or some combination.

1. Sheltering -- This option requires that people in potentially affected areas shelter themselves in an accessible building that can be made temporarily somewhat airtight. The objective is to isolate the population at risk from potentially contaminated outside air. This can be accomplished by seeking shelter in a personal residence, commercial building, or public building such as a school. Any building in the TMI area that is reasonably winter worthy will suffice.

2. Thyroid Prophylaxis -- Traditionally, it has been assumed that for virtually every significant accident at a nuclear power station the release of radioiodines, with the associated risk of thyroid exposure, will present the greatest demand for protective action. Certain compounds like potassium iodide ("KI") that contain stable iodines may in such

circumstances be useful as agents to block thyroidal uptake of radioiodines.

3. Evacuation -- The most frequently discussed protective action option is the almost complete removal of the population at risk from potentially hazardous situations through evacuation. This option is appropriate when its use is likely to bring about population dose savings commensurate with the associated social disruption. This situation would prevail where the time available from the decision to evacuate to population relocation is compatible with plume movement or in situations where substantial dose savings can be made by avoiding exposure to residual radioactivity (surface deposition) in the wake of sudden severe accidents.

Q.100 With respect to sheltering, is there any geographic limit on this mode of protective action?

A.100 No. This action could be taken in whatever area it was felt necessary to protect the public.

EP-17(A)

Q.101 The next measure you mentioned was thyroid prophylaxis. What is your view as to the feasibility of this protective action?

A.101 Thyroid prophylaxis, or the administration of radioprotective drugs, could be of some value in

providing additional protection to emergency response personnel since these persons would most likely receive larger doses than the general public due to their emergency response activities. In addition, there may be a need to administer radioprotective drugs at institutions with large non-ambulatory populations (e.g., hospitals, prisons) where

EP-17(A)

evacuation is not a realistic option. Licensee does not believe that the wide-scale administration of radioprotective drugs to the general population is either necessary or feasible. Final guidance from the Food and Drug Administration on the use of radioprotective drugs has not been issued.

Q.102 Finally, with respect to evacuation, does the definition of the plume exposure pathway EPZ impact on this protective action?

A.102 Yes, to some extent. The evacuation planning effort

EP-17(A)

generally is geared toward the area defined as the plume exposure pathway EPZ. The definition of the EPZ boundary, however, is not intended to limit the planning area, but rather to ensure that evacuation plans are prepared for a minimum of about 10 miles. These plans can then serve as a basis for an evacuation extending beyond a 10-mile radius, if such an evacuation is required. The state and five risk

counties around TMI have done some additional preplanning in that they already have undertaken initial work on a 20-mile evacuation plan. This initial work includes identification of evacuation routes, host/reception areas, and the procedures to be used for implementing such an evacuation.

Q.103 **In your opinion, is the plume exposure pathway EPZ for the TMI site, as delimitated by PEMA, sufficient to assure an adequate state of emergency preparedness around TMI?**

A.103 Yes. As indicated in our response to Question 91, we
EP-17(A) believe that, in defining the plume exposure pathway EPZ for the TMI site, PEMA has properly followed the guidance in NUREG-0654 by giving appropriate consideration to local conditions such as demography, topography, land use characteristics, access routes and local jurisdictional boundaries. Moreover, as explained in our responses to Questions 92 through 102, many of the functions that must be carried out by offsite agencies within the plume exposure EPZ to assure an adequate response capability are somewhat independent of the geographic extent of the EPZ. And, for those functions that are dependent on the geographic extent of the EPZ, we believe the preplanning done by offsite agencies is sufficient so that, if there were a need to take protective actions

beyond the defined EPZ, those measures could be accomplished in a timely and efficient manner.

Q.104 Intervenors have raised certain specific objections to the plume exposure pathway EPZ adopted by PEMA. Please respond to those objections.

A.104 Many of the intervenors' objections appear to be based on the misconception that the plume exposure pathway EPZ is a 10-mile circle about TMI. As we previously explained, this is not the case. Rather, PEMA has tailored the EP-17(A)(1) EPZ definition to local conditions.

1. In many instances this has meant that the EPZ boundary has been extended to include the whole of a municipal area that was bisected by the 10-mile circle. Examples of such extensions include the townships of Derry, South Hanover, Fairview, and Conewago. Where a municipal area is bisected by the EPZ boundary, this has been done by using a clearly defined marker that is known to residents in the area. Extending the EPZ boundary further yet, to include all municipal areas bisected by the EPZ, would not be desirable. It would result in an EPZ boundary with long, non-uniform appendages. In some instances, areas 15 to 20 miles from TMI

(e.g., Dover, Hellam, and Lower Paxton) would then be included in the EPZ, while areas closer to TMI (e.g., Palmyra and Monaghan) would not be included in the EPZ.

EP-17(A)(2)

2. Extending the EPZ boundary to include all of the "urbanized areas" around Harrisburg and York is unnecessary. In every case it will always be true that there is some area on the boundary of the EPZ. If all of the Harrisburg and York areas are included, then population areas even further from TMI (e.g., Lebanon and Lancaster) will be close to the new EPZ boundary and question will be raised as to why those areas are not in the EPZ. Any line drawing process is always based on judgment. In this instance PEMA judged that not all of the urbanized areas around Harrisburg and York need be included in the EPZ to assure an adequate response capability. We believe that conclusion to be valid. In cases of adverse meteorology (stable dispersion characteristics with low wind speed), and therefore potentially higher offsite doses, the Harrisburg and York areas not in the EPZ probably will have from 5 to 8 hours warning time beyond that available to closer-in areas.

Given the preplanning accomplished within the EPZ, this additional warning time should be sufficient for residents in the Harrisburg and York areas to take whatever protective action is necessary. Conversely, if weather conditions are unstable and plume travel time fast, the offsite dose is likely to be smaller and the need for protective action less.

EP-17(A)(3)

3. While we recognize the unique nature of the Old Order Amish community, intervenors have not provided any details about their particular concerns and thus we are unable to respond directly to the allegation.[3] However, we have no reason to believe that, if necessary, adequate protective measures could not be taken in a timely manner for the Old Order Amish community.

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3 Mr. Sholly's responses of August 4 and 29, 1980, to Licensee's interrogatory number 9 indicate that counsel for ANGRY was investigating the factual basis for the concerns about the Old Order Amish. ANGRY's response of September 3, 1980, to Licensee's interrogatory number 17 confirms this fact. As reflected in the letter from Licensee's counsel of September 16, 1980, ANGRY agreed to disclose additional information about the Old Order Amish "within a reasonable time after receipt, rather than in its direct testimony." To date, ANGRY has provided no information dealing with its concerns about the Old Order Amish.

4. Neither PEMA nor Licensee has relied upon 20-mile evacuation plans as a substitute for making an informed judgment as to the extent of the plume exposure pathway EPZ. Rather, we believe that the work done by the counties in developing such evacuation plans provides additional support for the adequacy of the EPZ boundary as delimitated by PEMA.

EP-17(A)(4)

Q.105 Has Licensee undertaken to make estimates of the time needed to evacuate the plume exposure pathway EPZ around the TMI site?

A.105 Evacuation time estimates for the plume exposure pathway EPZ around TMI have been performed by PEMA and by Wilbur Smith and Associates, under contract to FEMA. In addition, Licensee has retained a consultant to perform a third evacuation time study consistent with the revised guidance of NUREG-0654, Appendix 4 (Rev. 1). This work has not yet been completed.

EP-4(H)

Q.106 Will the evacuation time estimate being done for Licensee consider the population density around the TMI site?

A.106 Yes. In preparing the evacuation time estimates, three population components will be considered: permanent resident population, transient population,

EP-4(H)

and special facilities population. Population density was but one of the factors used in determining the evacuation time estimates for these components.

Q.107 Will the evacuation time estimate being done for Licensee also evaluate evacuation times as a function of weather conditions?

A.107 Yes. Adverse weather conditions will be evaluated in two different ways. First, an adverse weather scenario will be defined. The adverse weather scenario assumes a snow emergency condition when roads would be rendered temporarily impassable until PennDOT and local jurisdictions could clear them of accumulated snow. It is assumed that it would take about four hours after a snow storm to plow all major routes which are normally given priority. As a result, the roads have reduced capacity and operating speeds. For purposes of this evacuation scenario, a reduction of twenty percent in the roadway capacity will be made to account for such conditions, including narrowed travel lanes, reduced maneuverability and longer vehicle headways. Second, a factor listed in the evacuation time assessment will be adverse weather delay time. An additional twenty minutes to account for unpredictable isolated delays

associated with adverse weather conditions will be used.

Q.108 Does Licensee's Emergency Plan make provision for minimizing damage to personal property?

A.108 The prime objective of the TMI-1 Emergency Plan is to provide for corrective and protective actions to be taken in the event of an accident at the site. The plans of Licensee and the state and five risk counties are primarily oriented toward the protection of the health and safety of the general public, emergency response personnel and site employees. Protection of personal property, although not a prime objective of these plans, could occur indirectly through the actions and responses required by the plans.

Q.109 Does this mean that no protective measures are available for livestock?

A.109 No. Extensive information on the protection and sheltering of livestock during a radiological emergency is provided in the Pennsylvania Department of Agriculture Plan for Nuclear Power Generating Station Incidents, included as Appendix 7 to the State Emergency Plan.

Q.110 What are the primary functions that must be carried out within the ingestion exposure pathway EPZ in order to assure an adequate response capability?

A.110 Within the ingestion exposure pathway EPZ, it is necessary to identify the major exposure pathways from contaminated foodstuffs and water, and to develop plans for controlling the movement of such contaminated materials. During an actual emergency, response capabilities include: identification of the plume travel path, notification of emergency service personnel and the general public, and dissemination of information outlining protective actions that must be taken to adequately protect and control potentially contaminated foodstuffs and water.

Q.111 How are these functions being implemented around the TMI site?

A.111 An EPZ boundary of 50 miles has been delineated for the ingestion exposure pathway. Within this EPZ, planning is done at the state level by the Department of Agriculture, PEMA, and BRP. Dissemination of information on available protective action options is the responsibility of these state agencies. Additional information is provided in the State Emergency Plan, Appendices 7 and 8.

IX. Maintaining Emergency Preparedness

Q.112 Describe the Emergency Plan training program at TMI-1.

A.112 Licensee has developed a three-part Emergency Plan training program to ensure that all personnel, both onsite and offsite, receive adequate instruction.

1. The general employee training program is conducted annually and is given to TMI employees and contractor personnel permitted unescorted access to Unit 1. The program includes orientation on the content of the Emergency Plan and Implementing Document, employee responsibilities, emergency facilities and equipment, familiarization with station alarms and communication systems, radiation protection, and instructions and requirements associated with accountability, evacuation, and exposure criteria.

EP-18

2. Personnel with specific responsibilities in Licensee's onsite emergency and offsite emergency support organizations receive specialized training for their respective assignments. The Emergency Plan and Implementing Document delineate which personnel will receive specialized training, the type of training, and the minimum required frequency of such training.

EP-15(D)

3. Licensee also provides orientation and training for various offsite support groups. The purpose of this training is to ensure a high state of emergency preparedness and response capability between those groups and Licensee's emergency organization. Groups and personnel that might provide emergency assistance to TMI will be invited to participate in this training to become familiar with TMI (including the physical plant layout), key plant personnel, and the TMI Emergency Plan. Such training will be provided on at least an annual basis.

Q.113 Does this training include realistic drills and exercises?

A.113 Periodic drills and exercises will be conducted in order to assure an adequate state of emergency preparedness at TMI. The primary objective is to verify the emergency preparedness of all participating personnel, organizations, and agencies. Through such drills and exercises Licensee is able to: (a) ensure that participants are familiar with their respective duties and responsibilities; (b) verify the adequacy of the TMI Emergency Plan and the methods used in the EPIP's; (c) test communication networks and systems; (d) check the availability of

emergency supplies and equipment; and (e) verify the operability of emergency equipment.

The Supervisor-Emergency Preparedness is responsible for the planning, scheduling, and coordinating of all emergency planning-related drills and exercises. The following drills and exercises will be conducted on a periodic basis: medical emergency drill; fire emergency drill; repair and damage control drill; communication links test; radiological monitoring drill; radiological controls drill; and a radiation emergency exercise (i.e., a major drill appropriate to a Site or General Emergency). In accordance with 10 C.F.R. Part 50, Appendix E, Section IV, Paragraph F.2, it is expected that federal emergency response agencies will participate in the radiation emergency exercise at TMI at least once every five years.

EP-15(D)

EP-4(F)

During 1980, more than a dozen Emergency Plan drills were run at TMI. These drills exercised various facets of Licensee's onsite and offsite emergency organizations, as well as state and local emergency response agencies. The results of these drills were used to develop the specific emergency organizations, communication links, and response procedures described in Licensee's Emergency Plan. In order to

fulfill short-term action item 3(e) of the NRC's August 9, 1979 Order and Notice of Hearing, Licensee will conduct a test exercise of its Emergency Plan prior to restart. Currently, Licensee is discussing with the relevant agencies the precise date for such a test exercise.

Q.114 Are formal critiques of these drills and exercises conducted?

A.114 The Emergency Plan requires that a critique be
EP-17(B) scheduled and held as soon as practicable following the drill or exercise. Both observers and participants are encouraged to comment. These comments are presented to the Supervisor-Emergency Preparedness for resolution and follow-up as appropriate. An action item tracking system is used to ensure timely resolution of these items.

Q.115 How are the results of these critiques reflected in the Emergency Plan?

A.115 The critiques may point out weaknesses or defi-
EP-17(B) ciencies in the Emergency Plan, EPIP's, or equipment. The Supervisor-Emergency Preparedness is responsible for coordinating proposed revisions to the Emergency Plan and the Implementing Document and for the upgrading of emergency equipment and supplies. The

Supervisor-Emergency Preparedness submits such recommendations to the Vice President TMI-1 for his review. Recommended changes approved by the Vice President TMI-1 will be incorporated into the Emergency Plan or Implementing Document under the direction of the Supervisor-Emergency Preparedness.

Q.116 In what other ways is the Emergency Plan reviewed and updated?

A.116 The TMI-1 Emergency Plan, including appended letters of agreement, will be reviewed and updated on an annual basis. The Quality Assurance Department is responsible for conducting an independent periodic audit to verify compliance with the Operational Quality Assurance Plan, the Fire Protection Program Plan, Licensee's internal rules and procedures, federal regulations, and operating license provisions. The Supervisor-Emergency Preparedness provides an additional ongoing review of the TMI emergency preparedness program.

EP- 17(B)

The TMI-1 Emergency Plan is considered a part of the TMI Nuclear Station-Unit 1 FSAR. Revisions to the Emergency Plan therefore will be administratively controlled in the same manner as amendments to the FSAR. The TMI-1 Emergency Plan Implementing Document

will be incorporated into the TMI Nuclear Station procedures program. As such, the Implementing Document will be prepared, reviewed, approved, controlled, distributed, and revised in accordance with TMI Nuclear Station Administrative Procedures.

Results of each annual review and update will be reported to the Vice President TMI-1.

Q.117 What procedures are in place to assure that sufficient amounts of emergency equipment are always available?

A.117 Designated emergency equipment and supplies and their storage locations are listed in the Implementing Document. This equipment will be maintained, inventoried, inspected and calibrated in accordance with approved TMI Nuclear Station procedures. Equipment, supplies, and parts having shelf-lives will be checked and replaced as necessary. Any item removed for either repair or calibration will be replaced by an equivalent item. Any deficiency found during an inventory or inspection will be corrected immediately or will be documented for early corrective action. A report of each inventory and inspection, including documented deficiencies, will be prepared and submitted to the Supervisor-Emergency Preparedness, who will ensure

EP-18

that cognizant department heads assign personnel to correct deficiencies in a timely manner.

I (cont)
3/3

Lic 2/9/81

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

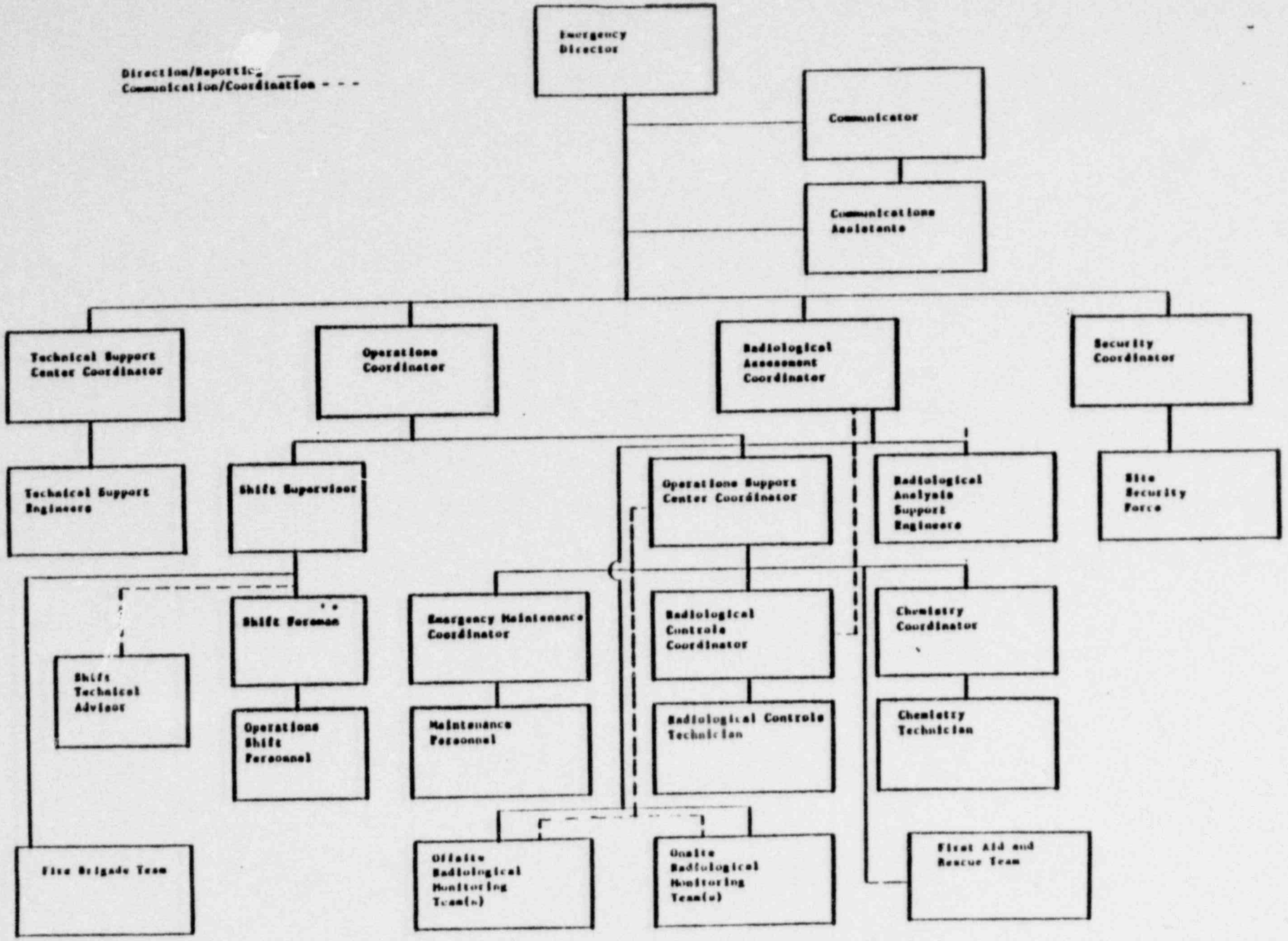
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
METROPOLITAN EDISON COMPANY	)	Docket No. 50-289
	)	(Restart)
(Three Mile Island Nuclear Station, Unit No. 1)	)	

LICENSEE'S TESTIMONY OF ROBERT E. ROGAN, GEORGE J. GIANGI AND ALEXIS TSAGGARIS ON THE ADEQUACY OF ONSITE EMERGENCY PREPAREDNESS AT THREE MILE ISLAND, UNIT 1

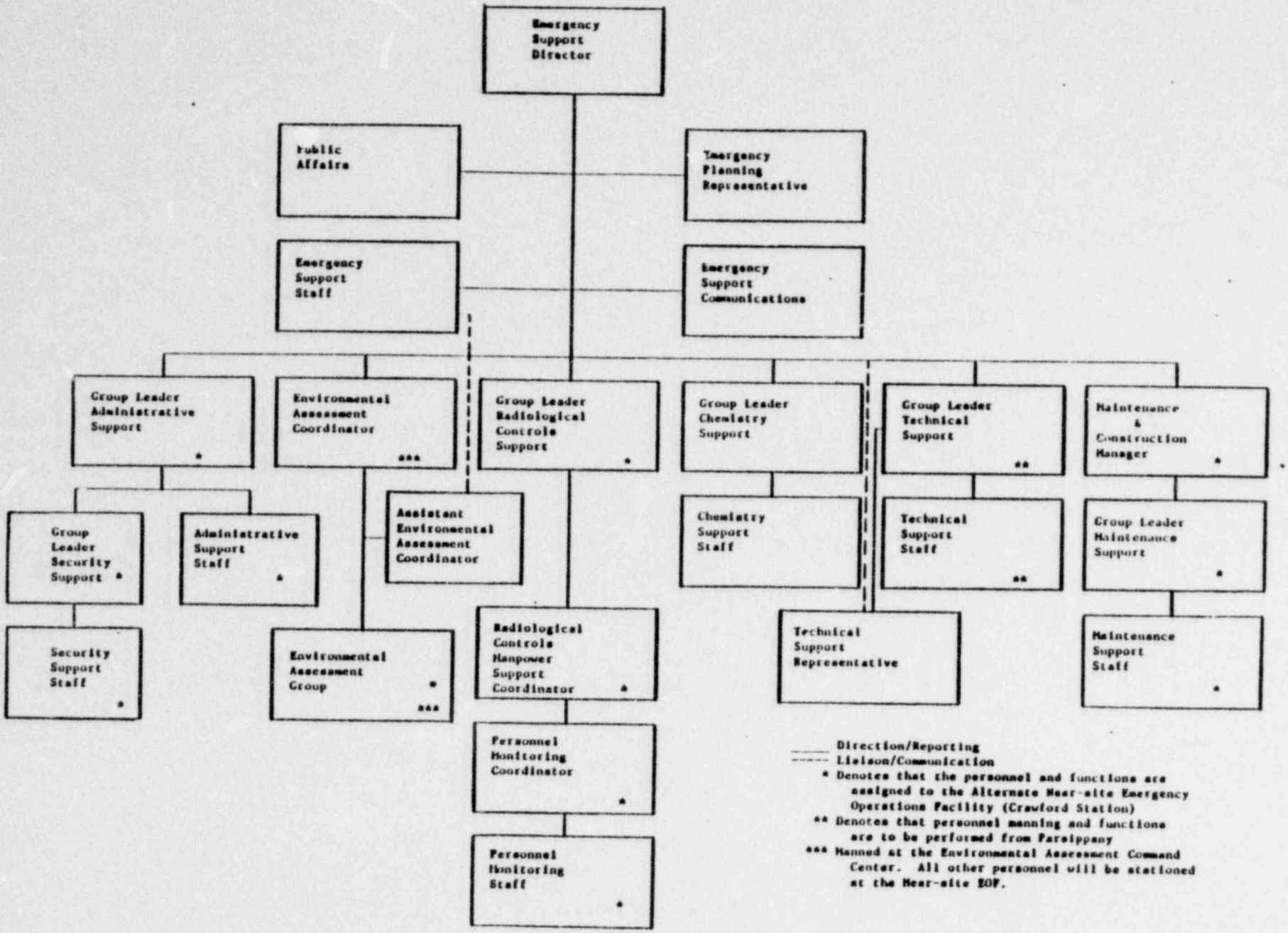
Volume 2 -- Figures, Tables and Appendices

FIGURES



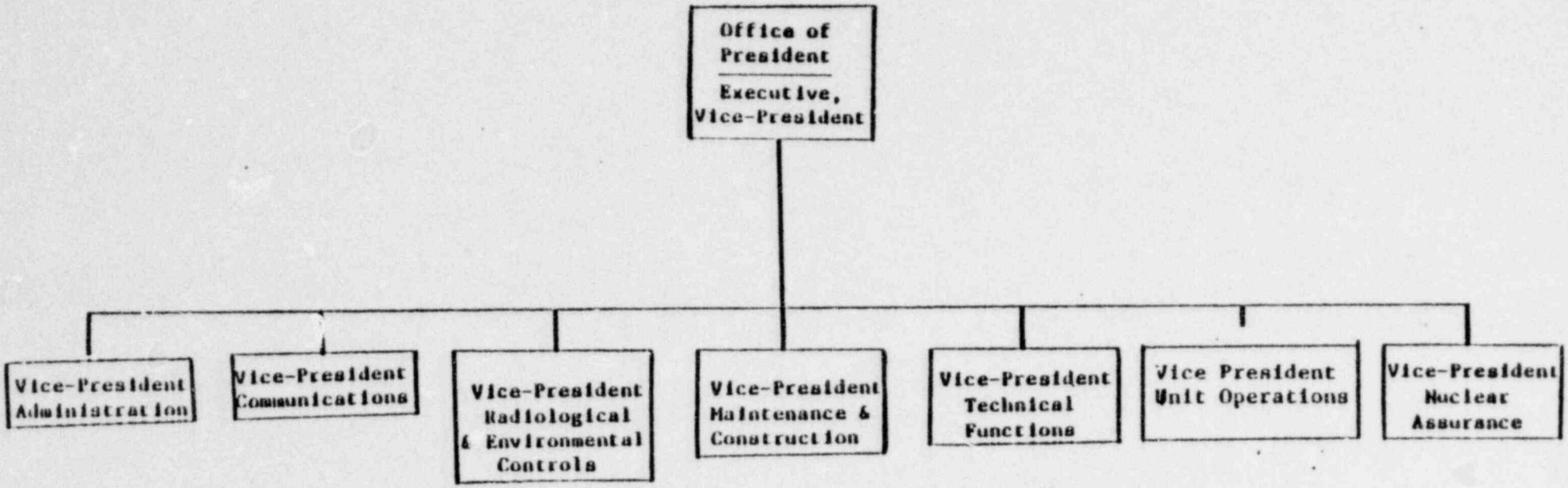
ON SITE EMERGENCY ORGANIZATION

Figure 1



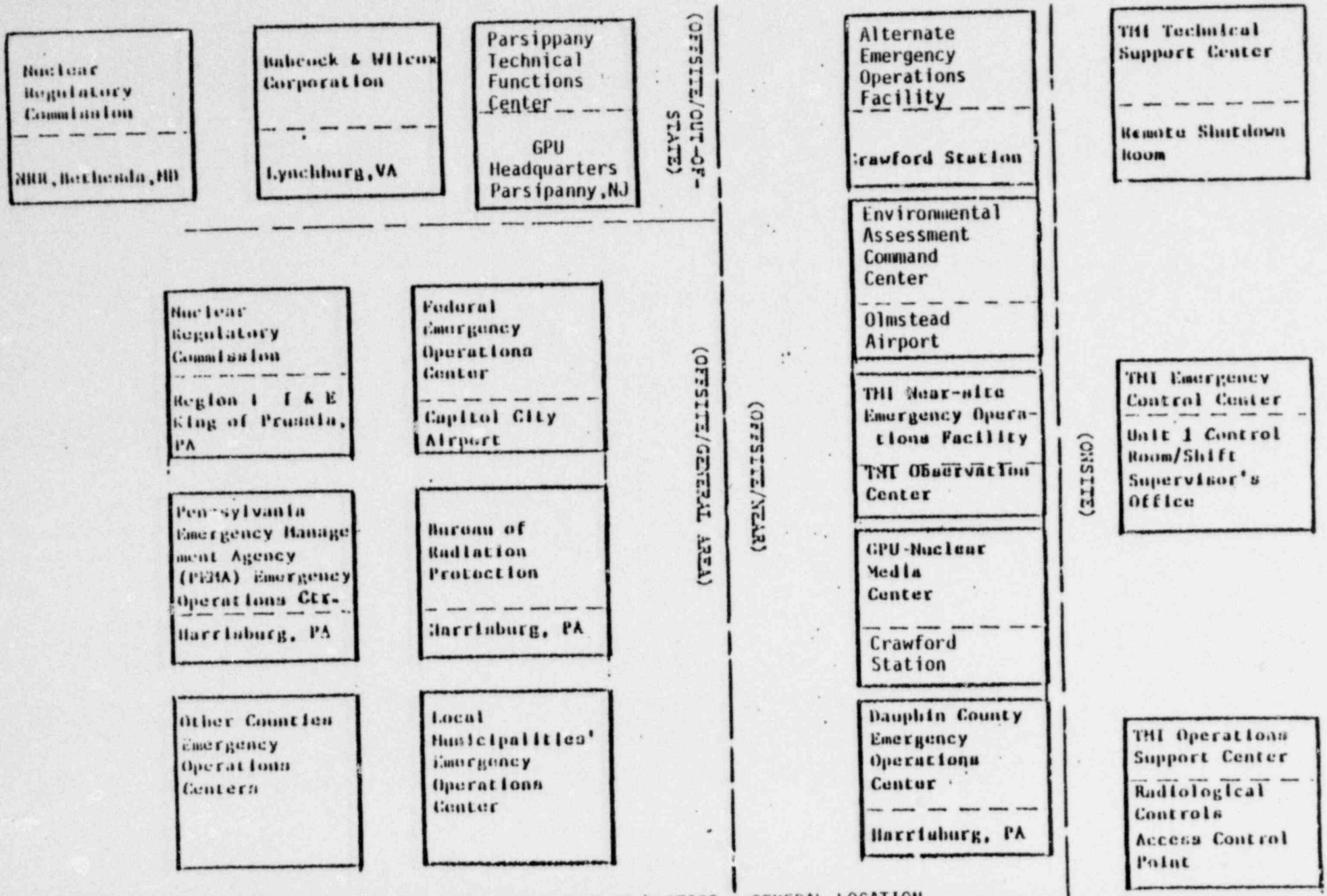
OFFSITE EMERGENCY SUPPORT ORGANIZATION

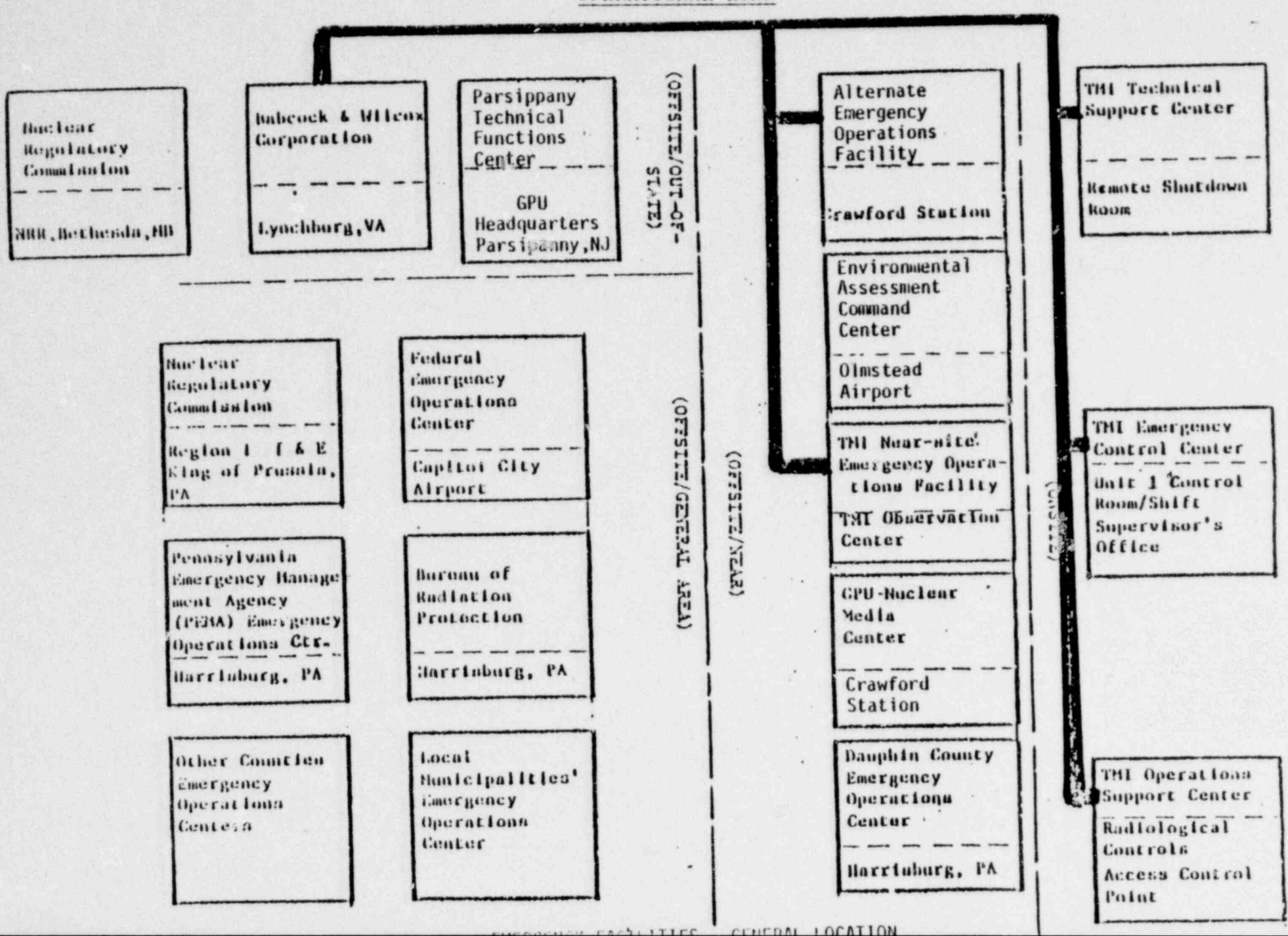
Figure 2



LONG-TERM RECOVERY ORGANIZATION

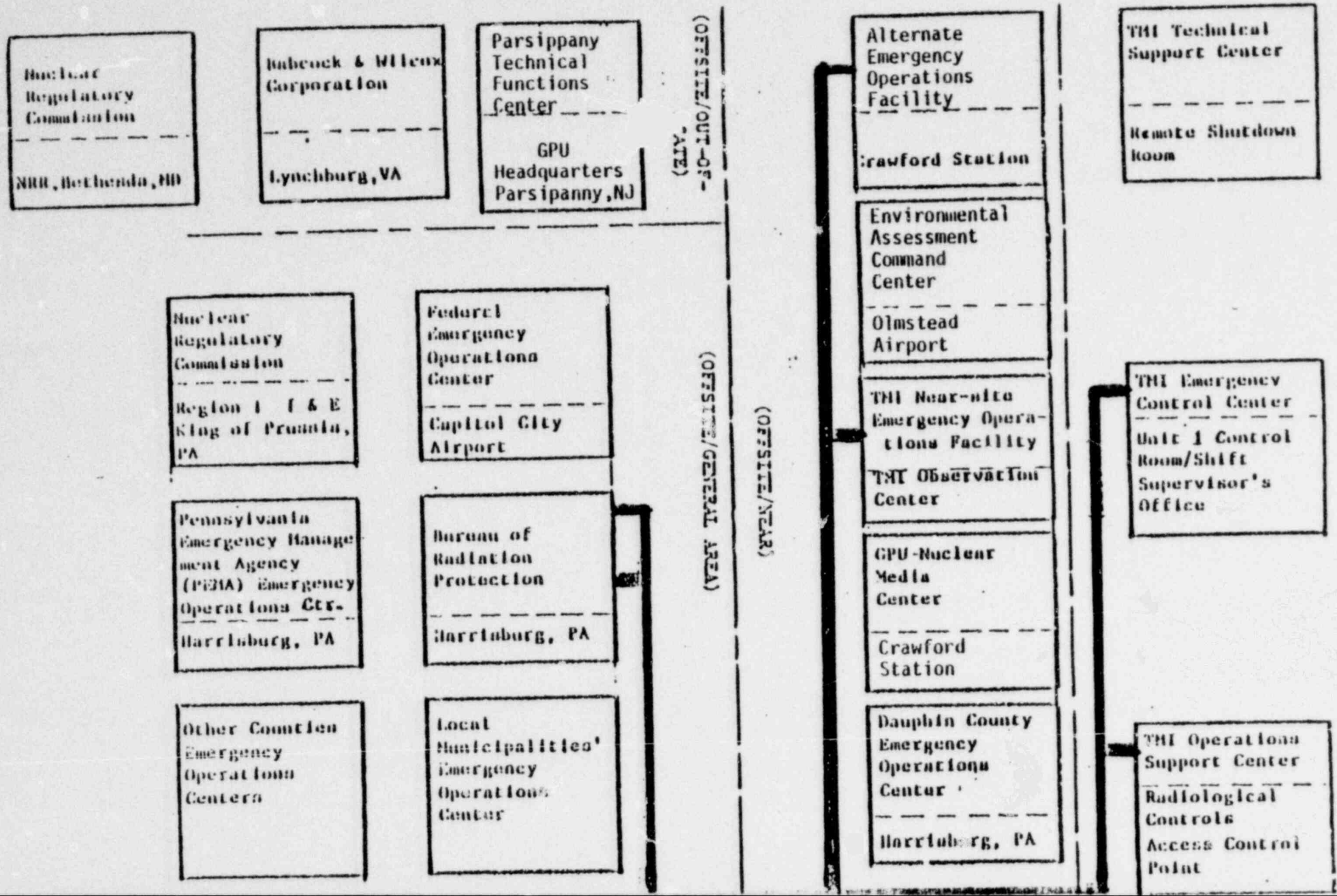
Figure 3


Nuclear Regulatory Commission
NRR, Bethesda, MD
Babcock & Wilcox Corporation
Lynchburg, VA
Parsippany Technical Functions Center
GPU Headquarters Parsipanny, NJ
(OFFSITE/OUT-OF-STATE)
Nuclear Regulatory Commission
Region I I & E King of Prussia, PA
Federal Emergency Operations Center
Capitol City Airport
Pennsylvania Emergency Management Agency (PEMA) Emergency Operations Center
Harrisburg, PA
Bureau of Radiation Protection
Harrisburg, PA
Other Counties Emergency Operations Centers
Local Municipalities' Emergency Operations Center
(OFFSITE/NEAR TERM)
(OFFSITE/NEAR)
Alternate Emergency Operations Facility
Crawford Station
Environmental Assessment Command Center
Olmstead Airport
TMI Near-site Emergency Operations Facility
TMI Observation Center
GPU-Nuclear Media Center
Crawford Station
Dauphin County Emergency Operations Center
Harrisburg, PA
TMI Technical Support Center
Remote Shutdown Room
TMI Emergency Control Center
Unit 1 Control Room/Shift Supervisor's Office
TMI Operations Support Center
Radiological Controls Access Control Point
(ONSITE)
EMERGENCY FACILITIES
GENERAL LOCATION

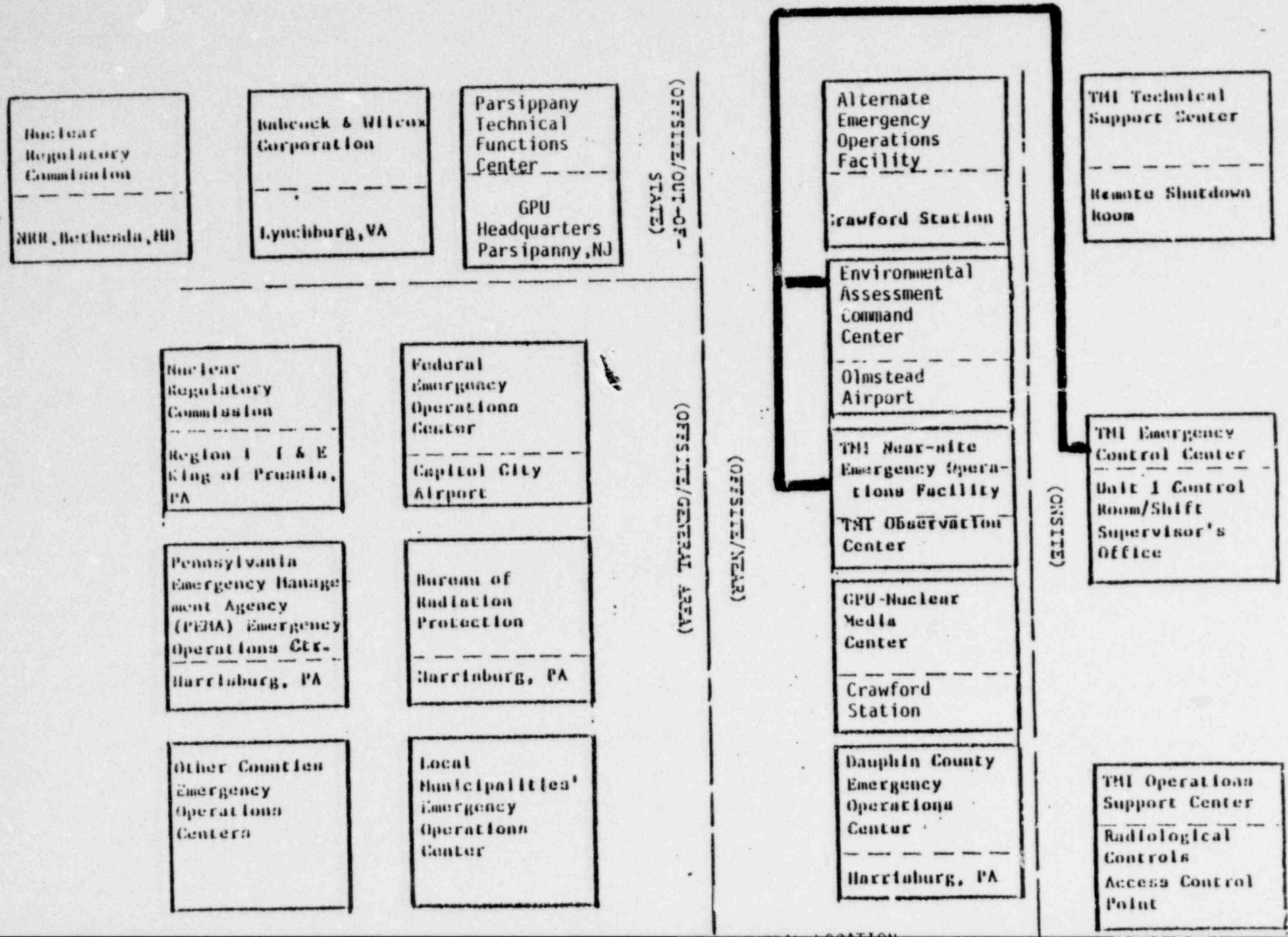


EMERGENCY FACILITIES - GENERAL LOCATION

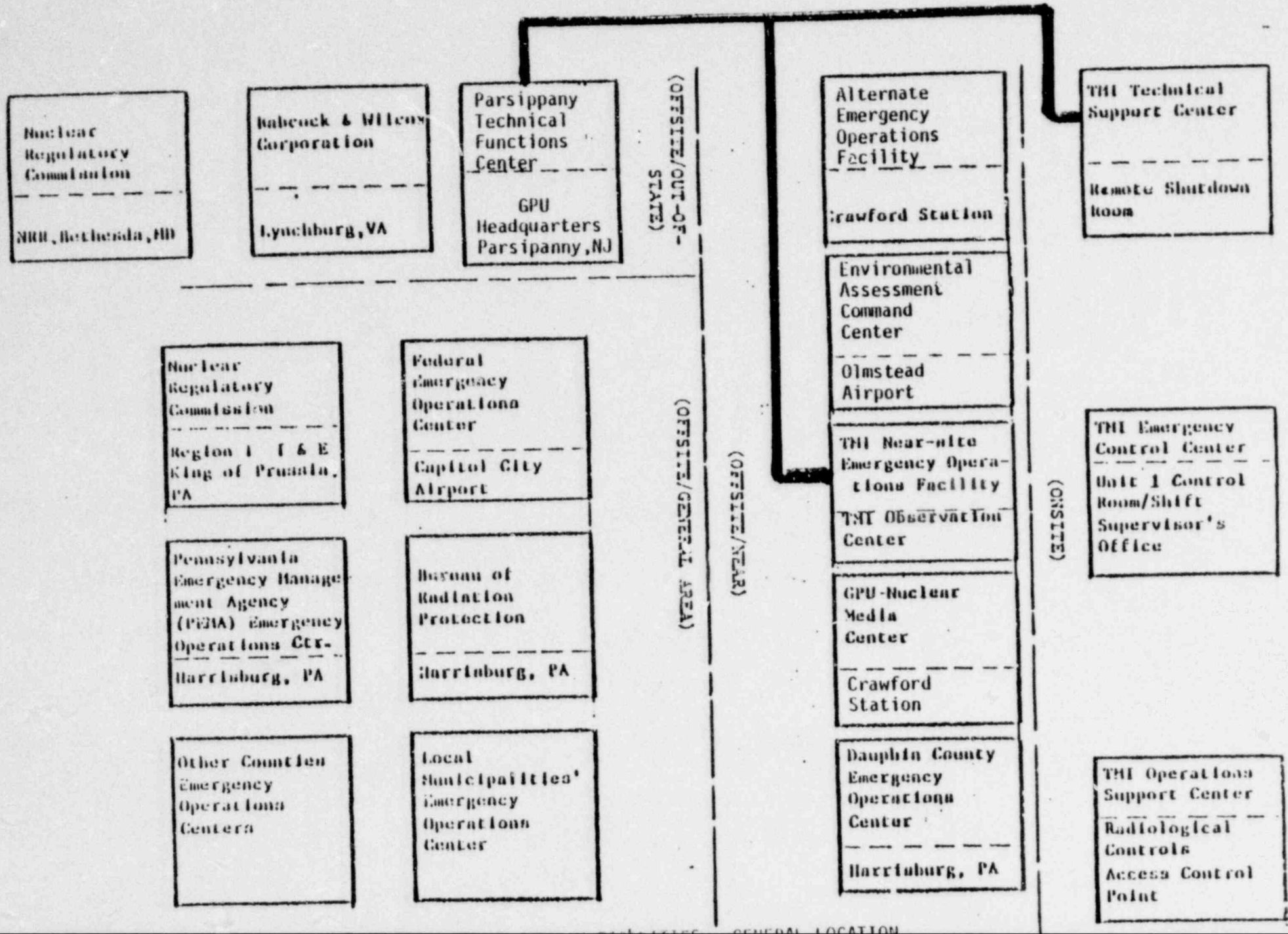
RADIOLOGICAL LINE



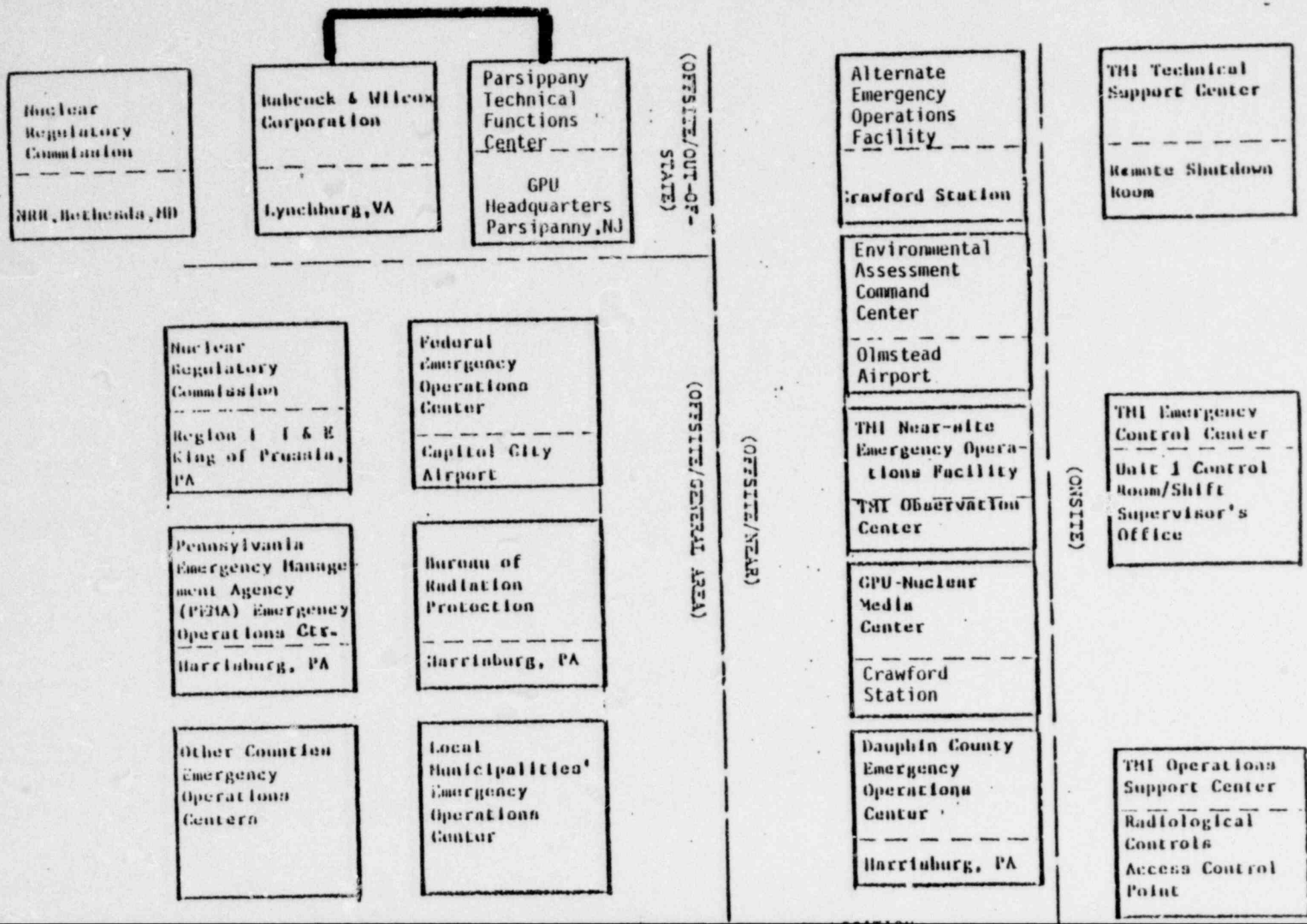
ENVIRONMENTAL ASSESSMENT LINE



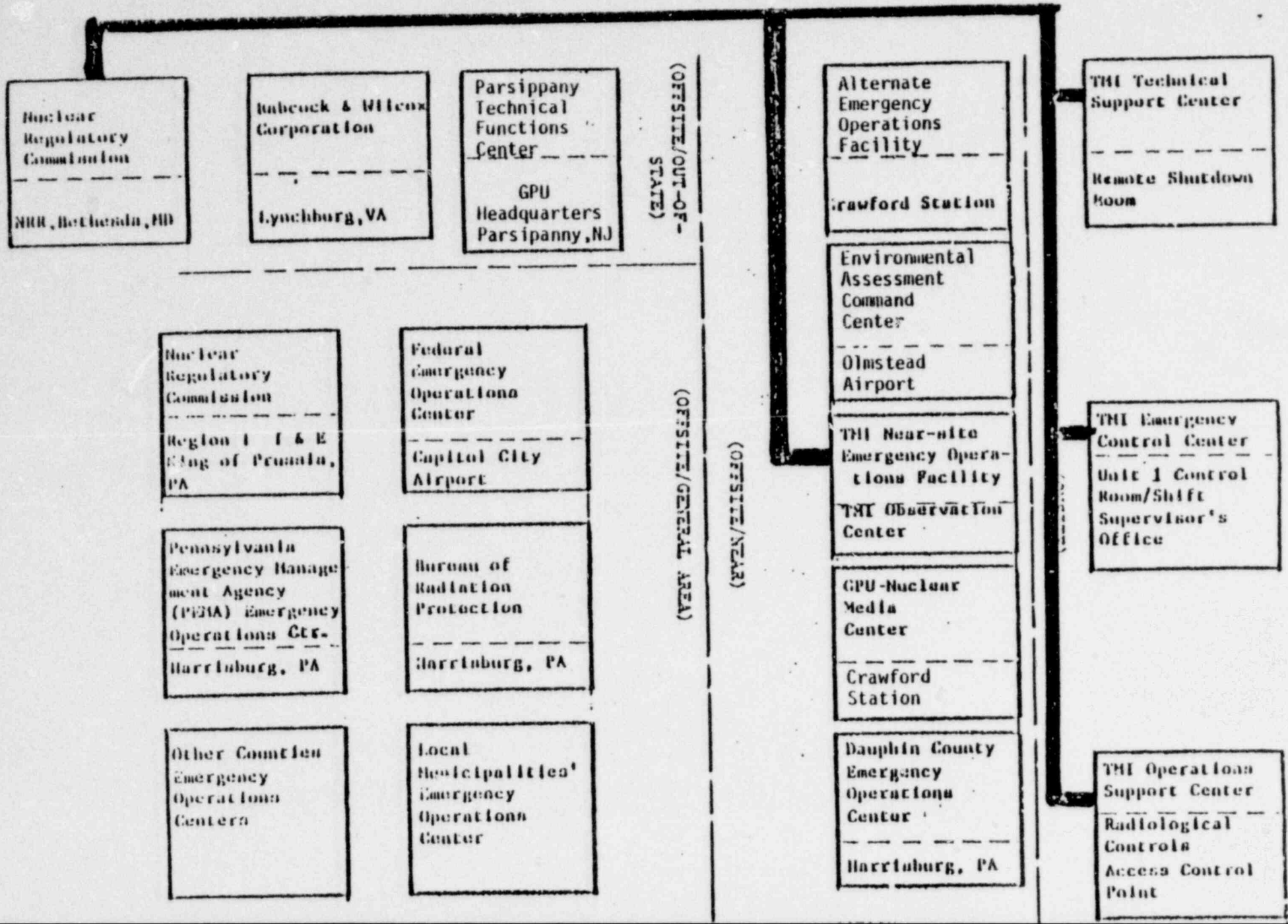
PARSIPPANY/TMI LINE



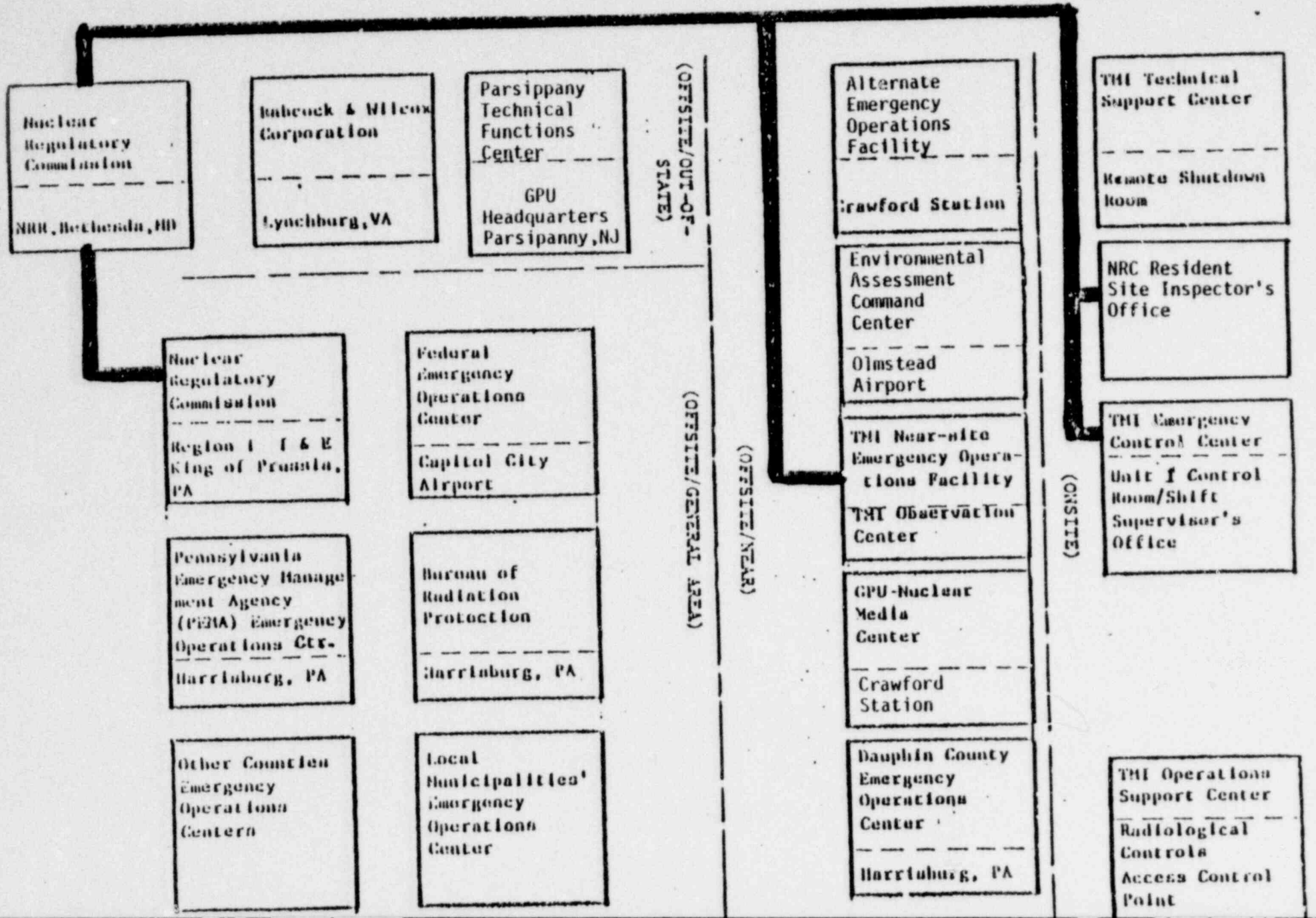
PARSIPPANY/B & W LINE



NRC EMERGENCY NOTIFICATION SYSTEM (ENS)



NRC HEALTH PHYSICS NETWORK LINE (HPN)



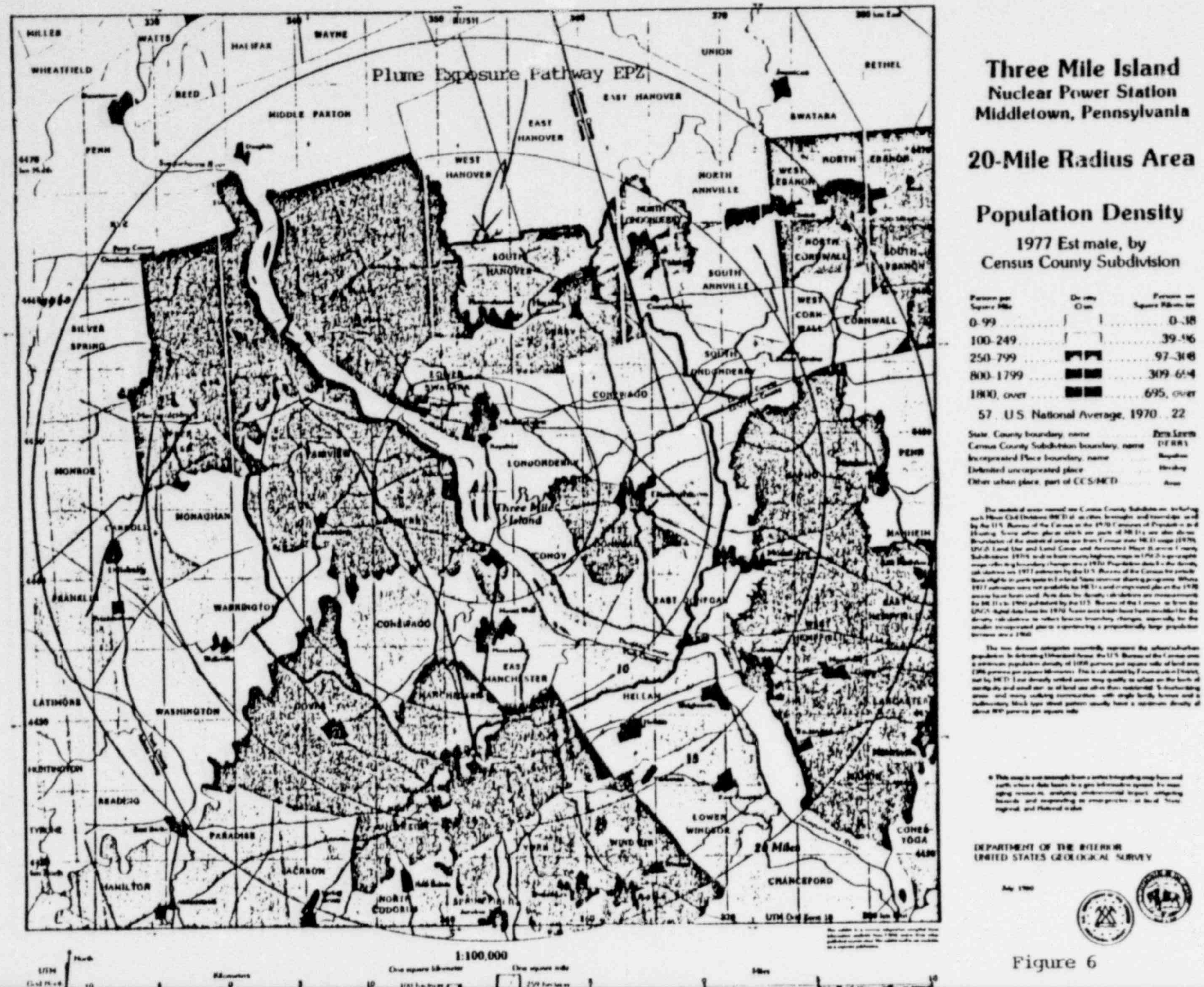

Three Mile Island
Nuclear Power Station
Middletown, Pennsylvania
20-Mile Radius Area
Population Density
1977 Estimate, by
Census County Subdivision
0-99 0-38
100-249 39-96
250-799 97-308
800-1799 309-694
1800, over 695, over
57 U.S. National Average, 1970 22
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
Plume Exposure Pathway EPZ
Three Mile Island
10
15
20 Miles
1:100,000
WHEATFIELD
HALIFAX
WAYNE
UNION
BETHEL
MIDDLE PAXTON
EAST HANOVER
WEST HANOVER
SWATARA
NORTH ANNVILLE
SOUTH HANOVER
SOUTH ANNVILLE
CORNWALL
SILVER SPRING
LONDONDERRY
CONEWAGO
MONAGHAN
CONOY
EAST DONEGAL
WASHINGTON
EAST MANCHESTER
HELLAM
LOWER WINDSOR
CHANCEFORD
LATIMORE
READING
PARADISE
JACKSON
HAMILTON
NORTH CODORUS
MANHEIM
PENN
MONROE
FRANKLIN
CONESTOGA

Figure 6

TABLES

TAB

Planning Standard	Required Corrective Action	Status of Licensee's Response
E. Notification Methods and Procedures	Establish physical and administrative means for providing prompt warning and instructions to the public within the plume exposure pathway Emergency Planning Zone in compliance with Appendix 3 of NUREG-0654.	System design engineering is complete; siren procurement is ongoing; system will be operational by July 1, 1981.
G. Public Education and Information	Provide the NRC staff with details of the public information program regarding how the public will be notified and what their actions should be in an emergency. Drafts of this information and the means of dissemination should be provided to the staff prior to restart.	PEMA has the lead role and is completing its Public Information section of the State Emergency Plan; information already distributed in utility bills and by many local emergency management agencies.
I. Accident Assessment	Specify the instrumentation for accident assessment required by NUREG-0578 as required by the Commission's Restart Order of August 9, 1979.	Licensing correspondence to the NRC specifies the additional equipment/instrumentation that will be operational prior to restart.
	Determine more exact assumptions for containment leak rates used in dose projection.	Licensee is reviewing present assumptions to determine need for change.
J. Protective Response	Provide time estimates for evacuations within the plume exposure EPZ which conform with the requirements of NUREG-0654, Appendix 4.	Evacuation time estimate study to be completed by ~~mid-February~~ mid-March; information to be forwarded to NRC.
	Establish provisions for stockpiling thyroid blocking drugs for distribution to onsite emergency workers.	Licensee has established provisions for stockpiling thyroid blocking drugs. ~~Awaiting Food and Drug Administration criteria on use of thyroid blocking drugs.~~
N. Exercises and Drills	The frequency for tests of communication links with States and Federal response organizations within the ingestion EPZ should be changed to at least quarterly.	Revision 3, Section 4.8.1.2 corrects this deficiency; quarterly communication tests will be conducted.

TABLE 2

Number	On-Shift Assignment	Emergency Assignment
1	Shift Supervisor	Emergency Director
1	Shift Technical Advisor	Performs normal functions
1	Shift Foreman	Performs normal functions
1	Control Room Operator #1	Operates primary plant
~~1~~	~~Control Room Operator #2~~	~~Communicator~~
1	Switching & Tagging Control Room Operator	Operates secondary plant
5 ~~4~~	Auxiliary Operators	Radiological monitoring teams, fire brigade, emergency repair, plant operations, Communications
1	Radiological Controls Foreman	Radiological Assessment Coordinator
1	Senior Radiological Controls Technician	Radiological Controls Coordinator
2	Radiological Controls Technicians	In-plant radiological controls (assess control surveys, etc.), radiological monitoring teams
1	Senior Chemistry Technician	Chemistry Coordinator
1	Shift Maintenance Foreman	Operations Support Center Coordinator
4	Maintenance Personnel	Emergency repair, search and rescue, radiological monitoring team drivers

TABLE 3

Protective Action Guides

Population at Risk	Projected Whole Body Gamma Dose from Airborne Radioactive Materials (Rem) b/	Projected Thyroid Dose due to Inhalation from a Passing Plume (Rem) b/
General Population	1 to 5 a/	5 to 25 a/
Emergency Workers	25	125
Lifesaving Activities	75	No Specific Upper Limit

	Ingestion Exposure Pathway Protective Action Guides	
	Dose Commitment to Infant Thyroid (Rem) c/	Dose Commitment to the Whole Body, Bone Marrow or any Organ (Rem) c/
Preventive PAG	1.5	.5
Emergency PAG	15.0	5.0

a/ Use lower limit in absence of constraints; in no case should higher limit be exceeded in determining the need for protective action.

b/ Source: EPA, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents" (EPA-520/1-75-001, Sept. 1975), at pp. 2.3 & 2.5; Department of Environmental Resources/Bureau of Radiation Protection, "Plan for Nuclear Power Generating Station Incidents", Appendix 8 to State Emergency Plan, at p. V-2.

c/ Source: Food and Drug Administration, Proposed Rule 21 C.F.R. § 1090.400(c), 43 Fed. Reg. 58790, 58795 (December 15, 1978); Department of Environmental Resources/Bureau of Radiation Protection, "Plan for Nuclear Power Generating Station Incidents", Appendix 8 to State Emergency Plan, at pp. IX-4 & IX-8.

APPENDIX A -- PROFESSIONAL QUALIFICATIONS

ROBERT E. ROGAN

Business Address: TMI Nuclear Station
P. O. Box 480
Middletown, Pennsylvania 17057

Education: B.S. (with honors), Chemistry, Jacksonville State College, Alabama.

M.S., Nuclear Physics, Tulane University.

U.S. Army War College, Masters Degree equivalency program in business administration, management and political science.

Experience: Manager-Emergency Preparedness, GPU Nuclear October 1980 to present. Responsible for GPU Nuclear emergency preparedness programs at TMI and Oyster Creek nuclear power plants. Supervised development of emergency plans to assure site planning provided an appropriate state of emergency preparedness and compliance with NRC regulations and guidance.

Senior Strategic Analyst and Study Group Manager, U.S. Army, June 1977 to October 1980. Managed multi-disciplinary teams performing research and analysis concerning national strategic issues.

Commander, U.S. Army Recruiting District, Omaha, Nebraska, June 1975 to July 1976. Senior executive of U.S. Army's second largest recruiting district. Responsible for all management, administrative, operational, training and logistic functions.

Commander, U.S. Army Mechanized Infantry Battalion, November 1973 to June 1975. Also served as Chief of Staff and Executive Officer for headquarters and subordinate organizations.

Senior Operating Executive and Project Manager, U.S. Army, July 1970 to July 1973. Responsible for supervising and coordinating joint nuclear research and development programs.

Senior Operations Officer, U.S. Army Combat Brigade, Vietnam, July 1969 to July 1970.

GEORGE J. GIANGI

Business Address:

TMI Nuclear Station
P.O. Box 480
Middletown, Pennsylvania 17057

Education:

B.S., Chemistry, Syracuse University, 1974.
Candidate for M.S., Inorganic Environmental Chemistry, Rensselaer Polytechnic Institute (course work completed, 1978; thesis submitted).

Training:

Radiation Emergency Seminar, Southern Science Applications, Inc. (1/30/81 - 2/1/81).

Primary Management of Radiation Injury Course, Northwestern University Medical School (11/80).

Emergency Planning Seminar - Mississagua Evacuation, NUS Corporation (11/80).

Emergency Preparedness Workshop, Institute of Nuclear Power Operations (10/80).

Public Notification Systems Seminar, Federal Signal Corporation (9/80).

Radiation Medical Emergency Course, Radiation Management Corporation (9/80).

Radiological Emergency Response Course, Nuclear Regulatory Commission/Federal Emergency Management Agency (6/80).

Experience:

Supervisor - Emergency Preparedness at Three Mile Island, November 1980 to present.

Emergency Planning Coordinator at Three Mile Island, February - November 1980. Responsible for preparation of revised Emergency Plan and Implementing Document for Three Mile Island Nuclear Station, and for ensuring compliance with NRC emergency preparedness requirements in areas such as public early warning systems, evacuation time estimates, radiological dose assessment, post-accident in-plant sampling, emergency drills and exercises, and emergency plan training.

Manager - Chemistry, Salem Nuclear Generating Station, July 1979 - February 1980. Responsible for all chemistry controls at Salem Nuclear Station.

Health Physics/Chemistry Supervisor, Salem Nuclear Generating Station, January - July 1979. Supervised health physics program, including exposure permits; radiation, contamination and airborne surveys; and radiological postings. Supervised chemistry program, consisting of analysis of primary and secondary chemistry parameters and issuance of environmental reports and radioactive release reports.

Auditor - Chemistry and Radiological Controls, Knolls Atomic Power Laboratory, 1978. Evaluation of all areas of chemistry and radiological controls at four nuclear power plants.

Chemistry and Radiological Controls Instructor, Knolls Atomic Power Laboratory, 1974 - 1978. Instructed Naval personnel in chemistry and radiological controls operations on nuclear powered ships.

Publication:

"Case History: Application of Inert Resin In Mixed Bed Polishing," Presented to The Eighteenth Annual Liberty Bell Corrosion Course, October 1980, by Ralph F. Eherts and George J. Giangi.

ALEXIS TSAGGARIS

Business Address: Energy Consultants, Inc.
121 Seventh Street
Pittsburgh, Pennsylvania 15222

Education:

B.S. Basic Engineering, Princeton University, 1970.

U.S. Navy Nuclear Power Training Program.

Experience:

Vice President, Energy Consultants, Inc., 1980 to present. Responsible for engineering and consulting services, including engineering design, nuclear training and emergency planning.

Corporate Quality Assurance Manager, Schneider, Inc., Pittsburgh, Pennsylvania, 1980. Responsible for all corporate and field-site quality assurance/control activities for nuclear and fossil power plant construction.

Director of Site Emergency Planning, Metropolitan Edison Company, 1979. Responsible for all post Three Mile Island accident emergency planning activities, including development of plans, procedures, organizations, facilities and communication systems, and the interface of these activities with NRC, state and local government agencies. Participated in hearings before the Advisory Committee on Reactor Safeguards and the Pennsylvania House Select Committee on Three Mile Island.

Supervisor of Maintenance, Metropolitan Edison Company, 1978. Responsible for all maintenance activities at a 3-unit coal fired generating station.

Director of Training/Supervisor of Nuclear Training, Metropolitan Edison Company, 1976 to 1978. Responsible for all training activities for generating station and corporate engineering personnel. This included all NRC required operations, maintenance and health physics programs at the Three Mile Island nuclear station. Planned, coordinated and executed the annual radiation emergency exercises.

Officer, U.S. Navy, 1970 - 1976. Trained at naval nuclear power school, prototype and submarine school. Positions held included Staff Training Officer, Lead Engineering Officer of the Watch at the D1G prototype plant, and various division officer positions aboard a fleet ballistic missile submarine. Qualified as Chief Engineer.

APPENDIX B -- ABBREVIATIONS

Abbreviations

1. AEOF - Alternate Emergency Operations Facility
2. ANI - American Nuclear Insurers
3. ARAC - Atmospheric Release Advisory Capability System
4. B&W - Babcock & Wilcox
5. BRP - Pennsylvania Bureau of Radiation Protection
6. DGI - Digital Graphics Incorporated
7. EAC - Environmental Assessment Coordinator
8. EACC - Environmental Assessment Command Center
9. EAL - Emergency Action Level
10. EBS - Emergency Broadcast System
11. ECC - Emergency Control Center
12. ENS - Emergency Notification System
13. EOC - Emergency Operations Center
14. EOF - Emergency Operations Facility
15. EPA - Environmental Protection Agency
16. EPIP - Emergency Plan Implementing Procedure
17. EPZ - Emergency Planning Zone
18. FEMA - Federal Emergency Management Agency
19. FSAR - Final Safety Analysis Report
20. GPU - General Public Utilities
21. HPN - Health Physics Network Line
22. INPO - Institute of Nuclear Power Operations
23. MIDAS - Meteorological Information and Dose Acquisition System
24. NAWAS - National Warning System

25. NRC - Nuclear Regulatory Commission
26. OSC - Operations Support Center
27. PAG - Protective Action Guide
28. PEMA - Pennsylvania Emergency Management Agency
29. PennDOT - Pennsylvania Department of Transportation
30. PSP - Pennsylvania State Police
31. RAC - Radiological Assessment Coordinator
32. REMP - Radiological Environmental Monitoring Program
33. RMC - Radiation Management Corporation
34. TFC - Parsippany Technical Functions Center
35. TLD - Thermoluminescent Dosimeter
36. TMI - Three Mile Island Nuclear Station
37. TSC - Technical Support Center

APPENDIX C -- ONSITE EMERGENCY PLANNING CONTENTIONS

NUMERICAL LIST OF ONSITE EMERGENCY PLANNING CONTENTIONS

EP-1

EP-3(C)

EP-4(B)

EP-4(C)

EP-4(D)

EP-4(E)

EP-4(F)

EP-4(G)

EP-4(H)

EP-4(I)

EP-4(J)

EP-7

EP-8

EP-9

EP-15(A)

EP-15(B)

EP-15(C)

EP-15(D)

EP-15(E)

EP-15(F)

EP-17(A)

EP-17(B)

EP-18

EP-1 (Aamodt)

It is contended that licensee has not made provision for timely dissemination of information in the event of accidental release of airborne radioactive gases or particulates. It is contended that licensee must make information available to the public which will allow appropriate action to be taken to protect persons, livestock, foodstuff and feed in the event of a discharge of significant proportions. All data and plant operating personnel observations relative to all radioactive releases must be transmitted immediately and simultaneously to the NRC, Pennsylvania Department of Environmental Resources, the commissioners of Dauphin, York and Lancaster Counties and the licensee's management. It is further contended that licensee must provide this capability before restart of TMI-1.

EP-3 (ANGRY)

The conditions set forth in the NRC's August 9 Order (44 F.R. 47821-25) for TMI-1's resumption of operation are insufficient to provide reasonable assurance that such resumption can occur without endangering the public health and safety for the reason that they fail to require the development and effectuation of adequate and effective Radiological Emergency Response Plans to protect the population surrounding TMI-1 from the consequences of any future nuclear accident. Such insufficiency is in particular demonstrated by the following flaws:

3(C) The NRC's vague instruction to the licensee to "upgrade" in generally unidentified respects its "Offsite monitoring capability" is insufficient to assure

that such upgrading will result in the ability to obtain and analyze the type and volume of information essential for protection of the public health and safety. ANGRY contends that such capability must at minimum encompass the following elements or their equivalent;

(1) Permanent offsite monitoring devices which register all forms of ionizing radiation and which can be remotely read onsite.

(2) Information analysis capability equal to or greater than that provided by the Atmospheric Release Advisory Capability System (ARAC) This contention now challenges the adequacy of the licensee's MIDAS radiological assessment system (EP, p. 6-9) to the extent that the information analysis capability it provides does not equal or exceed that provided by the ARAC system.

EP-4 (ANGRY)

The licensee's Emergency Plan (EP) fails to satisfy reasonable and applicable standards of adequacy and effectiveness in the following principal respects:

4(B) The perfunctory form letters found in Appendix C to licensee's EP provide no indication, let alone assurance, of the existence of "mutually acceptable criteria" for implementation of emergency measures as required by Emergency Planning Review Guideline No. One, Revision One (EPRG) IV(A)(1). Also N. 0654 A3.

4(C) The adoption of the Commonwealth of Pennsylvania Disaster Operations Plan Annex E (DOP) designation of "the 'risk county' as responsible for the preparation and dissemination of information material on protective actions to the general public" (p. 6-8) conflicts with the requirements in EPRG II(A)(7) and RG 1.101 § 6.4(2) to

> make available on request to occupants in the LPZ information concerning how the emergency plans provide for notification to them and how they can expect to be advised what to do.

Also, N. 0654 G4.

4(D) The licensee's "Onsite Emergency Organization" (Sec. 4.5.1.3) contains insufficient personnel and expertise in the area of Health Physics to discharge adequately the responsibilities of dose assessment and projection in the event of a rapidly developing accident sequence. The time required for the mobilization of offsite health physics support (2-4 hrs. - See Table 8), which is given responsibility for "overall assessment of the impact of liquid and gaseous effluents with respect to . . . protective action guides" (p. 5-12), is inconsistent with adequate radiological assessment capability.

4(E) The licensee's EP fails to provide for furnishing to the Pennsylvania Bureau of Radiation Protection (BORP) information called for in the latter's plan such as

"nature of the failure, the status of safeguards, the condition of consequence mitigating features" (p. VI-1).

4(F) The provisions for the conducting of a "Radiation Emergency Exercise" of the licensee (EP, p. 8-8) and of the Commonwealth (Pa. DOP, App. 14) are inadequate in that they do not clearly provide for the participation therein of federal agencies. The necessity for such participation is clearly established by the extensive involvement of federal agencies in the TMI accident. Second, the aforementioned appendix to the Commonwealth's emergency plan indicates that "all major elements of the plans and preparedness organizations" may be tested only over a period of five years. All such elements should be tested in an exercise prior to the restart of TMI-1.

4(G) The licensee's emergency notification procedures (pp. 6-2, 6-3, 6-4; Figure 15) (See also Pa. DOP Appendix 3) are inadequate with respect to certain areas directly at risk in the event of a nuclear accident, namely, York and Lancaster Counties. Although the Dauphin County Emergency Operations Center receives immediate notification of an emergency declaration, notification of York and Lancaster Counties must follow an excessively circuitous path:

1. Licensee to Dauphin
2. Licensee to PEMA
3. PEMA to BORP
4. BORP to Licensee
5. Licensee to BORP
6. BORP to PEMA
7. PEMA to Dauphin
8. PEMA to York, Lancaster, and Cumberland Counties.

Such a notification sequence is in direct conflict with requirements that "delegations of authority that will permit emergency actions (such as evacuation) to be taken with a minimum of delay should be carefully considered" (NUREG 75/111, § A3) and that "Upon declaration of a 'general emergency' immediate notification shall be made directly to the offsite authorities responsible for implementing protective measures . . ." (EPRG II(A)(5)) (Emphasis in original). Also, N. 0654 J7.

4(H) RG 1.101 Sec. 6.4 requires the licensee to specify "criteria for implementing protective actions. . ." The licensee's EP fails to set forth the following mandatory items of information regarding the time required for protective action implementation:

1. Expected accident assessment time. RG 1.7 0 , Sec. 13.3.1-2.
2. Time required to warn persons at risk. RG 1.101, Sec. 6.4.1-2(b); RG 1.70, Sec. 13.3.1-3,4.

3. Time required for a general evacuation. RG 1.70, Sec. 13.3.1-5,6; November 29, 1979 letter to "All Power Reactor Licensees" from Brian K. Grimes, Director, NRC Emergency Preparedness Task Group.

4. Time required to evacuate special facilities (e.g., hospitals). November 29, 1979 letter, supra.

See, N. 0654 J8.

4(I) The time provided in the EP for accident assessment, 1/2 hour (EP, p. 6-7), is in excess of the maximum permissible therefor specified in the Standard Review Plan, NUREG 75/087, Sec. 13.3(II)(3). (EP fig. 21 shows the thyroid PAG of 5 rems being reached in 12 minutes at 600 meters.) Moreover, the estimate given is unsupportable for monitoring of off-site locations on nearby islands or on the west shore of the Susquehanna River. Such factors may become critical in the event of a general emergency, which produces a "shift in emphasis to greater offsite monitoring efforts" (EP, p. 6-6). (See Contention EP-3(C)(1)).

4(J) The licensee's Onsite Emergency Organization staffing provisions as set forth in Table 8 of its EP fail to conform to the standards of N. 0654 Sec. B5 in the following respects:

1. Under said standards two control room operators are assigned the function of "plant operations and assessment of operational aspects." Another

shift employee is given the exclusive task of providing communications liaison with off-site officials. Under the licensee's staffing provisions, by contrast, the two control room operators are assigned to "operate equipment in control room and act as communicator" (emphasis added). This divided responsibility compromises the licensee's ability to provide prompt off-site notification of emergency conditions. The inadequacy of these staffing provisions is aggravated by the absence of any provision for the addition of three more persons with communications responsibilities within 30 minutes, as required by the aforementioned acceptability standard.

2. A similar confusion of assignments exists with regard to the shift supervisor and shift foreman, who are expected to fill three roles between them.

3. Although N. 0654 requires the emergency operations facility director to assume his assignment within 30 minutes, under the licensee's plan this will not occur for as long as four hours.

4. Two radiological analysis support engineers, who are the only employees identified as having the training and primary responsibility for performing "dose projection calculations and source term calculations" (EP, p. 5-10) will not be available for as long as 60 minutes.

EP-7 (ECNP)

The fractions of EPA PAGs listed on p. -1 of the Plan, with their associated action levels, do not take into account the total accumulated dose and dose commitment. As a result, the total exposures may exceed by large margins the listed PAG fractions prior to the advancement to a higher emergency category.

EP-8 (ECNP)

The various emergency categories (p. 4-2 to 4-8) each list a number of triggering events or conditions. Many of these are questionable indicators. For instance, on p. 4-3, "Valid" alarms are referred to. But there is no mention of the definition of a "valid" alarm, or what would be an invalid alarm. A number of reactor coolant activities (50, 130, and 300 ci/ml) are referred to, but no mention is made of how much full damage it takes to produce these readings. In addition, there is no indication of how or how rapidly these coolant activities will be determined.

EP-9 (ECNP)

Reliance on "adverse meteorology" (p. 4-5, 4-6), can prove to provide little or no "built-in conservation" (p. 4-7, 4-8) since, for instance, such conditions were not at all uncommon during the nighttime in the nights following the TMI-2 accident (for instance, the night of March 29, from 10 p.m. to 8 a.m., March 30; night of March 31, about 8:00 p.m. to 8 a.m., April 1).

EP-15 (Newberry)

Evacuation planning being done by the Metropolitan Edison Company is inadequate to insure the safety of the public, particularly those persons who live within a five (5) mile radius of the nuclear power plant located at Three Mile Island, Pennsylvania. Operation of TMI Unit No. 1 should not be resumed until a plan is in place for the evacuation of the public in the maximum area which could be affected by an accident or incident and the plans submitted by the Metropolitan Edison Company to that end are deficient as follows:

15(A) Section 4.5.2 provides that off-site authorities would provide certain services in the event of an emergency situation. The Plan does indicate that there are agreements between the various personnel, organizations and agencies listed in this section; however, the agreements of most local fire companies only indicate that certain manpower is available and certain pieces of equipment are available. Moreover, it appears as though somebody produced documents for the local fire companies to sign, which would indicate the amount of manpower and resources available to each one of the fire companies who signed such an agreement. The agreements with the fire companies do not state that they know exactly what will be expected of them in an emergency situation. Without a sound contractual understanding in place, it is questionable that during a crisis situation off-site authorities will know exactly what is expected of them.

Detailed understandings should be drawn between the local police, firefighting authorities and the State Police and other off-site authorities and agencies in order to ensure orderly support in the event of an emergency. The absence of such documentation and understanding between Metropolitan Edison Company and off-site authorities creates a deficiency in the Emergency Plan.

15(B) Section 4.5.1.3(1)(c)(d) states that the Emergency Director shall provide liaison communication with county, state and federal governments to ensure that notification and reports to these agencies are made in a timely manner and that he will communicate with off-site emergency support organizations. It is Intervenor's contention that this part of the Plan which is critical to the coordination of all emergency activities does not state with specificity the exact timeframe in which notification and communication is to be made with off-site emergency support organizations and agencies. It is Intervenor's position that this is critical in order to ensure that licensee reports and communicates any abnormal and emergency condition to the respective organizations in a truly timely fashion. The Emergency Plan as now drafted leaves too much discretion with the Emergency Director with regard to the contacting of these off-site agencies.

15(C) Section 4.5.3.2 of the Emergency Plan indicates that with respect to the 10-mile EPZ, the five counties identified in this section have prepared emergency plans that are coordinated with the State Disaster Operations Plan and with the TMI Emergency Plan as well. It is Intervenor's contention that this obviously cannot be the case, since revision #2 of this Plan is dated June, 1980 and that the county plans still are not adopted as final drafts. Moreover, a review of the Dauphin County and York County Plans indicate there is absolutely no referencing to the TMI Emergency Plan and that, in fact, it appears as though the county plans were written independently of the TMI Emergency Plan. All plans must inter-coordinate in order to ensure that all parties participating in the emergency will know what is expected of them. There is no provision in the Emergency Plan for the distribution and updates of the TMI Emergency Plan and, based upon these deficiencies, the Emergency Plan as now written is inadequate.

15(D) Section 4.5.4 of the Emergency Plan anticipates that the Pennsylvania Emergency Management Agency will conduct and participate in annual training exercises that involve state, county and local government agencies and that the testing of communications, radiological monitoring instrumentation and warning systems will be conducted. It is Intervenor's contention that at the present time, such communications, radiological

monitoring instrumentation and warning systems are either not in place within the surrounding communities or are not being maintained by operators within surrounding local communities. The Plan does not indicate who is responsible for the purchasing of communication, radiological monitoring instrumentation and warning systems and, furthermore, who is responsible for the maintaining of this equipment. The Commonwealth of Pennsylvania did begin a radiological monitoring effort; however, since local monitoring readers were instructed as to how to read the monitors, the Commonwealth of Pennsylvania has not been soliciting their readings and/or following up to determine whether the readings are being made by the readers. Is this burden to be shouldered by the local community, the county, the state government or the licensee? It is Intervenor's contention that while emergency plans may, in theory, set forth a plan of training, it cannot realistically be put in action because the Plan assumes placement of communications systems, radiological monitoring instruments and warning systems. It is Intervenor's position that until such systems are in place, it is determined who is responsible for the equipment's maintenance and who is to burden the cost of the placement and maintenance of such systems, the Plan is inadequate and unacceptable.

15(E) Section 4.6.5.1(2) of the Emergency Plan provides that

the responsibility for actions to protect persons in the off-site areas rests with the Commonwealth of Pennsylvania and that the Pennsylvania Emergency Management Agency shall be the agency with which the responsibility rests for the placing, in effect, of protective options such as evacuation, sheltering and thyroid prophylaxis. The same section indicates that in the event of a general emergency, precautionary measures may be taken such as sheltering, evacuation and evacuation of certain sectors based upon wind speed and direction. It is again Intervenor's contention that this particular section of the Emergency Plan providing for the precautionary measures cited have not been coordinated with local county plans to any measurable extent. For example, in the county plans, there is no indication of how the counties would instruct its local Civil Defense Directors to evacuate only certain sectors within a community instead of within radial distances of the Three Mile Island nuclear facility. This is again only but one example of a lack of coordination between the Emergency Plan and the various county plans and it is Intervenor's position that this lack of coordination is symptomatic of the entire Emergency Plan as it is now written. The Emergency Plan submitted by the licensee should encompass a total coordination of all Emergency Plans formulated by federal, state and county agencies. This lack of coordination creates a deficiency which has to be remedied.

15(F) Section 4.6.7.1 of the Emergency Plan deals with early warnings and information for transient areas. It is Intervenor's position that the methods depended upon in the Emergency Plan to warn the population at risk, are, at the present time, not in place. For example, section 2 of this particular section of the Emergency Plan states that a siren alert system could be activated by counties in order to warn the populace of impending danger. As has been indicated earlier in Intervenor's contention with regard to Emergency Planning, there are not enough Civil Defense warning sirens in order to adequately ensure that all members of the community are within hearing distance of the siren. Moreover, section 5 of this subsection of the Emergency Plan indicates that vehicles with loudspeakers could be dispatched to broadcast warning messages. The problem with this approach is that it would take time to get volunteers to man the vehicles and, secondly, there are many miles of road which would have to be traveled in order to ensure that all members of the populace were informed of the impending emergency condition. It is Intervenor's contention that until the Emergency Plan specifically states that a siren alert system is in place and that the warning emitted by the siren alerts could be heard at any point in the county surrounding the plant site, the Emergency Plan as now drafted is unacceptable.

EP-17 (Sholly)

Defects in Licensee's Emergency Plan, Revision 2, June 1980:

17(A) Licensee's acceptance, without formal analysis or evaluation, of a circular 10-mile radius for the Plume Exposure Emergency Planning Zone (as designated by the Pennsylvania Emergency Management Agency) does not discharge Licensee's responsibility to ensure that adequate emergency response plans exist to protect the public health and safety in the event of an emergency at TMI-1. Further, acceptance of or designation of a circular 10-mile radius Plume Exposure EPZ for TMI-1 is unjustified because such an EPZ fails to adequately consider local emergency response needs and capabilities as they are affected by demography and jurisdictional boundaries. These considerations, among others, are specified in NUREG-0396, NUREG-0654, and the new emergency planning rule published in the Federal Register on August 19, 1980. The following specific local conditions should be reflected in the Plume Exposure EPZ for TMI-1:

1. The proposed 10-mile radius circular EPZ includes within the EPZ portions of numerous jurisdictions at the township, city, borough, and town levels of government. Calling for an evacuation of only a portion of any political jurisdiction due to a hazard which affects a large geographic area and basing emergency plans and response capabilities on such a limited evacuation will lead to problems

due to spontaneous evacuation of a much larger area, with a concommitant increase in traffic and supply requirements at shelters. Therefore, the Plume Exposure EPZ for TMI-1 should include the entire geographic extent of all governmental jurisdictions at the township, city, borough, and town level which are bisected by the proposed circular 10-mile EPZ.

2. There are heavily populated areas in and near the cities of Harrisburg and York represented by the city proper and adjacent continuation of the urban areas into the suburbs. In the event that the wind is blowing toward either of these areas when a large release of radioactivity occurs, such areas would constitute a large percentage of the total population dose (in the case of the TMI-2 accident, for instance, Harrisburg contributed 25% of the total population dose despite the fact that most of the city is more than 10 miles distant from the plant). The urbanized areas in and around Harrisburg and York are concentrations of population for which preplanning for an evacuation is a necessity for successful implementation (for instance, preplanning would have to include evacuation routes, transportation needs, host area requirements, and problems posed by special populations such as prisons). Therefore, the urbanized areas around and including the cities of Harris-

burg and York should be included within the Plume Exposure EPZ for TMI-1.

3. Numerous members of the Old Order Amish community reside in relatively close proximity (within 10 miles) of the outer boundary of the Licensee's Plume Exposure EPZ in Lancaster County. Because the Old Order Amish eschew the use of electricity, telephones, and automobiles, they present unique problems with respect to warning, communication of protective action advisories, and transportation. These unique problems warrant the special consideration the inclusion of Old Order Amish within the Plume Exposure EPZ would provide.

4. To the extent that the Licensee relies upon the decision of county officials in the Three Mile Island area to develop and maintain a 20-mile emergency response capability as a substitute for making a determination that the 10-mile circular EPZ is adequate, the adequacy of such a 20-mile capability must be established as a condition to the restart of TMI-1.

17(B) Licensee's Emergency Plan fails to adequately provide a mechanism which will assure the effectiveness of the Emergency Plan throughout the operational lifetime of the TMI-1 facility.

EP-18 (Sholly)

It is contended that the Licensee's environmental radiation monitoring program contains an insufficient number of monitoring sites and an inadequate distribution of monitoring sites within twenty miles of the Unit 1 site to provide sufficient protection of the public health and safety. It is further contended that there is in the Licensee's environmental radiation monitoring program an unwarranted reliance on the use of thermoluminescent dosimeters (TLD's) for providing information used to calculate radiation exposure data and that this unwarranted reliance on TLD's seriously underestimates radiation doses to the public. It is also contended that the Licensee does not possess adequate portable radiation monitors to provide additional information in the event of an offsite radiation release, and that the Licensee does not exercise adequate administrative control over the maintenance of these units, nor the training of personnel in their use. It is contended that the radiation monitoring program of the Licensee must be greatly upgraded prior to restart to ensure adequate protection of the public health and safety.

SUBJECT MATTER LIST OF ONSITE
EMERGENCY PLANNING CONTENTIONS

A. Organization and Coordination

1. Manpower

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2. Letters of Agreement

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3. Coordination with Other Plans

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1. Definition of EPZ's

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F. Maintaining Emergency Preparedness

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2. Exercises and Drills

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3. Audit and Review of Plans

EP-17(B)

A. Organization and Coordination

1. Manpower

4(D) The licensee's "Onsite Emergency Organization" (Sec. 4.5.1.3) contains insufficient personnel and expertise in the area of Health Physics to discharge adequately the responsibilities of dose assessment and projection in the event of a rapidly developing accident sequence. The time required for the mobilization of offsite health physics support (2-4 hrs. - See Table 8), which is given responsibility for "overall assessment of the impact of liquid and gaseous effluents with respect to . . . protective action guides" (p. 5-12), is inconsistent with adequate radiological assessment capability.

4(J) The licensee's Onsite Emergency Organization staffing provisions as set forth in Table 8 of its EP fail to conform to the standards of N. 0654 Sec. B5 in the following respects:

1. Under said standards two control room operators are assigned the function of "plant operations and assessment of operational aspects." Another shift employee is given the <u>exclusive</u> task of providing communications liaison with off-site officials. Under the licensee's staffing provisions, by contrast, the two control room operators are

assigned to "operate equipment in control room and act as communicator" (emphasis added). This divided responsibility compromises the licensee's ability to provide prompt off-site notification of emergency conditions. The inadequacy of these staffing provisions is aggravated by the absence of any provision for the addition of three more persons with communications responsibilities within 30 minutes, as required by the aforementioned acceptability standard.

2. A similar confusion of assignments exists with regard to the shift supervisor and shift foreman, who are expected to fill three roles between them.
3. Although N. 0654 requires the emergency operations facility director to assume his assignment within 30 minutes, under the licensee's plan this will not occur for as long as four hours.
4. Two radiological analysis support engineers, who are the only employees identified as having the training and primary responsibility for performing "dose projection calculations and source term calculations" (EP, p. 5-10) will not be available for as long as 60 minutes.

2. Letters of Agreement

4(B) The perfunctory form letters found in Appendix C to licensee's EP provide no indication, let alone assurance, of the existence of "mutually acceptable criteria" for implementation of emergency measures as required by Emergency Planning Review Guideline No. One, Revision One (EPRG) IV(A)(1). Also N. 0654 A3.

15(A) Section 4.5.2 provides that off-site authorities would provide certain services in the event of an emergency situation. The Plan does indicate that there are agreements between the various personnel, organizations and agencies listed in this section; however, the agreements of most local fire companies only indicate that certain manpower is available and certain pieces of equipment are available. Moreover, it appears as though somebody produced documents for the local fire companies to sign, which would indicate the amount of manpower and resources available to each one of the fire companies who signed such an agreement. The agreements with the fire companies do not state that they know exactly what will be expected of them in an emergency situation. Without a sound contractual understanding in place, it is questionable that during a crisis situation off-site authorities will know exactly what is expected of them.

Detailed understandings should be drawn between the local police, firefighting authorities and the State Police and other off-site authorities and agencies in order to ensure orderly support in the event of an emergency. The absence of such documentation and understanding between Metropolitan Edison Company and off-site authorities creates a deficiency in the Emergency Plan.

3. Coordination with Other Plans

15(C) Section 4.5.3.2 of the Emergency Plan indicates that with respect to the 10-mile EPZ, the five counties identified in this section have prepared emergency plans that are coordinated with the State Disaster Operations Plan and with the TMI Emergency Plan as well. It is Intervenor's contention that this obviously cannot be the case, since revision #2 of this Plan is dated June, 1980 and that the county plans still are not adopted as final drafts. Moreover, a review of the Dauphin County and York County Plans indicate there is absolutely no referencing to the TMI Emergency Plan and that, in fact, it appears as though the county plans were written independently of the TMI Emergency Plan. All plans must inter-coordinate in order to ensure that all parties participating in the emergency will know what is expected of them. There is no provision in the Emergency Plan for the distribution and updates of the TMI Emergency Plan and, based upon these deficiencies, the Emergency Plan as now written is inadequate.

15(E) Section 4.6.5.1(2) of the Emergency Plan provides that the responsibility for actions to protect persons in the off-site areas rests with the Commonwealth of Pennsylvania and that the Pennsylvania Emergency Management Agency shall be the agency with which the responsibility rests for the placing, in effect, of protective options such as evacuation, sheltering and thyroid prophylaxis. The same section indicates that in the event of a general emergency, precautionary measures may be taken such as sheltering, evacuation and evacuation of certain sectors based upon wind speed and direction. It is again Intervenor's contention that this particular section of the Emergency Plan providing for the precautionary measures cited have not been coordinated with local county plans to any measurable extent. For example, in the county plans, there is no indication of how the counties would instruct its local Civil Defense Directors to evacuate only certain sectors within a community instead of within radial distances of the Three Mile Island nuclear facility. This is again only but one example of a lack of coordination between the Emergency Plan and the various county plans and it is Intervenor's position that this lack of coordination is symptomatic of the entire Emergency Plan as it is now written. The Emergency Plan submitted by the licensee should encompass a total coordination of all Emergency Plans formulated by federal, state and county agencies. This lack of coordination creates a deficiency which has to be remedied.

B. Initial Accident Assessment

1. Classification

EP-8 (ECNP)

The various emergency categories (p. 4-2 to 4-8) each list a number of triggering events or conditions. Many of these are questionable indicators. For instance, on p. 4-3, "Valid" alarms are referred to. But there is no mention of the definition of a "valid" alarm, or what would be an invalid alarm. A number of reactor coolant activities (50, 130, and 300 ci/ml) are referred to, but no mention is made of how much full damage it takes to produce these readings. In addition, there is no indication of how or how rapidly these coolant activities will be determined.

EP-9 (ECNP)

Reliance on "adverse metecrology" (p. 4-5, 4-6), can prove to provide little or no "built-in conservation" (p. 4-7, 4-8) since, for instance, such conditions were not at all uncommon during the nighttime in the nights following the TMI-2 accident (for instance, the night of March 29, from 10 p.m. to 8 a.m., March 30; night of March 31, about 8:00 p.m. to 8 a.m., April 1).

2. Radiation Monitoring

3(C) The NRC's vague instruction to the licensee to "upgrade" in generally unidentified respects its "Offsite monitoring capability" is insufficient to assure that such upgrading will result in the ability to obtain and analyze the type and volume of information

essential for protection of the public health and safety. ANGRY contends that such capability must <u>at minimum</u> encompass the following elements of their equivalent;

(1) Permanent offsite monitoring devices which register all forms of ionizing radiation and which can be remotely read onsite.

(2) Information analysis capability equal to or greater than that provided by the Atmospheric Release Advisory Capability System (ARAC). This contention now challenges the adequacy of the licensee's MIDAS radiological assessment system (EP, p. 6-9) to the extent that the information analysis capability it provides does not equal or exceed that provided by the ARAC system.

4(I) The time provided in the EP for accident assessment, 1/2 hour (EP, p. 6-7), is in excess of the maximum permissible therefor specified in the Standard Review Plan, NUREG 75/087, Sec. 13.3(II)(3). (EP fig. 21 shows the thyroid PAG of 5 rems being reached in 12 minutes at 600 meters.) Moreover, the estimate given is unsupportable for monitoring of off-site locations on nearby islands or on the west shore of the Susquehanna River. Such factors may become critical in

the event of a general emergency, which produces a "shift in emphasis to greater offsite monitoring efforts" (EP, p. 6-6). (See Contention EP-3(C)(1)).

EP-18 (Sholly)

It is contended that the Licensee's environmental radiation monitoring program contains an insufficient number of monitoring sites and an inadequate distribution of monitoring sites within twenty miles of the Unit 1 site to provide sufficient protection of the public health and safety. It is further contended that there is in the Licensee's environmental radiation monitoring program an unwarranted reliance on the use of thermoluminescent dosimeters (TLD's) for providing information used to calculate radiation exposure data and that this unwarranted reliance on TLD's seriously underestimates radiation doses to the public. It is also contended that the Licensee does not possess adequate portable radiation monitors to provide additional information in the event of an offsite radiation release, and that the Licensee does not exercise adequate administrative control over the maintenance of these units, nor the training of personnel in their use. It is contended that the radiation monitoring program of the Licensee must be greatly upgraded prior to restart to ensure adequate protection of the public health and safety.

C. Initial Accident Notification

1. Communications

EP-1 (Aamodt)

It is contended that licensee has not made provision for timely dissemination of information in the event of accidental release of airborne radioactive gases or particulates. It is contended that licensee must make information available to the public which will allow appropriate action to be taken to protect persons, livestock, foodstuff and feed in the event of a discharge of significant proportions. All data and plant operating personnel observations relative to all radioactive releases must be transmitted immediately and simultaneously to the NRC, Pennsylvania Department of Environmental Resources, the commissioners of Dauphin, York and Lancaster Counties and the licensee's management. It is further contended that licensee must provide this capability before restart of TMI-1.

4(E) The licensee's EP fails to provide for furnishing to the Pennsylvania Bureau of Radiation Protection (BCRP) information called for in the latter's plan such as "nature of the failure, the status of safeguards, the condition of consequence mitigating features" (p. VI-1).

4(G) The licensee's emergency notification procedures (pp. 6-2, 6-3, 6-4; Figure 15) (See also Pa. DOP Appendix 3) are inadequate with respect to certain areas directly at risk in the event of a nuclear accident, namely, York and Lancaster Counties. Although the Dauphin County Emergency Operations Center receives immediate notification of an emergency declaration, notification of York and Lancaster Counties must follow an excessively circuitous path:

1. Licensee to Dauphin
2. Licensee to PEMA
3. PEMA to BORP
4. BORP to Licensee
5. Licensee to BORP
6. BORP to PEMA
7. PEMA to Dauphin
8. PEMA to York, Lancaster, and Cumberland Counties.

Such a notification sequence is in direct conflict with requirements that "delegations of authority that will permit emergency actions (such as evacuation) to be taken with a minimum of delay should be carefully considered" (NUREG 75/111, § A3) and that "Upon declaration of a 'general emergency' <u>immediate</u> notification shall be made <u>directly</u> to the offsite authorities responsible for implementing protective measures . . ." (EPRG II(A)(5)) (Emphasis in original). Also, N. 0654 J7.

15(B) Section 4.5.1.3(1)(c)(d) states that the Emergency Director shall provide liaison communication with county, state and federal governments to ensure that notification and reports to these agencies are made in a timely manner and that he will communicate with off-site emergency support organizations. It is Intervenor's contention that this part of the Plan which is critical to the coordination of all emergency activities does not state with specificity the exact timeframe in which notification and communication is to be made with off-site emergency support organizations and agencies. It is Intervenor's position that this is critical in order to ensure that licensee reports and communicates any abnormal and emergency condition to the respective organizations in a truly timely fashion. The Emergency Plan as now drafted leaves too much discretion with the Emergency Director with regard to the contacting of these off-site agencies.

2. Alerting the Public

15(F) Section 4.6.7.1 of the Emergency Plan deals with early warnings and information for transient areas. It is Intervenor's position that the methods depended upon in the Emergency Plan to warn the population at risk, are, at the present time, not in place. For example, section 2 of this particular section of the Emergency Plan states that a siren alert system could be activated by

counties in order to warn the populace of impending danger. As has been indicated earlier in Intervenor's contention with regard to Emergency Planning, there are not enough Civil Defense warning sirens in order to adequately ensure that all members of the community are within hearing distance of the siren. Moreover, section 5 of this subsection of the Emergency Plan indicates that vehicles with loudspeakers could be dispatched to broadcast warning messages. The problem with this approach is that it would take time to get volunteers to man the vehicles and, secondly, there are many miles of road which would have to be traveled in order to ensure that all members of the populace were informed of the impending emergency condition. It is Intervenor's contention that until the Emergency Plan specifically states that a siren alert system is in place and that the warning emitted by the siren alerts could be heard at any point in the county surrounding the plant site, the Emergency Plan as now drafted is unacceptable.

D. Onsite Emergency Response

E. Offsite Emergency Response

1. Definition of EPZ's

EP-17(A) Licensee's acceptance, without formal analysis or evaluation, of a circular 10-mile radius for the Plume Exposure Emergency Planning Zone (as designated by the Pennsylvania Emergency Management Agency) does not discharge Licensee's responsibility to ensure that adequate emergency response plans exist to protect the public health and safety in the event of an emergency at TMI-1. Further, acceptance of or designation of a circular 10-mile radius Plume Exposure EPZ for TMI-1 is unjustified because such an EPZ fails to adequately consider local emergency response needs and capabilities as they are affected by demography and jurisdictional boundaries. These considerations, among others, are specified in NUREG-0396, NUREG-0654, and the new emergency planning rule published in the Federal Register on August 19, 1980. The following specific local conditions should be reflected in the Plume Exposure EPZ for TMI-1:

1. The proposed 10-mile radius circular EPZ includes within the EPZ portions of numerous jurisdictions at the township, city, borough, and town levels of government. Calling for an evacuation of only a portion of any political jurisdiction due to a

hazard which affects a large geographic area and basing emergency plans and response capabilities on such a limited evacuation will lead to problems due to spontaneous evacuation of a much larger area, with a concommitant increase in traffic and supply requirements at shelters. Therefore, the Plume Exposure EPZ for TMI-1 should include the entire geographic extent of all governmental jurisdictions at the township, city, borough, and town level which are bisected by the proposed circular 10-mile EPZ.

2. There are heavily populated areas in and near the cities of Harrisburg and York represented by the city proper and adjacent continuation of the urban areas into the suburbs. In the event that the wind is blowing toward either of these areas when a large release of radioactivity occurs, such areas would constitute a large percentage of the total population dose (in the case of the TMI-2 accident, for instance, Harrisburg contributed 25% of the tota population dose despite the fact that most of the ci is more than 10 miles distant from the plant). The urbanized areas in and around Harrisburg and York ar concentrations of population for which preplanning for an evacuation is a necessity for successful implementation (for instance, preplanning would have

to include evacuation routes, transportation needs, host area requirements, and problems posed by specia populations such as prisons). Therefore, the urban-ized areas around and including the cities of Harris burg and York should be included within the Plume Exposure EPZ for TMI-1.

3. Numerous members of the Old Order Amish community reside in relatively close proximity (within 10 miles) of the outer boundary of the Licensee's Plume Exposure EPZ in Lancaster County. Because the Old Order Amish eschew the use of electricity, telephones, and automobiles, they present unique problems with respect to warning, communication of protective action advisories, and transportation. These unique problems warrant the special considera-tion the inclusion of Old Order Amish within the Plume Exposure EPZ would provide.

4. To the extent that the Licensee relies upon the decision of county officials in the Three Mile Island area to develop and maintain a 20-mile emergency response capability as a substitute for making a determination that the 10-mile circular EPZ is adequate, the adequacy of such a 20-mile capability must be established as a condition to the restart of TMI-1.

2. Education Program

4(C) The adoption of the Commonwealth of Pennsylvania Disaster Operations Plan Annex E (DOP) designation of "the 'risk county' as responsible for the preparation and dissemination of information material on protective actions to the general public" (p. 6-8) conflicts with the requirements in EPRG II(A)(7) and RG 1.101 § 6.4(2) to

> make available on request to occupants in the LPZ information concerning how the emergency plans provide for notification to them and how they can expect to be advised what to do.

Also, N. 0654 G4.

3. Protective Action Options and Decisionmaking

4(E) RG 1.101 Sec. 6.4 requires the licensee to specify "criteria for implementing protective actions. . ." The licensee's EP fails to set forth the following mandatory items of information regarding the time required for protective action implementation:

1. Expected accident assessment time. RG 1.71, Sec. 13.3.1-2.
2. Time required to warn persons at risk. RG 1.101, Sec. 6.4.2-2(b); RG 1.70, Sec. 13.3.1-3,4.
3. Time required for a general evacuation. RG 1.70, Sec. 13.3.1-5,6; November 29, 1979 letter to "All

Power Reactor Licensees" from Brian K. Grimes, Director, NRC Emergency Preparedness Task Group.

4. Time required to evacuate special facilities (e.g., hospitals). November 29, 1979 letter, supra.

See, N. 0654 J8.

EP-7 (ZCHP)

The fractions of EPA PAGs listed on p. 4-1 of the Plan, with their associated action levels, do not take into account the total accumulated dose and dose commitment. As a result, the total exposures may exceed by large margins the listed PAG fractions prior to the advancement to a higher emergency category.

F. Maintaining Emergency Preparedness

1. Emergency Training

2. Exercises and Drills

4(F) The provisions for the conducting of a "Radiation Emergency Exercise" of the licensee (EP, p. 8-8) and of the Commonwealth (Pa. DOP, App. 14) are inadequate in that they do not clearly provide for the participation therein of federal agencies. The necessity for such participation is clearly established by the extensive involvement of federal agencies in the TMI accident. Second, the aforementioned appendix to the Commonwealth's emergency plan indicates that "all major elements of the plans and preparedness organizations" may be tested only over a period of five years. All such elements should be tested in an exercise prior to the restart of TMI-1.

15(D) Section 4.5.4 of the Emergency Plan anticipates that the Pennsylvania Emergency Management Agency will conduct and participate in annual training exercises that involve state, county and local government agencies and that the testing of communications, radiological monitoring instrumentation and warning systems will be conducted. It is Intervenor's contention that at the present time, such communications, radiological monitoring instrumentation and warning systems are either not in place within the surrounding communities or are not being maintained by operators within surrounding local communities. The Plan does not indicate who is responsible for the purchasing of communication, radiological monitoring instrumentation and warning systems and, furthermore, who is responsible for the maintaining of this equipment. The Commonwealth of Pennsylvania did begin a radiological monitoring effort; however, since local monitoring readers were instructed as to how to read the monitors, the Commonwealth of Pennsylvania has not been soliciting their readings and/or following up to determine whether the readings are being made by the readers. Is this burden to be shouldered by the local community, the county, the state government or the licensee? It is Intervenor's contention that while emergency plans may, in theory, set forth a plan of training, it cannot realistically

be put in action because the Plan assumes placement of communications systems, radiological monitoring instruments and warning systems. It is Intervenor's position that until such systems are in place, it is determined who is responsible for the equipment's maintenance and who is to burden the cost of the placement and maintenance of such systems, the Plan is inadequate and unacceptable.

3. Audit and Review of Plans

17(B) Licensee's Emergency Plan fails to adequately provide a mechanism which will assure the effectiveness of the Emergency Plan throughout the operational lifetime of the TMI-1 facility.

MR. ZAHLER: Mr. Chairman, at this time I would like to mark for identification as Licensee's Exhibit Number 30 the GPU Nuclear Corporation emergency plan for Three Mile Island Nuclear Station Unit 1, Revision 3, dated January 1981. Exhibit Number 30 is a multipage document consisting of ten sections, a set of tables and figures, and Appendices A through C.

Let me note for the record that Appendices D through I, which are the state and five county plans, be introduced during the off-site emergency planning phase by the Commonwealth's attorney.

This revision of Licensee's emergency plan was distributed to the Board and the parties on January 15, 1981. There are a few changes to the plan since it was initially distributed, and I am providing corrected copies of those pages to the Board and parties. These changes are on Figure 10 and Table 8.

I would request that Licensee's Exhibit Number 30 be received into evidence.

MR. GRAY: Mr. Zahler, could you briefly indicate what the changes are to Table 8 and Figure 10 relative to the previous Revision 3?

MR. ZAHLER: Yes, sir. With respect to Table 8, on page 1 of 11 under "Technical Support Center Engineers," there was a blank. The number was left out in typing. The

number "3" now appears.

On page 2 of 11, the operation shift initially listed under "SRO: 2" -- excuse me -- "3," it now lists two. And under "Auxiliary Operator," it initially listed four, and it now lists five.

In addition, on page 3 of 11, under "Radiological Controls Technicians," the initial version listed six without any indication of the on-shift complement. It now lists three with a plus sign in the margin, indicating that they are on shift, and three additional which would be available in 60 minutes.

Finally, on page 5 of 11, the single asterisk has been deleted, in addition to the places where the single asterisk appears had been deleted from the table. That asterisk related to qualifications and licensing aspects. That is covered in other correspondence between the Licensee and the NRC.

Similarly, on Figure 10, there were in the various blocks indications with respect to licensing consistent with the previous changes. That is deleted. These matters are covered in additional Licensee correspondence between the Licensee and the staff. And the notes that appeared at the foot of Figure 10 have likewise been deleted.

MR. GRAY: Thank you.

CHAIRMAN SMITH: Are there any objections?

(No response.)

CHAIRMAN SMITH: Licensee's Exhibit 30 is received.

(The document referred to was marked Licensee's Exhibit No. 30 for identification and received in evidence.)

MR. ZAHLER: Mr. Smith, there is a short amount of supplemental rebuttal testimony that I would like theese witnesses to address. This testimony is in three areas:

First, responses to the open items identified in Mr. Chestnut's prefiled testimony of the Nuclear Regulatory Commission staff;

Secondly, responses to the recommendations included in the I&E reports on the investigation into information flow during the accident at Three Mile Island, NUREG-0760, marked as Staff Exhibit Number 5 in this proceeding;

And finally, information relating to the environmental qualifications of equipment used to declare and classify an accident, which was inquired into in an earlier phase of this proceeding.

I propose to do that examination at this time.

DIRECT EXAMINATION--Resumed

BY MR. ZAHLER

Q Mr. Giangi, on pages 83 and 84 of the prefiled testimony, Mr. Chestnut identified eight open items. I would like to go through each of those items with you.

The first relates to the early warning and notification system.

CHAIRMAN SMITH: Wait a minute. Let's break until 25 after, to get our papers in order.

(Brief recess.)

CHAIRMAN SMITH: Mr. Zahler.

BY MR. ZAHLER: (Resuming)

Q Mr. Giangi, the first item on Mr. Chestnut's list relates to the early warning and notification system. Would you describe the current status of Licensee's efforts in this area?

A (WITNESS GIANGI) With regard to the early warning system, a siren engineering study has been completed. The siren sites have been established and surveyed, and the map showing the siren sites has been -- has been established and, in fact, discussed with the NRC staff recently.

The contract has been awarded to a siren manufacturer. The shipment and installation schedule is available. It has been coordinated with the various state and county agencies, and a report describing the design objectives and the methodology used in establishing the siren sites and the map and its consistency with Appendix 3

to NUREG-0654 will be submitted to the staff by mid-April of this year.

Looking again, consistent with Appendix B, the topography and population density was also used.

Q Will this system, as designed by Licensee, provide full coverage within the entire plume exposure pathway EPZ, around Three Mile Island?

A (WITNESS GIANGI) Yes, it will.

Q What is the current date when Licensee believes this system will be operational?

A (WITNESS GIANGI) It will be operational July 1, 1981, consistent with the rule.

Q The second item on Mr. Chestnut's list concerns the public education and information program. Has Licensee provided copies of such public information to the staff for its review?

A (WITNESS GIANGI) Yes, they have brochures for each of the five risk counties with the plume exposure pathway EPZ. It has been submitted to the staff.

Q What is Licensee doing to ensure that such information is distributed to the permanent and transient population?

A (WITNESS GIANGI) Licensee will submit a schedule outlining the distribution and the methods used in the distribution of these brochures to the public within the

plume exposure pathway EPZ. This will be consistent with NUREG-0654, and it will be submitted to the staff by mid-March.

Q Will the emergency plan be modified to reflect Licensee's activities in this area?

A (WITNESS GIANGI) Appendix B to the emergency plan, which is the Emergency Public Information Plan, will be modified to reflect what I have just mentioned and ongoing efforts performed by Three Mile Island in the way of public information and education.

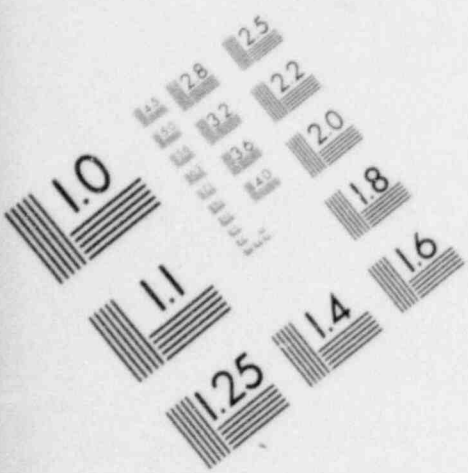
Q The third item on Mr. Chestnut's list is an evacuation time study. What is the status of Licensee's efforts in this area?

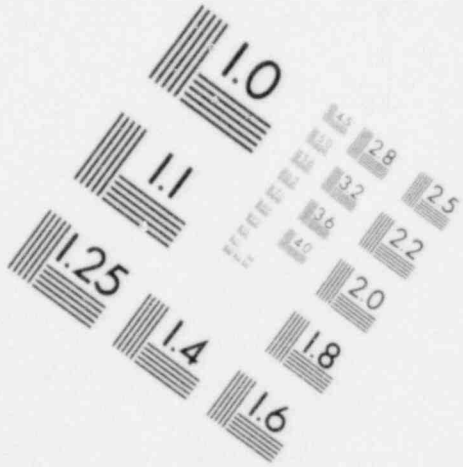
A (WITNESS GIANGI) Three Mile Island has awarded the contract to Parsons, Brinkerhoff to perform an evactuation time study of the entire plume exposure pathway EPZ surrounding Three Mile Island. This study will be in accordance with Appendix 4 to NUREG-0654, and the report would be available by mid-March.

Q That is a change from the previous testimony that was prefiled that indicated that the report would be available in mid-February.

A (WITNESS GIANGI) That is correct.

Q The fourth item on the list is to station a senior manager as the emergency operations facility director within





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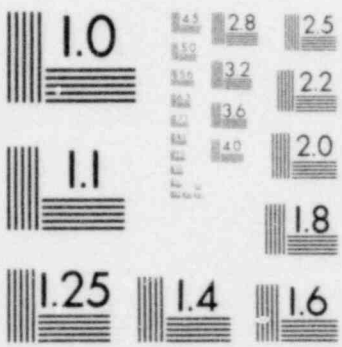

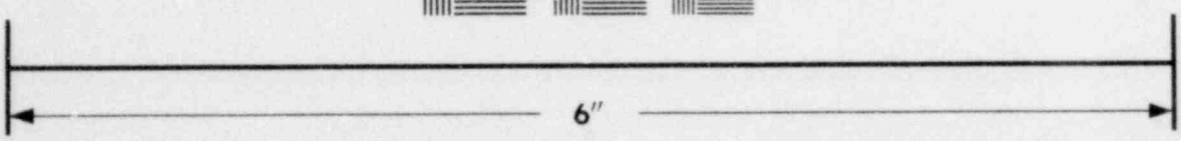

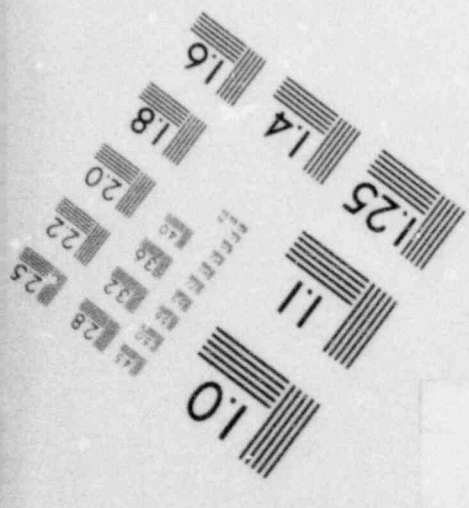

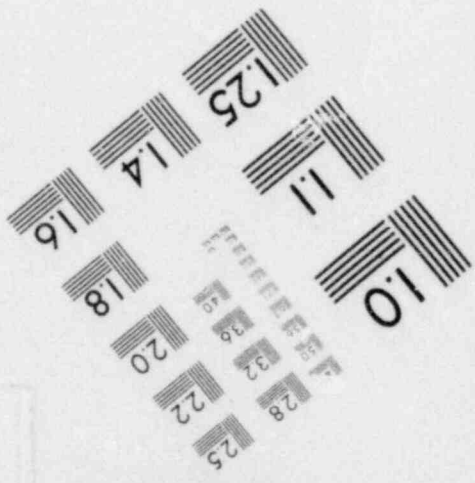

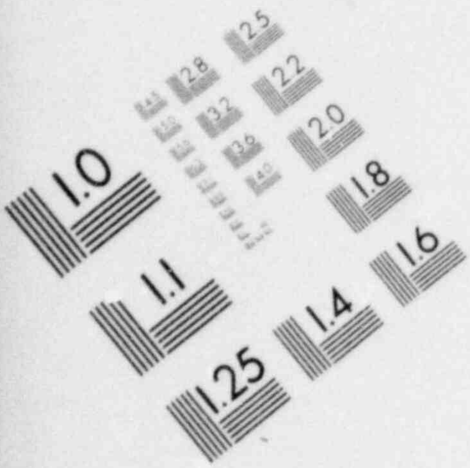

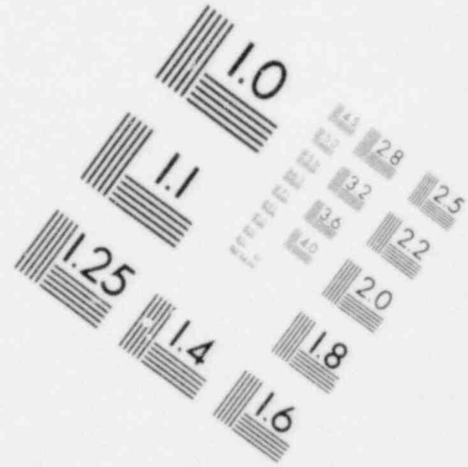

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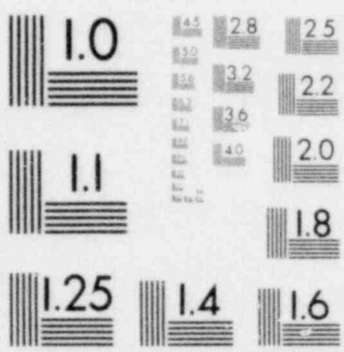

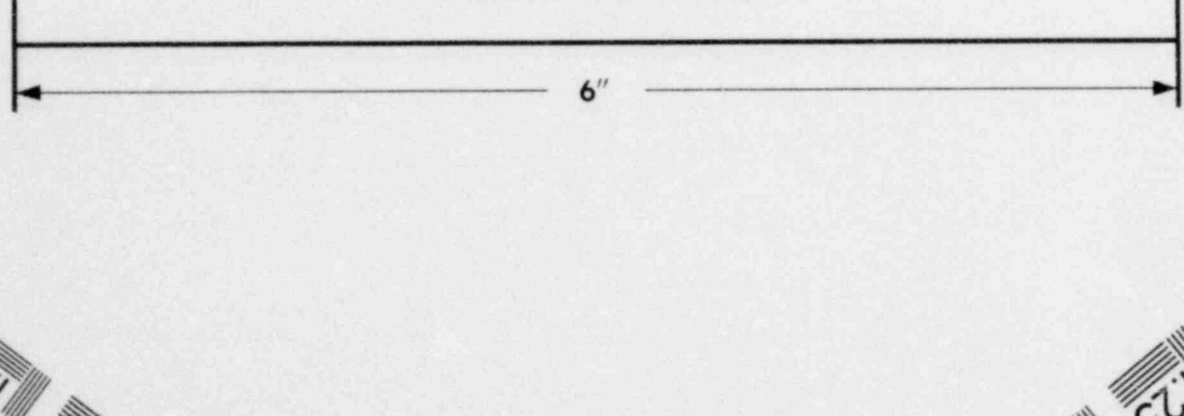

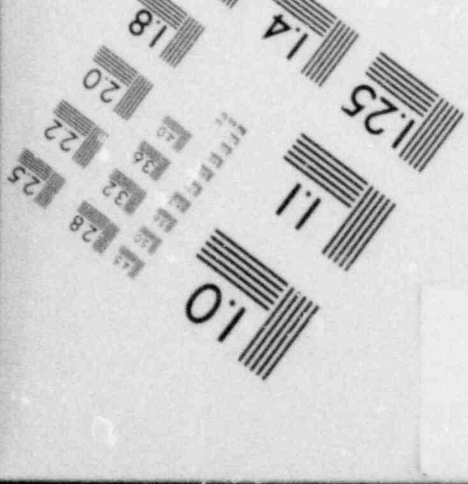

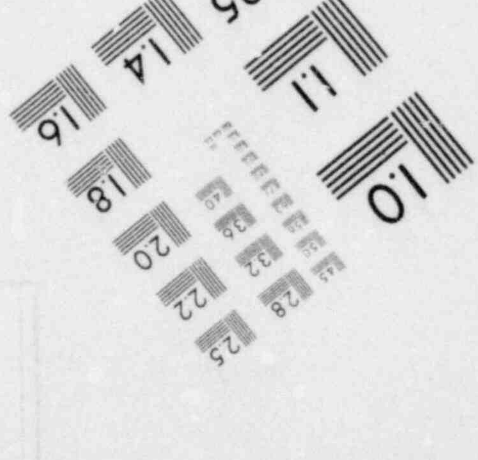

one hour of the decision to activate the EOF. What is Licensee's position on this requirement?

A (WITNESS GIANGI) Three Mile Island believes that they satisfy this requirement in other ways. Table B-1 to NUREG-0654 recommends that the EOF director report within one hour for the following functions: radiological accident assessment and operational accident assessment.

As far as the radiological accident assessment, on shift at all times a radiological controls foreman immediately has been trained to report to the dose assessment area in the control room to perform dose projections, dispatch off-site and on-site radiation monitoring teams, and to give protective action recommendations to the emergency director.

Within one hour this is supplemented with a senior radiological engineer who then becomes the RAP, or the radiological assessment coordinator; as well as two additional radiological engineers, and they will take on the functions of radiological analysis support engineers that will assist him in dose projections, rad waste calculations, and so on.

In the area of operational accident assessment, the operations staff on shift at all times, the shift supervisor has been trained to become the emergency director upon recognition of an emergency and declaration of an

emergency. His operations staff continue to look at the primary-secondary plant. Within one hour, that is supplemented by a designated individual known as the operations coordinator, who is an SRO license, as well as technical support center coordinator, and engineers.

Lastly, with regards to a senior manager capable of performing protective actions, recommendations, and other decisionmaking processes, the shift supervisor, as I mentioned, becomes the emergency director and unilaterally has that capability. Within one hour, either the vice president of TMI-1 or the director of operations and maintenance will report as the emergency director. And, again, they will be capable of decisionmaking processes as well as protective action recommendations given to the state, if necessary.

Q Mr. Giangi, in your view, is the vice president of TMI-1 or the operations and maintenance director, TMI-1, the senior manager called for in Table B-1 of NUREG-0654?

A (WITNESS GIANGI) Yes, sir.

Q On the basis of this testimony that you have just given, is it your view that Licensee's emergency plan provides an alternative means for carrying out the functions of the EOF director during the early hours of an emergency that is at least equally as good as stationing a senior manager at the emergency operations facility?

A (WITNESS GIANGI) Yes, sir.

CHAIRMAN SMITH: It would be helpful to me if, in addition to explaining why he believes that the plan is equally as good or functionally equivalent or in compliance, but if he would explain where it differs.

BY MR. ZAHLER: (Resuming)

Q Mr. Giangi, would you answer the Chairman's question?

A (WITNESS GIANGI) Mr. Smith, it differs in the sense that the EOF director, who by our emergency plan would be known as the emergency support director, would not report to activate the EOF within the one hour for those functions mentioned in Table B-1. However, based on what I previously mentioned, we believe we fulfill these requirements in those -- in those areas that he was tasked with.

CHAIRMAN SMITH: You have your EOF director reporting in four hours.

WITNESS GIANGI: It has been revised in Revision 3 to six hours.

BY MR. ZAHLER: (Resuming)

Q Mr. Giangi, the Board members are generally familiar with some of the staff at Three Mile Island. I think they might get a better appreciation of the distinction that you are drawing if you identify, for example, for them by actual name the current primary

emergency director who would be available within one hour.

A (WITNESS GIANGI) The emergency director available within one hour would be Mr. Hank Hukill, vice president, TMI-1; Mr. Ron Toole, director of operations and maintenance; and Mr. Bill Potts. The emergency support directors would be individuals such as Mr. Robert Arnold, Mr. Philip Clark, and the vice presidents Mr. Jack Herbein or Mr. Hovey would be called in.

Q The fifth item on Mr. Chestnut's list deals with modifying the emergency action levels to assure consistency with the guidance in NUREG-0654, Appendix 1. With respect to unusual event, are Licensee's emergency action levels more conservative than those specified in NUREG-0654?

A (WITNESS GIANGI) No, sir, they are not.

Q Does the staff contend that they are?

A (WITNESS GIANGI) No, sir, they do not.

Q With respect to the alert classification, are Licensee's emergency action levels more conservative than those specified in NUREG-0654?

A (WITNESS GIANGI) No, sir, they are not.

Q Does the Licensee -- strike that.

Does the NRC staff contend that they are?

A (WITNESS GIANGI) No, they do not.

Q With respect to the site emergency, are Licensee's emergency action levels more conservative than those

specified in NUREG-0654?

A (WITNESS GIANGI) No, they are not.

Q Does the staff believe that they are?

A (WITNESS GIANGI) Yes, they do.

Q Could you explain that apparent inconsistency?

A (WITNESS GIANGI) I believe the apparent inconsistency may, in fact, lie in an error in the NRC-filed testimony, in that the site emergency Appendix 1 calls for 50 millirem per hour for one-half hour duration. The NRC testimony left the "per hour" out, and it just read "50 millirem for one-half hour."

Looking at it at 50 millirem per hour for one-half hour, integrated out, would come out with a total dose of 25 millirem. The Licensee's testimony uses 50 millirem per hour for one hour. So for one-half hour's time the 25 millirem would be consistent with Appendix 1 of 25 millirem.

Q With respect to the emergency action level relating to reactor coolant system activity level, are Licensee's emergency action levels more conservative than those specified in NUREG-0654?

A (WITNESS GIANGI) Yes, sir, they are.

Q What does Licensee intend to do in this area?

A (WITNESS GIANGI) In order to make all emergency classifications uniform from the viewpoint of the NRC, we

will modify our emergency action levels consistent with Appendix 1, as far as reactor coolant system activity, the example you just cited.

Q With respect to the general emergency, are Licensee's emergency action levels more conservative than those specified in NUREG-0654?

A (WITNESS GIANGI) Yes, they are.

Q And what does Licensee intend to do in this area?

A (WITNESS GIANGI) Licensee will reevaluate the general emergency -- emergency action level -- specifically, the projected dose rates used -- to be consistent with Appendix 1.

However, I would like to point out that Appendix 1 uses the projected dose rates as an emergency action level measures at the site boundary. We used the exclusion area, which is a defined radii. To that extent, we will modify the emergency action levels in the dose projection area at our exclusion area to make it consistent with the emergency action level of the NRC at the site boundary.

CHAIRMAN SMITH: How long is it going to be before we understand why the NRC objects to more conservative actions and why the Licensee moves in the direction -- moves away from conservatism to comply?

MR. ZAHLER: My next question was going to inquire into that area. Before I prejudge the witness' statement,

let's get his testimony. Then, if you have some questions, we can come back to that.

BY MR. ZAHLER: (Resuming)

Q Will these changes adversely affect the emergency preparedness at Three Mile Island?

A (WITNESS GIANGI) No, sir, they will not.

Q Could you explain why that is so?

A (WITNESS GIANGI) The emergency action levels are merely trigger points to implement the plan. They will have no bearing on protective action recommendations consistent with the State of Pennsylvania and Licensees as far as recommendations are concerned.

Q Do you understand why it is that the NRC staff has requested the Licensee to modify its emergency action levels to make them more consistent with NUREG-0654?

A (WITNESS GIANGI) I believe I do.

Q Could you tell me your understanding of that?

A (WITNESS GIANGI) My understanding is that the NRC would like to have a feel for the magnitude of severity, degradation of the core, if you will, or level of safety of the plant. When one Licensee reports he has a site emergency, they should be able to reference that to that which is identified in Appendix 1. And I can understand if one Licensee is more conservative than the other, that may have potential problems in that area. For that reason, we

are modifying them to be consistent with Appendix 1.

Q But nonetheless, it is your testimony that this change will not affect the ability of Three Mile Island to make protective action recommendations at the levels they deem prudent and appropriate?

A (WITNESS GIANGI) That is correct.

Q In essence, the trigger levels and the protective action recommendations are separate matters?

A (WITNESS GIANGI) Yes, sir, they are.

CHAIRMAN SMITH: Who is Mr. Potts?

WITNESS GIANGI: Mr. Potts is the radiological controls manager for Unit 1 with considerable operations experience.

CHAIRMAN SMITH: He testified. We forgot his job.

BY MR. ZAHLER: (Resuming)

Q The sixth item on Mr. Chestnut's list relates to assumptio s for containment leak rate used in dose projections. What are the assumptions now used by Licensee?

A (WITNESS GIANGI) The present assumption used in the containment leak rate issue is 0.2 percent per day at 55 pounds pressure in the containment. That happens to be twice the tech spec limit.

Q What does Licensee propose to do with respect to

the assumption for containment leak rate used in dose rate projections?

A (WITNESS GIANGI) In evaluating the containment leak rate that was actually measured at 55 pounds, that was approximately .05 percent per day, or roughly a factor of 4 less than what we use. The Licensee will consider using the actual measured containment leak rate that will be performed prior to restart in the integrated leak rate test and consider using a more realistic leak rate, if you will, into the emergency action levels.

Q Mr. Giangi, are there potential problems associated from using an overly conservative leak rate in the dose projections?

A (WITNESS GIANGI) Yes, sir. Being too conservative can be counterproductive in the sense that protective action recommendations may be based on twice the tech spec limit where, in fact, actual measured would be a factor of 4 or less.

Q The seventh item is to establish provisions for stockpiling thyroid-blocking drugs for on-site workers. What has Licensee done in this area?

A (WITNESS GIANGI) In the area of thyroid blocking, Licensee has made provisions for stockpiling of potassium iodide. We have dealt with Radiation Management Corporation to give us procedural guidelines on its distribution and

will prepare a procedure to distribute potassium iodide in the event of an emergency.

CHAIRMAN SMITH: Would you complete the sentence or complete the thought: distribute to whom?

WITNESS GIANGI: I am sorry. Distribute it to on-site emergency workers.

BY MR. ZAHLER: (Resuming)

Q The last item on Mr. Chestnut's list is to include an analysis of reactor coolant samples with actual elevated activity levels during the annual radiological control drills. Mr Giangi, have you conducted sample analysis drills in the past?

A (WITNESS GIANGI) Yes, sir, I have.

Q Where was that?

A (WITNESS GIANGI) Knolls Atomic Power Laboratory, the Naval nuclear power program, employed with General Electric.

Q Were actual elevated samples used in such drills?

A (WITNESS GIANGI) No, sir, they were not.

Q And why is that?

A (WITNESS GIANGI) It was our opinion that there were no real training benefits to be derived using actual elevated samples. However, it was simulated to the point that it was equally as effective.

Q Could you describe in more detail how you would

simulate this effect in carrying out a drill?

A (WITNESS GIANGI) A number of ways. For one, it would be very difficult to sample elevated samples in the system through the normal sample drawings. So what you could do is to, upon sampling the RCS as you normally would, give them dosimetry that had been, for example, spiked by a source to indicate what he may have got, and had it been post-accident samples when he was actually counting it in either jelly or running chemistry analyses, to actually give him either sources to count, which would indicate post-accident conditions so that he would evaluate the printout in that way.

And, of course, he was graded as though he was using elevated samples from a radiological controls standpoint and from a chemicals standpoint.

Q In such drills, might he use available long-handled tools or shielding as with the chemistry of an actual elevated sample?

A (WITNESS GIANGI) Yes, sir, he would use long-handled tools, shields; he may use different geometries for jellies, as well as glass shielding or portable lead shielding and transport systems in transporting from the sample site, if you will, to the area of analysis.

Q In your view, is there any legitimate training or education purpose that would be served by using actual

elevated samples?

A (WITNESS GIANGI) In my view, there is not. You may increase the potential for contamination or exposure. And the training benefits, as I mentioned, I do not believe they do exist.

Q Given that view, do you believe that conducting drills with actual elevated samples would be consistent with the ALARA principle?

A (WITNESS GIANGI) Could you repeat the question?

Q Given your view that there are minimal or no training benefits and that there is a potential for contamination or for receiving a dose, do you believe that conducting drills with actual elevated samples would be consistent with the ALARA principle?

A (WITNESS GIANGI) No, it would not.

DR. JORDAN: Could I ask one question? You mentioned that one of the problems with using actual samples was the difficulty in obtaining a sample. Now, that concerns me, because if that is the case, isn't it also difficult to get that sample then in the case of an accident?

WITNESS GIANGI: Let me clarify that. What I was referring to was in my estimate the way to obtain an actual elevated sample would be to get a certain volume of reactor coolant system sample as it presently existed in the RCS

system and evaporate it down or boil it down to a certain concentration. To that extent, they would always have the capability of sampling reactor coolant system as it was in the core, as it was in the reactor coolant system.

However, to simulate the actual procurement process of the RCS sample, it would not be possible for them to be sampling the actual elevated. But once obtained, the normal reactor coolant system sample, they would switch for that actual elevated sample.

DR. JORDAN: So that in case of an accident, there would not be any necessity to boil down and, therefore, it would be very -- you could still get the sample itself quickly; is that correct?

WITNESS GIANGI: That is correct, sir.

DR. JORDAN: You will probably explain later. I believe you also have means for measuring gamma rays outside of the pipes to get an estimate of the activity also?

WITNESS GIANGI: Yes, sir, that is correct.

DR. JORDAN: All right.

MR. GRAY: Dr. Jordan, by way of clarification, maybe I could ask a question here that might help.

Mr. Giangi, during a drill isn't it true that you will not have, necessarily, elevated activity levels in the reactor coolant system?

WITNESS GIANGI: That is correct.

MR. GRAY: And that is why during a drill you cannot -- you will have difficulty in obtaining actual elevated reactivity levels, simply because they are not there?

WITNESS GIANGI: That is correct.

MR. GRAY: Okay.

BY MR. ZAHLER: (Resuming)

Q Mr. Giangi, at this point I would like to turn to the I&E report, which is marked as Staff Exhibit Number 5 in this proceeding. One of the recommendations in that report is that there be an assignment of specific responsibilities to ensure that all pertinent information is accumulated, recorded, and displayed. What has Licensee done to ensure this?

A (WITNESS GIANGI) Licensee has designated specific individuals in the areas of communications; for example, a designated individual for the communicator, two designated individuals as his communications assistants.

There have been status boards put up in the emergency response facilities both on site and off site, emergency information attachments and checklists coordinated, again, with the off-site agencies, have been incorporated into the procedures. The operators have been trained to transmit that information at the very minimum to the off-site agencies.

Formal logs and communications recordkeeping have been developed, and the operators have been trained on their use.

As I mentioned, the CRT system which accesses the in-plant computer, the NODCOM computer, also helps in this information transmission, as well as an innumerable number of dedicated phone lines and backup communications systems that have been installed as part of the emergency communications network.

Q Two of the other recommendations suggest that there be an assignment of responsibilities to ensure that the information accumulated is disseminated to others both on site and off site. In that regard, would you describe further the communications systems that you just referred to?

A (WITNESS GIANGI) Yes, sir. I would like to do this by splitting up the areas, because I think it might -- it might be helpful in the areas of radiological information and operational information.

In the areas of radiological information where the dedicated radiological line which drop into the Department of Environmental Resources, two drop points in the Bureau of Radiation Protection of the Department of Environmental Resources, we have various drops into the plant on site.

We have the environmental assessment line which

allows for communication of environmental and radiological types of information to be transmitted between the environmental assessment command center at the Harrisburg International Airport, the ECF, as well as the dose assessment area of the control room.

As far as radiological information to the NRC, there is another dedicated line, which is now called the "health/physics network line," and the purpose of which is to transmit radiological information to the NRC Bethesda office and the Region I office.

The operational end of it, we have an operational line which connects various operations personnel at the TMI site. There is a Parsippany-TMI line which connects the technical functions group up in Parsippany, New Jersey, with the TMI site; namely, the technical support engineers and the ECF.

There is a Parsippany B&W line which connects the technical function engineering group to Babcock & Wilcox, the nuclear steam supplier, as well as to the NRC from an operational standpoint. We have a dedicated line called the emergency notification system which all the Licensees use immediately reporting an incident and for transmission of information to the NRC. Again, that goes to the Bethesda office, and they have the capability of patching into the Region I office in our case. There is --

CHAIRMAN SMITH: Excuse me. Just for clarification, this testimony is, in large part, already in the written testimony.

MR. ZAHLER: Mr. Smith, that is correct. The written testimony is comprehensive. The purpose of this was to pull the various threads together in different place so there was one place that it was clear what Licensee's response was.

CHAIRMAN SMITH: All right. All right.

BY MR. ZAHLER: (Resuming)

Q Mr. Giangi, another recommendation is that the present system of verbal telephonic information flow be augmented by a real-time data link. What is being done in this area?

A (WITNESS GIANGI) I believe you are referring to the Nuclear Data Link. It will be, as I understand, a future requirement by the NRC. I have not really seen complete tie lines on it or the extent of the Nuclear Data Link. When that requirement does come out and the guidance is set forth, I believe TMI will comply with that.

MR. ZAHLER: Mr. Smith, at this point I am going to move to the third area, which had to do with environmental qualifications of equipment used during emergency planning. At the close of the initial phase of hearings on design issues, Licensee indicated that it would

provide further information relating to the environmental qualifications of equipment used to declare and classify an emergency.

The purpose of the following testimony is to show that for emergency planning purposes it is not necessary to environmentally qualify any equipment beyond present ongoing programs.

BY MR. ZAHLER: (Resuming)

Q Mr. Giangi, are there emergency action levels that would be triggered if certain instrumentation failed to operate for some reason?

A (WITNESS GIANGI) Yes, sir, there are.

Q Could you give me some examples?

A (WITNESS GIANGI) Yes, I can.

MR. SHOLLY: Excuse me, Mr. Chairman. I wonder if Licensee's counsel could identify particularly where this particular topic is referenced? This may be of interest to counsel for UCS, and I would like to be able to refer them to a specific transcript reference.

MR. ZAHLER: Mr. Smith, I do not have a specific transcript reference at this time, but I will attempt to get one over lunch. It is my understanding that it was a matter raised and then at the close of the initial session on design phase, I believe Licensee presented a list of areas where they would get back to the Board with additional

information. And this was one of those areas. I will attempt to provide a specific transcript reference.

MR. SHOLLY: Thank you.

WITNESS SINGH: In the TMI-1 emergency plan, Revision 3, Table 21, emergency action level Number 13 for the unusual event, reads as follows:

"Indications were alarms on process or effluent parameters not functional in control room to an extent requiring plant shutdown or other significant loss of assessment or communication capability."

That would be one example for the lower-classification event. I believe there is also one for an alert.

Table 22, the emergency action level Number 12 for the alert classification, reads as follows:

"Most or all annunciators lost, which may involve an actual or potential substantial degradation of the level of safety of the plant."

There is also one, I believe, for a site emergency. Emergency action level Number 8 for the site emergency classification, reads as follows:

"Most or all annunciators lost and plant transient initiated or in progress which may involve actual or likely major failures of plant functions needed for protection of the public."

BY MR. ZAHLER: (Resuming)

Q In establishing the emergency action levels as a general matter, what approach did Licensee use?

A (WITNESS GIANGI) In establishing the emergency action level, the concept of that was not to have them as diagnostics of the accident, rather redundant paramters that are key trigger points for a specific scenario. We used Appendix 1 to NUREG-0654 as the staff's guidance on that concept.

Q Are there multiple pieces of equipment available for triggering particular emergency action levels?

A (WITNESS GIANGI) Yes, sir, there are.

Q Could you give an example of that?

A (WITNESS GIANGI) Yes, I believe I can. As an example, Table 23 of Revision 3 to the TMI Emergency Plan emergency action level 1 for a site emergency reads as follows:

"A known loss-of-coolant accident greater than makeup capacity leading to reactor coolant system saturation." Possible indicators of that phenomenon would be automatic ECCS initiation due to high containment pressure, i.e., 4 pounds or greater, or low reactor coolant system pressure at 1600 pounds, or reactor coolant system pressure and temperature indicating saturation by either the steam curves or the subcooling monitors which will be

installed to indicate saturation conditions.

That as well as level makeup feed and RCS temperature and pressure might be possible indicators of that specific emergency action level. Pelton is one instrument used as a sole indicator for a scenario.

Q Are there multiple emergency action levels that you might expect to be exceeded for significant accidents?

A (WITNESS GIANGI) Yes, there are.

Q Could you give me an example of that?

A (WITNESS GIANGI) Using the examples cited, the LOCA, the emergency action levels that I just read -- namely, emergency action level number 1, site emergency -- would pertain.

Another possible emergency action level may be Number 14 to a site emergency, reactor building pressure greater than 30 pounds, greater than or equal to 30 pounds.

Number 16, to the site emergency, high in-core thermocouple readings following a reactor trip.

Emergency action level Number 3 for an alert, primary coolant leak rate of greater than 50 g.p.m.

Q In addition to the various equipment that you described that would classify an emergency, does Licensee use procedures for declaring particular emergencies?

A (WITNESS GIANGI) Yes, sir, we do. We use the emergency and abnormal operating procedures as well as the

emergency plan of implementing procedures. They are as described in the testimony provided.

DR. JORDAN: Have you finished that particular line? I think I missed something following the thread. I thought this started out having to do with qualification of equipment. Is that correct? I thought you were going to explain why it is that you are using equipment that had not been qualified?

MR. ZAHLER: That is correct. The purpose was to show that for emergency plan purposes, regardless of whatever else is used in the plant, that there are multiple instruments, multiple emergency action levels procedures, or the loss of instrumentation itself, which gets you into the emergency plan. And therefore, with respect to the emergency plan, the environmental qualifications of the equipment are not important.

In other words, whatever is being done for the plant elsewhere, that so long as the plant complies with whatever other requirements are, there are no special ones that you would need to get into the emergency plan, because of the redundancy and the nature of the emergency plan itself.

And therefore, you need not look at the emergency plan or the requirements imposed by the emergency plan in determining what types of environmental qualifications are

necessary for plant equipment.

DR. JORDAN: I see. I thought that was correct. But then he went on to describe failure of quite a lot -- a group of equipment, many of which is safety-related and, therefore, is surely environmentally qualified, such as the pressures in the containment vessel and a number of other things.

And so that is why I lost the thread is because you then said -- you mentioned all this equipment which might possibly fail or trigger an emergency, and yet that equipment is surely environmentally qualified. So that is why I lost the thread.

WITNESS GIANGI: I was trying to bring out the redundancy and the various indications that may trigger an emergency action level.

DR. JORDAN: So that even if there was, you are saying, a failure of a particular equipment that was not environmentally qualified, there would be at least -- there would be other equipment that would do the job?

WITNESS GIANGI: Yes, sir. I may give you an example that I think would illustrate this. The emergency action levels, as I mentioned, conceptually are trigger points to get us into the emergency plan, and not necessarily why the emergency occurred.

One example might be four pounds pressure as seen in the containment. Was that due to a LOCA or was that due to a steam line rupture? The emergency plan for all practical purposes declares the emergency.

Okay. And let's see, operators through their normal alarm response procedures, emergency operating and abnormal operating procedures, further look at the diagnostics and the engineering problems of the emergency in the normal accident mitigation.

However, the emergency would have been recognized, declared, and all actions carried out consistent with the emergency plan, namely notifications, the recordkeeping, rad monitoring and so on and so forth.

DR. JORDAN: I see. And so therefore you are saying it is not necessary to have every piece of equipment qualified?

WITNESS GIANGI: Yes, sir.

DR. JORDAN: In order to meet the requirements.

WITNESS GIANGI: Yes, sir.

DR. JORDAN: All right.

MR. ZAHLER: Dr. Jordan, one thing I might add. Emergency planning is somewhat a different animal. To get to a site or a general emergency, you have to already have assumed substantial major failures that are generally not consistent with the rest of NRC practice in design and licensing. And therefore throughout this testimony you are likely to hear of the failure of major pieces of equipment that is just assumed to do the emergency planning.

We do not have any mechanisms for those failures or necessarily endorse them, but we assume them and do the planning on that basis.

DR. JORDAN: All right.

MR. ZAHLER: In response to Mr. Sholly's question, I have some transcript pages that could reference us back. Initially, I believe it was a concern raised by the Commonwealth attorney.

Transcript pages are 7784 and then 7787 to 7788, 7791, and 7821 to 7824.

I have no further questions of this panel and they are available for cross-examination.

(Board conferring.)

CHAIRMAN SMITH: Mr. Sholly, would you prefer to continue after lunch or proceed now?

(Counsel for ANGRY conferring.)

MR. SHOLLY: We may as well break for lunch. I do not see any sense in starting and breaking in half an hour.

CHAIRMAN SMITH: We will return at 1:15.

(Whereupon, at 12:13 p.m., the hearing was recessed, to reconvene at 1:15 p.m. the same day.)

AFTERNOON SESSION

(1:18 p.m.)

CHAIRMAN SMITH: Are you ready to proceed?

MR. ADLER: Mr. Chairman, I just have one preliminary. I wanted to make an introduction. On my left is Michele Straube. Pending final bureaucratic approval, Ms. Straube will be entering an appearance on behalf of the Commonwealth and taking over for the offsite emergency planning phase of the hearing.

MR. ZAHLER: Mr. Chairman, I have a preliminary comment also. At an earlier date, Licensee informed the Aamodt's that, with respect to Dr. Molholt's testimony, we would probably object to its admission into evidence as beyond the scope of the contention. It deals with the adverse health effects of Unit 2 accident and not emergency planning.

I would like to, if possible, schedule for tomorrow morning argument with respect to that; and to also alert the Board and the Aamodt's that if Licensee is unsuccessful in that motion, we are not prepared to cross-examine Dr. Molholt this week.

His testimony was filed at a later date. We have had it for one week. It includes three lengthy lengthy articles dealing with the adverse health effects of the Unit 2 accident, and we would just not be prepared to go ahead

with cross-examination on that at this time.

CHAIRMAN SMITH: The --

MR. AAMODT: Mr. Chairman, we would like a couple of minutes to think about this.

CHAIRMAN SMITH: The point here is, I guess, rather than waiting until he actually takes the stand and then objecting, they wish to have arguments heard in advance, which would seem to me that you would probably want to have a determination made early.

But the only request before us now is to schedule argument for it in the morning.

MR. AAMODT: Having a little more time to think about it, Mr. Chairman, it would be my inclination to ask you to wait for that argument until after we finish cross-examination of the Licensee's witnesses, because in that cross-examination we expect to bring out information that bears on this.

CHAIRMAN SMITH: It seems -- what is your pleasure?

MR. ZAHLER: I have no objection to that. The point of the argument is as to scope. Dr. Molholt is sitting here. But whenever it is convenient to the Aamodt's. The earlier we do it is the preference of Licensee.

CHAIRMAN SMITH: All right. You have the most at

stake on when the argument is made, so we will do it your way.

MR. AAMODT: We would prefer that, Mr. Chairman, if we might, as we requested.

CHAIRMAN SMITH: All right.

MR. ADLER: Mr. Chairman, I would just like to point out that the Commonwealth may have additional objections to this testimony, in addition to Licensee's. And it would seem to be preferable to us to get over with the argument before the witness comes up, so that in case we do not have to spend the time preparing for cross-examination we do not have to.

CHAIRMAN SMITH: I did not recognize that interest in having an early disposition of it. That is a good one, that is right.

Well, let's see where we are. You think that you want to establish by cross-examination of this panel that his testimony is within the scope of the contention?

MR. AAMODT: Yes, sir.

Mr. Molholt would feel that it might be helpful if he made a comment at this time.

CHAIRMAN SMITH: You are welcome.

MR. MOLHOLT: If it pleases the Chair, I think that the relevance of this, to which perhaps both the utility and the state could comment, is that the area

residents have already, through the accident, been exposed to considerable radiation, and this is -- this will be the bulk of my testimony.

And therefore, we are especially predisposed to a series of diseases that makes the TMI-1 restart hearing relevant to that particular population more than, say, if you were talking about any other population.

CHAIRMAN SMITH: We have read the testimony and we are familiar with it. So I think we can have an early scheduling. I really do not see how the testimony of this panel -- you can argue what you expect to prove from this panel, and then argue from there the relevance of it to the contention, and that will serve everyone's purpose, I would think.

You do not have to wait until they actually testify. You can argue the relevance from what you hope to prove. And I think we could schedule it, then, tomorrow morning. Then you can argue your relevance, and you can argue as well, then, as you can after this panel completes its testimony.

(Mr. and Mrs. Aamodt conferring.)

CHAIRMAN SMITH: Mr. Gray, do you have a position on it?

MR. GRAY: We have the same concern about the

relevancy, and we would prepare -- would be prepared to argue on that tomorrow morning or as it would suit the other parties.

CHAIRMAN SMITH: I would think that when you think about it you will want an early ruling, too.

MR. AAMODT: Yes, sir, we do. I just -- I did not anticipate this now, and you don't like to answer precipiticely.

CHAIRMAN SMITH: We will come back to it at the end of the day. But I think you should look forward to an early resolution of it.

MR. AAMODT: Okay.

Whereupon,

ROBERT E. ROGAN

GEORGE J. GIANGI

ALEXIS TSAGGARIS,

the witnesses on the stand at the time of recess, resumed the stand and, having been previously duly sworn, were examined and testified further as follows:

CHAIRMAN SMITH: Before you begin the cross-examination, I would like to clarify some of your supplemental testimony. You testified that Mr. Toole -- let me get their jobs -- Mr. Toole, who is superintendent of operation and maintenance, Mr. Hukill, who is vice president of TMI-1, and Mr. Potts, who is a manager of radiological

controls, would come in for what purpose within an hour?

WITNESS GIANGI: First of all, Mr. Poole is the director of operations and maintenance.

They would come in for the purpose of performing the emergency director's role. They would relieve the shift supervisor, who initially assumed that position of emergency director.

CHAIRMAN SMITH: Now, this is provided for in the emergency plan?

WITNESS GIANGI: Yes, sir.

CHAIRMAN SMITH: The question I have is that Mr. Potts is not a part of the operating management of the plant. He reports to the vice president, radiological and environmental controls.

WITNESS GIANGI: Yes, sir.

CHAIRMAN SMITH: But for the purpose of emergency planning, would he be transferred to Mr. Hukill's authority?

WITNESS GIANGI: For the purposes of emergency planning, any one of those three individuals may become the emergency director to take on that function of accident mitigation, if you will.

The emergency director, again, would also report to the chief executive officer, Mr. Arnold, if he is manning the EOF. So yes, he will.

CHAIRMAN SMITH: In any event, he becomes a full operational officer at that point, not just a support officer?

WITNESS GIANGI: Yes, sir.

CHAIRMAN SMITH: Mr. Sholly -- incidentally, I was mistaken. Mr. Potts has not yet testified. We have heard his job described, but we have not heard his testimony yet.

MR. SHOLLY: I might just note for the record that the testimony which was presented this morning was, needless to say, a surprise to ANGRY. And ANGRY would reserve the right to recall these witnesses and cross-examine them on that testimony, should that prove necessary.

I will speak with Ms. Bradford at the earliest opportunity, as soon as we get a chance to review the transcript, and we will expeditiously inform the Board of our intention along those lines.

CHAIRMAN SMITH: Well, you do not have an absolute right to reserve that. This has been consistent with our approach here, as you know, that direct testimony is supplemented where other testimony indicates the need. However, on any particular instance where you show that it is necessary, the Board will entertain a request. But you do not have an absolute right to reserve it.

MR. SHOLLY: I thought it was best to put the parties on notice that we may in fact consider the need to

do that, so they are aware.

There is one particular area that the witnesses went into this morning which I would like to address, at least briefly.

CROSS-EXAMINATION

BY MR. SHOLLY:

Q This is the area of containment leak rate testing. During the TMI-2 accident, very early on there was a projected dose in Goldsboro of 10 rads per hour. And as I understand it, this was based on a projected containment leak rate factor.

Do any of you gentlemen recall this particular instance, and could you be prepared to discuss how the assumption that you propose making would make that sort of calculation any different?

A (WITNESS TSAGGARIS) I personally do not know the background of how that specific calculation was made. And I am not sure how they arrived at the 10 rem per hour number.

A (WITNESS ROGAN) Nor am I.

A (WITNESS GIANGI) Specifically I also am not familiar with the actual dose projections used.

(Pause.)

Q Are any of you familiar with the use of an assumed containment leak rate in projecting offsite dose rates? Are any of the witnesses familiar with that procedure?

A (WITNESS TSAGGARIS) Yes.

Q What would be the effect on a projected offsite dose rate if, instead of using the .2 percent per day, you used .05 percent or some other figure? How would that project offsite into a dose at any given point?

A (WITNESS TSAGGARIS) To the extent that the total source term used in projected dose calculations is a combination of all monitored release paths, that particular component that would come from containment leakage would be reduced essentially by a factor of four, if you look at .2 percent vice .05 percent.

Q It is pretty much a straightforward arithmetic relationship rather than a geometric relationship?

A (WITNESS TSAGGARIS) That is correct.

DR. JORDAN: Well, can we ask, then, is that likely to be the major component of offsite dose?

WITNESS TSAGGARIS: That would really depend on the scenario, where the releases were coming from. If there was a significant amount of fission products release in containment, then perhaps the containment -- the containment leakage and the contribution to the source term from the containment might be more significant than if you had some sort of waste gas release from the auxiliary building, where there would be no fission products involved in the containment and there would be no contribution from the

containment.

DR. JORDAN: Yes, I see. So it depends upon the nature of the accident?

WITNESS TSAGGARIS: That is correct.

BY MR. SHOLLY: (Resuming)

Q Okay. What I would like to do is involve the witnesses in a discussion of how the TMI-1 emergency plan was developed, and take th. from immediately before the TMI-2 accident and trace the history of how we came to arrive at Revision 3.

First of all, prior to the TMI-2 accident, what was the organizational structure that would respond to an accident? Were there separate plans for TMI-1 and TMI-2 or were there plant unit specific emergency plans?

A (WITNESS TSAGGARIS) Prior to the Unit 2 licensing, the emergency plan addressed Unit 1. When Unit 2 was licensed, the emergency plan was extended to include Unit 2. So the emergency plan at that point in time, with both units operating, wa an overall site plan.

Q Does that differ from the plans which exist now?

A (WITNESS TSAGGARIS) Yes, it does. Both Unit 1 and Unit 2 have their own specific emergency plan, with basic concepts that are common, but site-specific to the extent that Unit 2 deals with peculiar issues and unique items involved in the recovery efforts.

Q Are there any facilities involved in responding to an emergency that are shared between TMI-1 and TMI-2?

A (WITNESS ROGAN) Yes, there are. Among those are the offsite facilities. And perhaps for clarification it is useful to note that some rather large percentage of the basic plan -- that is, the licensing document -- is in effect common to the site rather than to the units.

Most of these relate to such issues as coordination with the offsite facilities, anything that would relate to Three Mile Island as differentiating from a relationship to a specific response activity or a specific action level or a specific procedure, which would have to vary between Unit 1 and Unit 2 because of the difference in design or the difference in the current state of that plant.

So there is a very, very high degree of commonality, and included in that commonality is offsite facilities.

Q Which onsite facilities would be shared by Unit 1 and 2 in terms of responding to accidents? Are there any? If so, what are they?

A (WITNESS GIANGI) There are none.

Q No onsite facilities are shared?

A (WITNESS GIANGI) That is correct.

Each unit has its own meteorological

capabilities?

A (WITNESS GIANGI) Let me clarify that. When you are talking onsite facilities, I am assuming you are taking about emergency response facilities onsite. There are three onsite emergency response facilities: the operations support center, technical support center, and emergency control center.

Each unit has their own independent facility.

Q A difference in terminology, I guess.

There is only one meteorological tower; that is correct, is it not?

A (WITNESS GIANGI) That is correct.

Q Prior to the TMI-2 accident, approximately how many full-time personnel did Licensee have assigned to work strictly on emergency planning matters?

A (WITNESS TSAGGARIS) Would you please repeat the question?

Q Prior to the TMI-2 accident, how many full-time personnel did Licensee have on its staff who were concerned solely with emergency planning or largely with emergency planning?

A (WITNESS TSAGGARIS) Prior to the TMI-2 accident, several individuals shared functional responsibilities with respect to the emergency plan. Training responsibilities were shared by the training supervisor, and plan

development, review and maintenance was conducted by an individual in the radiation protection department.

So to answer your question specifically, there were two individuals that were primarily involved with the plan.

Q And approximately how many are there now?

A (WITNESS ROGAN) At this particular time?

Q Yes, sir.

A (WITNESS ROGAN) Dedicated to emergency planning, there is presently a staff of eight plus administrative support. Let me -- let me correct that slightly by saying that that number includes my presence on the site at this time, my emphasis clearly being directed toward Three Mile Island issues. However, I am a member of the corporate staff and my permanent location will not always be there.

Q At the time of restart, how many full-time personnel would there be then?

A (WITNESS ROGAN) I would expect, depending upon when restart might occur, the number will be either as it is now or that number less two.

(Pause.)

Q Following the TMI-2 accident, approximately when was the first revision of Licensee's emergency plans undertaken?

(Pause.)

A (WITNESS TSAGGARIS) Following the TMI-2 accident, I was primarily involved in my position as a site emergency planning director in revising the emergency plan prior to -- and that occurred prior to any interim guidance published by the NRC.

The first, if you would call it, Revision Zero, to the best of my recollection was developed in the June or July time frame. Subsequent to that -- and I believe it is in our testimony -- some interim guidance from the NRC was published in the August to September time frame, 1979. And we met with representatives from the NRC at the site in a public meeting to discuss the interim guidance and developed Revision 1, which I believe was submitted in the October 30 time frame, October 30 to November 1 of 1979.

(Pause.)

Q Who on Licensee's staff was responsible for Revision Zero?

A (WITNESS TSAGGARIS) I was.

Q Were you also in charge of Revision 1?

A (WITNESS TSAGGARIS) Yes.

Q Were there any consultants involved at all during the Revision Zero or Revision 1?

A (WITNESS TSAGGARIS) Yes, there were.

Q Could you describe who those consultants were and what their functional responsibilities were in terms of the

revision?

A (WITNESS TSAGGARIS) Assisting me in the development of Revision 1 were several engineers from Energy, Incorporated. Their primary responsibilities were that, under my supervision, they assisted me in the preparation of Revision 1 of the plan and in drafting emergency plan implementing procedures.

Q You also supervised the drafting of the procedures as well as the plan?

A (WITNESS TSAGGARIS) Yes.

DR. LITTLE: Excuse me just a moment. You said Energy, Incorporated. Is that the same as the company you are now with, Energy Consultants, Incorporated, or a different one?

WITNESS TSAGGARIS: No, it is not. It is a different one.

DR. LITTLE: Okay.

BY MR. SHOLLY: (Resuming)

Q Energy, Incorporated, is based in Idaho, is it not?

A (WITNESS TSAGGARIS) That is correct.

Q Are you familiar with the Energy Incorporated personnel who you worked with on this plan and, if so, could you describe a bit of their background in working on emergency plans and procedures?

A (WITNESS TSAGGARIS) The two people from Energy Incorporated that were primarily involved with the Revision 1 document, one individual holds a senior reactor operator's license on a Westinghouse pressurized water reactor and has over ten years of nuclear operating experience, both in the Navy and at the Salem Generating Station as a shift supervisor.

The other individual had approximately, at that time in 1979, eight years of commercial and naval nuclear power experience and was a licensed reactor operator on a General Electric boiling water reactor.

(Pause.)

Q Were these consultants involved at all in work on emergency planning which relates to the interface between Licensee's plans and plans of offsite authorities?

A (WITNESS TSAGGARIS) The primary interface functions that occurred early on in the revision of the emergency plan were directed by myself, in that I attended numerous meetings with the Pennsylvania Emergency Management Agency, their representatives, the Bureau of Radiation Protection, and some of the county directors.

The initial meetings were designed to agree on the communications and organizational concepts that interfaced the offsite and onsite plans. I basically took from those meetings the guidance that all organizations agreed to, came

back and, under my supervision, the consultants that I have mentioned developed that guidance, which I reviewed, into the Revision 1 of the emergency plan.

(Pause.)

Q Were any of the consultant personnel that you used to develop Revision 1 experienced in matters relating to civil defense, evacuation planning, transportation planning, health physics, anything other than engineering?

A (WITNESS TSAGGARIS) As I mentioned, the two individuals had significant operating experience, and as such had significant training in health physics, radiological controls, plant operations. And since their function was primarily to develop onsite plans, that is where their expertise was utilized.

As far as the interface between the onsite and offsite plans, none of those individuals had direct civil defense experience. However, the interface of the plans in my opinion -- to interface the plans is an interface organizationally and in a communications sense. And for that reason, it was not necessary for those individuals to have civil defense experience.

Q Did you request the Energy Incorporated personnel to review the final draft of Revision 1 prior to its submittal, so that they could be assured that their advice and recommendations had been properly integrated into the

plan?

A (WITNESS TSAGGARIS) Throughout the development of Revision 1, there was an ongoing review as the sections were developed. When these sections were submitted to me for review, they had already been reviewed by the individuals that had prepared them.

It should be clear that the final document, Revision 1, when submitted to me was reviewed by me for compliance as a member of the Licensee, and the consultants were only performing their function to support my responsibility.

Q Was there any instance where Licensee chose not to follow recommendations or advice made by the consultants?

A (WITNESS TSAGGARIS) There may have been. I just cannot recall.

Q Within Licensee's organization, what personnel were contacted during the preparation of Revision 1?

A (WITNESS TSAGGARIS) During the preparation of Revision 1, planning meetings were held with senior department personnel in the radiological controls, operations and maintenance and security areas to ensure that Revision 1 interfaced with existing plant programs in those areas, and training, I might add.

Planning meetings were conducted with senior utility officials, such as Mr. Arnold, to ensure that the

initial concepts of communications and organization were agreed to by him and members of his staff. That was all incorporated into Revision 1.

Q What steps were taken to interview or incorporate the suggestions of personnel at TMI-2 based on their experience of the TMI accident? Was there any steps taken to incorporate their experience into a restructured emergency plan?

A (WITNESS TSAGGARIS) In developing Revision Zero, which obviously preceded Revision 1 -- and I cannot recall the exact time that we had our first draft made -- I did make an attempt to discuss with some of the management personnel involved in the TMI-2 response to get some of their feelings on where they felt improvements were needed. And to the best of my ability, I tried to incorporate some of their observations and comments into Revision Zero of the plan and Revision 1.

Q In terms of management personnel, do you include within the scope of management personnel, for instance, a shift supervisor or shift foreman?

A (WITNESS TSAGGARIS) Yes.

Q Did you consult with members of the radiation monitoring teams in terms of their responsibilities during an accident and their experience during the TMI-2 accident, to incorporate their experience into the plan?

A (WITNESS TSAGGARIS) I did not personally discuss with any member of a radiation monitoring team any particular problems. However, I did discuss problems encountered with their supervisors.

(Pause.)

Q Were there any persons or organizations outside the Licensee's staff, consultants, that were invited to comment on any of these earlier revisions or were invited to offer suggestions as to how to improve the emergency plan?

A (WITNESS TSAGGARIS) Yes, there were.

Q Could you identify those agencies or organizations?

A (WITNESS TSAGGARIS) One organization that I remember specifically was Mr. Bill Loew of Picard and Loew in Washington, D.C. We discussed with Mr. Loew some of the organizational and communications concepts that we had developed for Revision 1, and as a senior consultant solicited his opinions and views.

Q Was there an attempt to contact Commonwealth agencies, the NRC or any other government agency about this matter?

A (WITNESS TSAGGARIS) As I indicated, in the development of Revision 1, numerous planning meetings were held with Pennsylvania Emergency Management Agency personnel and individuals from the Bureau of Radiation Protection

prior to the development of Revision 1. And also, Revision 1 incorporated some of the interim guidance that had come out from the NRC.

Q In developing the most recent revision to the plan, which I understand is Revision 3, and for future revisions, is there any type of institutional arrangements for involving personnel other than Licensee's personnel in commenting on revisions to the emergency plan or offering suggestions for improving the plan?

A (WITNESS GIANGI) In the process of revising the emergency plan, of course excluding, as your question asks, all onsite personnel, which is quite extensive, we worked closely with the NRC, with licensing and the Region I office, for their comments on various -- various changes, if you will.

We have recently adopted in our training program that the materials to be taught to the offsite agencies will be sent to these agencies for review to ensure that the areas of concern, the areas of their concern, are brought out to their satisfaction or perhaps introduced some other areas that they feel in fact they would like to be brought out a little bit more in the training sessions.

Of course, we also worked, as Mr. Tsaggaris mentioned, with the Pennsylvania Emergency Management Agency and other state agencies, such as the Bureau of Radiation

Protection, to assure consistency in conceptual design of the emergency plan.

Q Is --

A (WITNESS FOGAN) I might add that, although there is no formal provision that I know of at this time, there is a continuing exchange of information within the industry, both informally, corporation to corporation, but also more formally through the good offices of the Institute of Nuclear Power Operations. And we take advantage of that sharing of information, both on an individual basis company to company and on the basis of formal workshops that are quite often co-sponsored both by the Atomic Industrial Forum and by INPO out of Atlanta.

So that one -- one could suggest that there is developing a very formal institutionalization process by which no one in the industry will work in isolation from the flow of sharing of experiences, except as they force themselves to. And it would almost be a forced issue.

Q Other than the contacts Licensee maintains with other industry organizations, as I understand your testimony, then, there is no formal institutionalized program per se, but it is more of an ad hoc continuing sort of relationship person to person-wise between people in different agencies.

Is that a fair assessment of the situation; and if

it is not, could you elaborate or correct that?

A (WITNESS GIANGI) That is a fair assessment.

Q In preparing Revision 3 to the emergency plan, were any consultants involved in that effort?

A (WITNESS GIANGI) Yes, there were.

Q Could you identify the consultants and what their major roles were?

A (WITNESS GIANGI) Could you give me a minute to try and pick my brains a little bit.

Q Take your time.

(Pause.)

A (WITNESS GIANGI) You did ask for Revision 3, not Revision 2?

Q That is correct.

(Pause.)

A (WITNESS GIANGI) Predominantly two companies were used of consultants: the Energy Incorporated which Mr. Tsaggaris referred to earlier, as well as an Energy Consultant engineer who was permanently assigned -- who was assigned to Three Mile Island.

MR. ZAHLER: Just so the record is clear, Mr. Giangi, that Energy Consultant person is an Energy Consultant, Inc., person; is that correct?

WITNESS GIANGI: That is correct.

BY MR. SHOLLY: (Resuming)

Q Would that person be Mr. Tsaggaris or somebody else?

A (WITNESS GIANGI) Someone other than Mr. Tsaggaris. I am only talking about engineers assigned to the Three Mile Island site. However, Mr. Tsaggaris and two other engineers took an active role in the development of Revision 3 from through home offices and occasional visits.

Q And what were the major functional areas within the emergency planning effort that these consultants were involved with?

A (WITNESS GIANGI) The major functional areas that the consultants were involved in consisted of development of the plan, interfacing with various departments onsite, development of procedures, as well as the implementation.

Q Were there not additional consultants used on items that were perhaps more related to off-site planning matters? I may have misled you into thinking I was only concerned with specifically on-site matters. I am also interested in off-site matters, such as evacuation time estimates, the public notification system, and any other facets which Licensee was involved with.

A (WITNESS BOGAN) That is correct. There were other consultants. However, I would like to clarify: In the evacuation time estimate effort, which is now just completing, is not directly related to the Revision 3 of the plan and would, therefore, not have been included in our answer.

However, we did retain the services of a local governmental relations consulting firm for the purposes of assisting the local municipalities in developing their plans for their local municipalities. This serves -- was considered to be appropriate in that many of the municipalities do not, as you know, have salaried staff to work full-time on thes kinds of proejcts. And so as the Licensee, we provided that service.

We also did, in fact, retain the services of consultants for evacuation time estimate studies and also for the initial studies and design proposals for the prompt-notifications system.

Q Is there a date, an implementation date, by which Licensee must have evacuation time studies submitted to the NRC staff?

A (WITNESS ROGAN) I am not personally aware of such a date, although we have committed at least, or suggested at least, one time to the staff that we would provide our response. And we have had that request postponed, and we are now committed to having that information by mid-March.

Q There have been two other evacuation time studies performed, have there not?

A (WITNESS ROGAN) That is my -- that is my understanding, yes, although at least one of those I am not sure I would categorize as a full evacuation time study.

Q Which particular document are you referring to?

A (WITNESS ROGAN) That would be the one that has been referred to as the PennDot-FEMA-Commonwealth of Pennsylvania study. And since I have never seen a full document -- it was not my understanding that that was a full evacuation time estimate in the sense of the definition of the NUREG-0654 requirement.

Q That was submitted to the NRC, though, as an evacuation time estimate, was it not?

A (WITNESS ROGAN) I am not aware that we did that, no.

Q The other witnesses?

A (WITNESS GIANGI) I am not aware that we have done that either.

Q Pardon me for a second.

(Pause.)

A (WITNESS GIANGI) I would like to -- I would like to state something. As I came in to become the emergency planning coordinator, Three Mile Island, 1980, I do remember now that a study was submitted to the NRC. Whether that was on docket or not, I am not too certain. But it consisted, as I understand, of looking at Dauphin County only. And any more detail than that, I am really not sure of. But I would like to refrain from any more detail on it.

(Counsel for ANGRY conferring.)

MR. SHOLLY: I have here copies of the February 4, 1980, letter which was sent by Mr. Herbein to Mr. Grimes at NRC, which references evacuation time estimates.

I would like to provide the Board, the reporter, and the witnesses with copies and mark this ANGRY Exhibit Number 2 for identification.

(The document referred to was marked ANGRy Exhibit No. 2 for identification.)

CHAIRMAN SMITH: Our original order setting up orders, setting up the sequence of events of the hearing anticipated that exhibits would be provided at the time of

the testimony. We do not have any ruling for exhibits that are used -- documents that are used -- in cross examination.

But prime exhibits, the parties have an obligation to distribute them to the parties and the Board as soon as they know that they are going to use them, unless it is something that you have to reserve, hold and reserve for cross examination.

We have no specific ruling on that, but the concept of getting exhibits in which are used affirmatively for your case-in-chief has been pretty well expressed in our prehearing orders.

This will be ANGRY Exhibit Sholly 2. I am informed by Ms. Bradford that there was an earlier exhibit marked 1, which was not accepted for evidentiary purposes. And I thought perhaps it best to mark this "2."

MR. SHOLLY: I should note for the parties' benefit that this is the text of Mr. Herbein's letter with Attachment 1, which gives the evacuation time estimates. There was an additional attachment which listed the hospitals and nursing home facilities within a ten-mile radius of Three Mile Island, which I did not anticipate using for cross-examination purposes, so I did not include it. But that document does also exist.

BY MR. SHOLLY: (Resuming)

Q Mr. Giangi, you said you perhaps recalled that this document was submitted. Having seen it, do you recall this document?

A (WITNESS GIANGI) I would like to preface my response by saying that I joined Metropolitan Edison February 8. This did go out February 4. And all I did remember was that, yes, there was something that did go out. If I had seen it, it was -- it was right at the very beginning of my employment; I was not very familiar with it.

Q You were certainly not involved in preparing this then?

A (WITNESS GIANGI) Yes, sir, that is correct.

Q Mr. Tsaggares, would you have been involved in the preparation of these evacuation time estimates?

A (WITNESS TSAGGARES) I would like to read it first, please.

Q Certainly.

(Witness reading document.)

MR. SHOLLY: Mr. Chairman, I think Mr. Zahler has some information about how this was prepared that might help clarify the situation.

MR. ZAHLER: To speed the record along, if you look at the initials after "Mr. Herbein," there is a "D.D." I believe that is David Digby, who was the interim emergency

planning coordinator between the time that Mr. Tsaggares left and the time that Mr. Giangi joined the staff.

It is my understanding that, with respect to this document, that none of the members of this panel were involved in either the draft or the cover letter or with respect to the development of the PennDot-FEMA study.

BY MR. SHOLLY: (Resuming)

Q Since none of you gentlemen were involved in preparing this, it would not seem fruitful to pursue that line of questioning.

Move on one step further. Was there any NRC response to this letter dated February 4, which is identified as ANGRY Exhibit number 2?

A (WITNESS ROGAN) I am not aware of such a response.

A (WITNESS GIANGI) I am only aware of discussions that I had with NRC Licensing in Bethesda with regards to it. And it went something like this: that while guidance and the regulatory requirements were really not established for an evacuation time estimate, it seemed that it needed a little more work to be submitted as an evacuation time estimate.

Of course, shortly thereafter, NUREG-0654 Revision Zero comment period had been completed, and they were in the process of finalizing that. And as you well know, Appendix

4 had been changed several times before it got to its present version of Revision 1. That was just out in November of 1980.

With that in mind, that is the background that I know about this evacuation time estimate. I have not really seen -- at least I don't remember seeing -- a formal letter on the docket from the staff to the Licensee specifying their feeling of this evacuation time estimate.

CHAIRMAN SMITH: This is a general subject matter, that having read the testimony of this panel, Mr. Chestnut's testimony, and having looked at Appendix 4 of NUREG-0564 -- 0654, it still is not clear to me what are the objectives of establishing evacuation times.

As far as I can see, Appendix 4 just states that evacuation time should be presented. But we do not see from any of these documents what standards -- the standards against which the sufficiency of the evacuation times are measured. And that is an area that I hope will be covered in the testimony.

MR. ZAHLER: Mr. Smith, if I might, could we address that to the Board -- to the panel -- and get them to respond at this time to that concern?

CHAIRMAN SMITH: If you think it is an appropriate time, yes. I think it would be helpful to have it early on.

MR. ZAHLER: Mr. Rogan, why don't you comment in response to the Chairman's inquiry?

WITNESS ROGAN: Mr. Smith, I agree with your observation, because it will clarify many of the issues. And it is important to understand the purpose of the estimates.

And, in fact, the ultimate purpose of developing these estimates, particularly with regard to facilities which are already located and operating, is to provide a basis for certain decisions should there be a requirement to consider protective actions in the event of an incident.

And the development of the evacuation time estimates provides to that decisionmaker, the Governor of the Commonwealth or whoever that might be, some bases on which to determine whether in fact evacuation is a proper and viable alternative as a protective action or whether sheltering may in fact be the only appropriate course or whether there is some combination of events which might occur.

So it has at least been our understanding that the philosophy of the estimates in the study is to provide decision bases and to in fact lay out for the decisionmaker whether or not certain alternatives are really available to you.

CHAIRMAN SMITH: I think that that part of it

shines pretty well through your testimony and through Mr. Chestnut's testimony. We can infer that. But still it is not clear as to what are the ultimate, if any, objectives of evacuation time. I mean is it that a decision might be made that persons must be evacuated within such a period of time as to meet the Environmental Protection Agency PAGs? Is that one of the uses which can be made of it?

WITNESS ROGAN: Let me make sure I understood your question by answering it the way I understood it, sir. And that is, there is not a direct relationship between the time it takes to evacuate and the achieving of a certain level of a disclosure according to the EPA guidelines.

However, if one can project that a certain level of exposure will occur in a certain time frame, and one also knows for that particular plume exposure pathway that is likey to occur in a certain given time, then the comparison of the two forms the basis for whether or not it is appropriate to do it, it is appropriate to follow the course of evacuation.

Does that answer your question, or have I --

CHAIRMAN SMITH: Yes. It still leaves some areas open that I suppose will be filled in as the testimony progresss. So apparently, there is no standard evacuation plan.

WITNESS ROGAN: If that is your question, that is

correct. To my understanding, there is no maximum time beyond which we would find it totally unacceptable.

CHAIRMAN SMITH: Nor can I see so far that there are any standards for evacuation times.

WITNESS ROGAN: I think that is a valid observation at this point also.

CHAIRMAN SMITH: Mr. Sholly.

MR. SHOLLY: That discussion raises a number of questions in my mind. I do not know if this is the appropriate time or forum to bring them up in, but I will do so. If it is improper, I wish the Board would let me know.

CHAIRMAN SMITH: I am sure someone will let you know.

(Laughter.)

MR. SHOLLY: As I understand the sequence of events, this, the request for evacuation time estimates, went out in the fall of 1979. I do not know the original date of the letter, but there was a letter from Mr. Eisenhut at the end of October which requested again evacuation time estimates and provided some amount of guidance as to exactly what NRC was looking for.

This was followed up at some point with a contract with one of the Battelle research organizations to perform a study of evacuation time estimates. And this is probably something we can get into with the staff witnesses.

I do have that study, and you raised the issue of submitting exhibits at the time the testimony is submitted. I was put in somewhat of a bind by this, having been requested at somewhat of a late date to assist ANGRY. So I gathered the information that I can find available in NRC's public document room from other sources and brought it along and have sufficient copies to be made available to the parties.

I do not know what kind of can of worms this opens up, but I am sure we will get to it at some point. Perhaps it would be appropriate for me at the next break to make a distribution of these documents. And we give the parties at least some time to examine them.

CHAIRMAN SMITH: Yes. Incidentally, you do not have to mark for identification, mark as an exhibit, every document you wish to cross examine on.

MR. SHOLLY: I was not aware of that.

CHAIRMAN SMITH: It is only those that you ultimately wish to offer into evidence that you should go through that procedure. Sometimes, if a document becomes too much a part of the record, then the record would be inadequate without it and the Board will insist it become an exhibit. But you can cross examine on the document without it being marked or offered as an exhibit.

MR. SHOLLY: Ms. Bradford and I have had a limited

amount of time to discuss this particular issue, evacuation time estimates. But from my standpoint, I do think they are very important. The witnesses mentioned their use in determining protective actions and how quickly they could be implemented, not only to normal situations but to situations where there is some factor operating, perhaps weather, that an increasing amount of time it would take to evacuate.

In addition, I would not think it would be outside the realm of possibility for the NRC to receive an evacuation time study, examining a particular site, and reach a determination that evacuation simply cannot be accomplished in a timely manner for a particular site, and that then they would be forced to look at whether sheltering or thyroid prophylaxis or a combination of those two or other measures would be sufficient to protect the public in the event of an accident.

So I would see that that could possibly be the use to which such a study would be put. Perhaps that helps as a little bit more of an explanation.

The Battelle study which I mentioned, had become incorporated, in large part, in NUREG-0654 as Appendix 4. That appeared as an appendix in the Battelle study and was pretty much copied into Appendix 4 of NUREG-0654 as the suggested format, the suggested manner of presenting the evacuation time estimates and population data.

So, there is to my way of thinking a fair amount of guidance on exactly what the Commission expects these evacuation time estimates to show and what sort of format they are looking for the information in.

I do not think it is quite the void that perhaps I seem to take from the Licensee's witnesses.

MR. ZAHLER: I do not want the record to be confused at this point. I do not think that is a correct characterization of the witnesses' testimony. Mr. Rogan identified the criteria. The question to which the final document would be put. And Appendix 4 does not address that question except to the extent as Mr. Rogan indicated, which was it is to be used by the decisionmakers as part of the emergency response.

In adddition, I guess at this point I would ask that Mr. Sholly direct questions to the witnesses rather than lengthy narratives in the nature of proposed findings.

CHAIRMAN SMITH: Mr. Sholly's observations throughout this hearing have been very helpful to the Board.

DR. JORDAN: I guess I do want to raise one question which I should know the answer to. In the development of, say, a safety evaluation report either by the staff or Licensee in considering certain accidents and the population exposures resulting therefrom, are there

assumptions made with respect to evacuation and the fraction of the people that are evacuated and the times required? It has just been a while since I looked at one of these. I don't know the answer. Can someone help me on that?

CHAIRMAN SMITH: The question is addressed primarily to the panel, but if somebody else can tell us where to look --

DR. JORDAN: If the panel knows the answer, they are the best, by all odds. That is, do you at any place rely on evacutation as a mitigation from an accident either from an accident, a design basis accident, or in your consideration of accidents beyond design basis?

WITNESS TSAGGARES: I think you are referring to siting criteria, Part 100.

DR. JORDAN: Yes.

A WITNESS TSAGGARES: To my knowledge, no, I think that question would be well directed to the staff. They might be able to respond to that a little bit better.

DR. JORDAN: All right. Well, I do not really ask for immediate response. But if someone -- this is a matter maybe I will be able to satisfy myself -- but if someone can help me during the next day or two, I would appreciate it. That is all.

MR. SHOLLY: Dr. Jorda, are you speaking in terms of past practice?

DR. JORDAN: Yes. Or even at present. Does the Licensee in any way rely on getting people out in a certain length of time in order to reduce the exposure? And if so, what times -- are they assuming any particular time or are they assuming any evacuation at all? I want to know do they have an exposure limit that they are shooting for and they need evacuation within a certain time in order to get that exposure limit.

MR. ZAHLER: This panel can answer that question, I think, which was is Licensee relying on evacuation for complying with any other regulations? Is that your question?

DR. JORDAN: Yes, it is. I should have said it that way. Thank you.

WITNESS ROGAN: I believe the answer to that question is "No."

DR. JORDAN: All right.

CHAIRMAN SMITH: Give us -- extend the whole concept, give us the basic concept of these protected actions. Apparently you want to have your choice of sheltering, thyroid blocking, evacuation, or whatever else is available. But by what objective? What is your -- what are your factors that you are trying to stay within? Is it the EPA PAGs? I mean are you making decisions based upon those? If so, which ones? There are lower ones and outer

ones, depending upon the pathway. But what is -- what is the overall planning objective to avoid what?

WITNESS ROGAN: The overall objective is to avoid exposing the public to more than the EPA guidelines.

CHAIRMAN SMITH: Okay.

WITNESS ROGAN: But however, if I may just inject another thought, unfortunately in these evacuation time considerations one really tends to deal in the three most obvious of the courses of action, one which is shelter, the second which is the potassium iodide, and the third which may be evacuation.

But even those must be considered in the context of the overall risk to the public as a reult of other things. And, for instance, that is one of the reasons why the issue of weather comes up. Even though you may provide an environment in which conceivably you may be able to reduce the potential for exposure to the public by asking them to take to the roads, the difference in risk to the population at large on a sunny day versus an icey road may present a very interesting judgmental situation for the decisionmaker.

So what this whole proceeding tries to do is to give some bases, if you will, for the decisionmaker to make that decision which exposes the public to the least risk and the greater risk in fact may not be exposure to radiation.

It may be associated with evacuation or a variety of other considerations.

WITNESS GIANGI: Mr. Smith, if I could add something that I guess maybe is being overlooked. That is, that the evacution time estimate for planning purposes now helps the decisionmaker in recommending the protective action recommendations specific for that scenario. And I will give you an example to maybe clarify that a little bit.

The Commonwealth and the Licensee both use common criteria for recommending protective action recommendations, one of which is projecting approaching or exceeding the lower limit PAGs, that being one rem whole-body, five rem child thyroid.

The criteria whether evacuation or sheltering may, for example, be the choice protective action recommendation to be made, to be given to Pennsylvania emergency management agency and eventually to the public, depends on the relief time.

Another criteria would be if the evacuation can be well underway prior to plume arrival, then you exercise that option, assuming that you are projecting approaching or exceeding the lower-limit PAGs. To that extent, it would be very helpful in the planning business to know that for TMI specifically the adverse weather conditions may be in fact

snow conditions and snow removal may put a damper on normal evacuation times. That being the case, that would be taken into account in deciding what protective action recommendations to be made specifically for that scenario, specifically for the climatic conditions, and the projected dose rates.

BY MR. SHOLLY: (Resuming)

Q Mr. Rogan, you stated a short time ago that there may be conditions under which the risk posed by exposure to the public to radiation at a given level may be the lesser of risks involved in determining a protective action decision. I wonder if you could elaborate on that a little bit more and perhaps give an example of such a situation.

(WITNESS ROGAN) I am really not prepared, nor am I sure that I am personally qualified, to make the assessment with regard to the radiation exposure and its eventual consequences. The point which I wish to make by that statement, and one which I believe is valid, is that often the response to an incident involving a nuclear facility considers the potential radiation hazard almost as a separate and only entity involved in protecting the public.

And I merely suggest that there could in fact be a variety of circumstances, some of which were mentioned by Mr. Giangi and including road hazards, weather conditions,

and a number of other issues which may complicate an evacuation and may in fact render evacuation in a given scenario as being something less than a viable course of action.

And that, of course, would have to be considered in the context of the specific potential for exposure of the public. And I would suggest that there could be constructive scenarios where that exposure rate is really very much at the lower limit of the PAGs or even just on the border of reaching the lower limit where the hazard to the public may in fact be less from radiation than it would be from social dislocation, road travel, and other considerations.

A (WITNESS TSAGGARES) I would like to add to Mr. Rogan's comments, if I may, to clarify the record.

The decision on what protective action will be undertaken is clearly the responsibility of the state agencies involved. The Licensee makes recommendations based on what it perceives as the plant conditions, the magnitude of the release, and does not exercise judgment as to weather conditions, et cetera, in making this recommendation. The Licensee offers their recommendation based on the effluents being released from the plant and the plant conditions as an input to the final decisionmakers who have all the variables at their disposal.

In the control room it is very difficult for the shift supervisor, for instance, to know what the climatic conditions are out there, what time the impact of traffic on the time of day. So the plant provides a recommendation to the outside agencies based on criteria that have been mutually agreed on and are in the plant procedures. And the Licensee does not exercise judgment as to whether the evacuation is the best protective action to take because of adverse weather or whatever. That decision is made by the off-site agencies.

Q Nonetheless, Mr. Rogan, you did offer a view that there may be conditions where the radiation exposure hazard is less than some hazard which would be presented by evacuation, perhaps road hazards or some other complication. On what do you base that view or opinion or judgment, and could you perhaps be as specific as you can?

A (WITNESS ROGAN) Well, I believe my last response covered that issue in about as much technical detail as I am prepared to offer at this moment. And I do not think it would be appropriate for me to try and construct at this time some sort of scenario which would support that allegation.

I would just recall that evacuation is not the only course that can protect one from the lower levels of radiation exposure or potential for radiation exposure.

I would also suggest that past experiences have indicated some confusion at the time of decisionmaking with regard to protective actions, and that the provision of these kinds of criteria upon which to base the decision perhaps make it a little bit more clear for the decisionmaker in terms of evaluating which of the courses available to him may in fact provide the greatest well-being to the public.

Q That is a decision that the Commonwealth, in this case, would exercise and not Licensee; is that correct?

A (WITNESS ROGAN) In fact, that is correct. They are the ones who make that decision.

Q Getting back to the issue of evacuation time estimates, was there not a study prepared by Wilbur Smith & Associates under contract to the Federal Emergency Management Agency, which was a site-specific study of evacuation time estimates?

A (WITNESS ROGAN) There was such a study; that is correct. Site-specific to the extent that it included a number of other sites besides Three Mile Island.

Q But there was a study within -- within that scope of the work that Wilbur Smith & Associates did which did specify evacuation time estimates for Three Mile Island; is that correct?

A (WITNESS ROGAN) That is correct.

Q Pending the completion of the study which is underway, which one of the witnesses mentioned earlier today, what degree of reliance, if any, does Licensee place on the Wilbur Smith & Associates study?

A (WITNESS ROGAN) We place no reliance whatsoever on the estimates arrived at by Wilbur Smith. We conduct no planning, nor is there anything in our plans and procedures which relies upon the data which was contained in those -- in that study.

Q Did the Licensee not reference that study in response to a communication from NRC that the previous evacuation time estimate was inadequate?

A (WITNESS ROGAN) We did in fact, and at that time I suppose it only fair to observe that we saw that as being the best of the available data at the time.

However, we have since undertaken an independent study, which is the one on which we will base our planning and considerations.

Q And you will place no reliance whatever on the Wilbur Smith & Associates study?

A (WITNESS ROGAN) That is in fact correct.

Q On pages 5 and 6 of the testimony the witnesses specifies certain documents and guidance and criteria and so forth that were used in preparing the TMI-1 evacuation plan. Other than the guidance which is listed in the

testimony, were there any other reference works, standards, criteria, anything of that sort, on which Licensee relied in preparing Revision 3 to the emergency plan?

A (WITNESS ROGAN) At least one document -- or documents, I suppose, not of the NUREG or formal publication sort -- were comments provided to us by the staff on our Revision 2, which we had submitted last summer and which they suggested certain modifications, if you will, or improvements to the plan. And those were certainly considered in Revision 3.

A (WITNESS GIANGI) As far as formal documents, other than we got out of drills and from talking to operators, radiologic controls technicians, 0654 was predominantly the document used as guidance.

Q Gentlemen, each of you were asked on the voir dire this morning about your review of documents related to the TMI-2 accident and your review of the emergency plan based on that. Addressing now on an institutional basis, has there been or does there continue to be any formal process for considering the recommendations and findings which were made in the various studies and following up on the revisions to the emergency plan to assure that the revisions conform to the recommendations and findings which were made?

A (WITNESS GIANGI) There have been numerous

correspondences between our licensing staff and the NRC staff with regards to recommendations made as a result of accident investigations. To that extent, we have been actively involved in the correspondence and have evaluated and incorporated into the planning process -- I am saying "planning process," I am talking about both the emergency plan and the emergency plan implementing document -- those -- those items that have been part of the correspondence that I have referred to.

A (WITNESS ROGAN) I would also like to add what may be the obvious, which is that although I personally have not, as I indicated at the outset this morning, reviewed in detail several of the earlier documents, I feel comfortable, from the documentation I have reviewed and from my knowledge of the NRC-FEMA approach to the guidance they are providing us, that the most recent set of documentation which form the basis for our plans has essentially over a period of almost three years now put together in a manageable form the tons -- literally tons -- of paperwork which evolved from the incident and puts in a workable form for us the data that ought to be genuinely considered and appear in order for us to have a document which provides the best solution to the TMI-2 actions.

And to that extent, I think, as a matter of policy we first follow that guidance and then any additional

guidance as it is provided from the staff is reviewed, as is the continuing exchange of information between the staff and the Licensee with regard to the plan.

Q Would you say then that there has been or has not been a systematic review of the accident investigations and that this was used in determining the adequacy of the emergency plan?

A (WITNESS ROGAN) I believe there has been, from my exposure and from what indicators I can derive in the time I have been associated with the Licensee. It is my understanding and impression that they have diligently reviewed all of these documents at the time that they were fielded, that in concert with the staff they have identified the appropriate actions, many of which have been published in NUREG, other of which have been picked up by the Licensee; and that it shall be our policy to continue to do that.

And to the extent that action items have been identified which need to be incorporated and followed, they have been made as part of an action item management system.

MR. SHOLLY: Mr. Chairman, I wonder if we might have a brief recess, perhaps five to ten minutes. I have need to talk with Ms. Bradford about something. Perhaps that would be the most efficient way to handle that, if there is no objection.

CHAIRMAN SMITH: Okay. With no objections, we will take a very brief break. It is a little bit early for our afternoon break.

MR. SHOLLY: Yes, sir, I realize that. Five minutes, I think, will be sufficient.

(Brief recess.)

MR. SHOLLY: Thank you, Mr. Chairman.

BY MR. SHOLLY: (Resuming)

Q The testimony at page 9, about two-thirds of the way down the page, contains a very brief reference to a training program which is apparently being developed by the Licensee which will incorporate the TMI-1 emergency plan and the emergency plan implementing procedures. I would like to pursue this training program for a bit.

To start off, how has the development -- the revision of the emergency plan implementing procedures taken place? One of the witnesses testified a bit ago that there was an early drafting of EPIPs where Energy, Incorporated was involved. What I want to do is take it from that point up to the present as to what involvement has there been, how have the revisions been undertaken?

CHAIRMAN SMITH: You skipped a part of your proposed cross examination?

MR. SHOLLY: Yes, sir.

WITNESS GIANGI: The emergency plan implementing

procedures, since I started employment with Metropolitan Edison Company, have been revised quite a few times to reflect a number of areas, obviously one of which is the finalization of NUREG-0654 and its criteria.

Another important area are drill critiques and observations made by -- made by Licensee personnel, discussions with the staff -- specifically Region I when I refer to the "staff" -- in the context of the emergency plan implementing procedures.

Those are really the major areas that led to revisions to the emergency plan implementing procedures and have ended up where we are today with the current versions.

Q Who is responsible for a final review of the emergency plan implementing procedures before they are submitted to the NRC staff?

A (WITNESS GIANGI) It is a long, drawn-out review process. Let me go back --

Q If you will pardon me, I am particularly interested in the ultimate responsibility, the line of last review.

A (WITNESS GIANGI) Okay. After the procedures have been reviewed by TMI-1 PORC and signed off on the review process, they go to what used to be the plant manager Unit 1. It is now the director of operations and maintenance. He signs them off prior to going to the NRC, as you

mentioned, depending on whether it is a TMI-1 or a common submittal, may either be Mr. Hukill as the vice president, TMI-1, or Mr. Bob Arnold.

Q Have the emergency plan implementing procedures for TMI-1 been submitted to the NRC staff?

A (WITNESS GIANGI) Yes, they have.

Q When was that submittal made?

A (WITNESS GIANGI) The formal submittal was made this Monday -- in fact, last Monday, consistent with the March 1 submittal date of the final rule, drafted then submitted prior to implementation of procedures as far back as approximately June or July of 1980.

Q But you have made the submittal as anticipated in the emergency planning recommendations?

A (WITNESS GIANGI) Would you repeat that?

Q You have made the submittal which was anticipated by the emergency planning regulations, the March 1 submittal?

A (WITNESS GIANGI) Yes, sir.

Q Who is designing the training program that is referenced in the testimony, the training program dealing with the emergency plan and the implementing procedures?

A (WITNESS GIANGI) I played a major role in the development of the training program. Mr. Tsaggaris and his staff of consulting engineers took that -- took that function over a while back, and I am sure he can give you a little bit more information on it.

Q Mr. Tsaggaris, if you could, please.

A (WITNESS TSAGGARIS) My firm is currently developing a formalized training program for the emergency preparedness program at Three Mile Island. The program, as an overview, will contain an overall program document which describes the specific training to be done, what individuals will receive the training, the duration of the training, and other aspects of an overall training program document.

The training program will be designed for onsite Licensee personnel and headquarters support, and also for offsite agencies. The training program will basically be broken down into two sections, one for Licensee and one for offsite personnel.

The Licensee section of the training will be broken down into two phases, one which will train all station employees to varying degrees of the emergency planning document, Revision 3 of the document. The second

phase of the Licensee portion of the training program will provide specific training to individuals on the emergency plan implementing procedures that they would be expected to utilize in an accident response situation.

The offsite portion of the program will be developed and focused on agencies such as the local fire department, ambulance, police, county emergency management agencies, Bureau of Radiation Protection, Pennsylvania Emergency Management Agency.

The primary purpose of that program is to familiarize those individuals with the TMI site and the basics of the Three Mile Island emergency plan and how that plan interfaces with each particular offsite agency. The training program will have formalized lesson plans and will be scheduled in conjunction with TMI training personnel.

A (WITNESS ROGAN) May I add that, while Mr. Tsaggaris has most adequately described the formal training program in terms of what it encompasses in scope and in terms of formal lesson plans, a very important additional part of the training program which was not alluded to was the team drills and exercises, which are a very real and ongoing part of our training program.

And even as we await the publication of this formal, this revised formal training program, we are now and shall continue, as we have in the past, to conduct drills

and exercises from the small team level, such as the fire brigade or the rescue teams and so forth, right up to and including a practice exercise of the particular unit on-shift personnel.

Q Regarding the training for onsite personnel, could you describe in general terms what training the staff, operating staff, has already received on Revision 3 to the emergency plan and the latest version of the implementing procedures?

A (WITNESS GIANGI) The operating staff, assuming that is the onsite emergency organization and the on-shift personnel, have received numerous drills. Last year that turned out to be approximately two dozen. There have been walk-throughs and many exercises.

Let me explain what that is. In fact, we have got a program ongoing -- I believe March 3 or March 4 is the first day for this new program -- to also give many drills for the working level that Mr. Rogan referred to, and to supplement that with the training.

As an example, the radiological assessment coordinator. As I previously mentioned, the radiological controls foreman initially assumes those functions, and it is supplemented by a senior radiological engineer within one hour. Those personnel are now receiving approximately three hours or so, three to four hours, of radiological assessment

in the areas of dose projections, the mini-computer system that I am sure some of you have seen in your control room tour, the use of that, the use of the Isopleths, the dispatching and positioning of radiation monitoring teams, and the use of the procedures.

It is that level of detail. And this is also done in the areas, in the work areas, if you will, that they will be assigned. And that has expanded to not only the radiological assessment coordinators, as well as the radiation monitoring teams, operations, support personnel, emergency repair, technical support engineers, as well as the offsite and corporate, which I know you did not include, as well as -- and I do not want to leave this out -- the emergency plan familiarization has been given to a lot of the TMI-1 personnel.

Again, this was based on Revision 2. You realize, we just submitted Revision 3, and that process was described by Mr. Tsaggaris, which will eventually take place.

Q Does Licensee have in mind an implementation date for this new training program? If so, could you explain the process which will be used?

A (WITNESS ROGAN) Yes, we do. Subject to some failure to meet a commitment, which I am confident will not occur, the formal training program which was described to you by Mr. Tsaggaris will initiate on the 1st of April. And

this is a commitment we have entered into with the staff. That first phase of training will represent both the onsite and Licensee personnel, various levels of plan training, and the offsite training program.

And we will pick up on the specific procedures training after we have completed the initial orientation training. I might, in just slightly more detail, indicate that, depending upon the responsibilities of the particular group of people receiving the training within the Licensee's staff, they receive a separate program of varying degrees of depth of detail.

For instance, the emergency director or someone of that type of responsibility will receive something on the order of 16 hours of concentrated training on the details of the plan and its implementation, whereas someone who has no responsibilities whatsoever for the plan or its implementation and simply must know that if they hear an alarm they report to a certain assembly area and so forth, will receive an hour or so's worth of training.

The other commitment we have with regard to that is we will complete one full iteration of that program before restart.

Q Will that training program be completed before the full-scale drill is held, which I believe is anticipated by the Commission's August 9 order?

A (WITNESS ROGAN) I am sorry, I did not hear the question.

Q Within the August 9 order, do you not recall a requirement for a test of the Licensee's emergency plan prior to restart?

A (WITNESS ROGAN) Yes, I do. I am aware of that.

Q Will the training program that we have been discussing be completed before that drill takes place?

A (WITNESS ROGAN) I would have to answer that question in what may appear to be a somewhat evasive manner, by saying that that depends upon the scheduled date of the drill. We are now negotiating a date yet unclear. And the final determination of that date will tell me whether or not we will have completed that first full iteration.

However, at the earliest possible date that we could have the drill, I suspect we will be very, very, very deeply into the program, and we certainly will have achieved the level of proficiency such that it will permit us to demonstrate our ability to respond to an emergency.

(Pause.)

Q You have been using the terms "drill" and "exercise," I believe. Do any of the witnesses distinguish functionally between a drill or an exercise?

A (WITNESS ROGAN) I suppose I could be guilty of saying that I do not. If I -- if I am occasionally wont to

do that, I would perhaps use the distinction that "drill" is a training term used in-house to train people on the proper procedures, whereas "exercise" generally brings to my mind the full-scale graded exercise requirement with the NRC-FEMA participation.

Q What is Licensee's practice regarding participation in that full-scale type of exercise? I am concerned here with what type of information is available to the operating staff about this drill before it occurs.

In other words, is the operating staff aware of the date that the drill is going to take place, and are they aware of details concerning the particular scenario that has been chosen for the exercise?

A (WITNESS ROGAN) With regard to the first part, I will answer that by saying, unquestionably that the day of the drill will be well-known and everyone will have full knowledge of that. I think that is necessitated not only by the magnitude of the exercise, which involves state-county participation and all of the agencies involved therein, as well as our own Licensee staff, but the preparation with the Federal Government and so forth just precludes us trying to make that kind of a surprise exercise.

And I am not sure that that is appropriate in any case, because among other things, a misreading of a full-scale exercise on the part of some of the public could

result in very, very unfavorable response. So I would expect we would tend to give a lot of public notification that what they will see on a given date is a drill and not in fact an actual emergency.

With regard to the knowledge of the scenario, I would like to pass that response to Mr. Giangi.

A (WITNESS GIANGI) One interesting note I might bring up is, in the past where we had intended to only inform the plant operations management people, it turned out that the July 16th exercise was publicized in newspapers. So that precluded our not giving that date out. I imagine, as Mr. Rogan mentioned, that will also be the case.

As far as the scenario is concerned, the staff, the operations, the radcom people, are not familiar with the scenario that will be used during the exercise. The people that would be familiar with it would be, for example, Mr. Rogan, myself and the staff of engineers. We will submit it to the NRC for review, and as I understand they will submit it to FEMA, if I am not mistaken, for their review as well.

A (WITNESS ROGAN) Let me clarify also, for the edification of all who are interested, that the development of the scenario for a full-scale exercise is very much a participative activity by the state and the Licensee. While the Licensee will be the major contributor to the technical

scenario which will occur within the plant, in order to have an effective exercise which truly demonstrates both Licensee's and Commonwealth's ability to respond to and manage.

There will necessarily be some artificiality to get the appropriate times and so forth. And we are not very far from sitting down together to begin to develop that scenario, because we see that as a fairly lengthy and detailed process.

A (WITNESS GIANGI) I did overlook the Commonwealth of Pennsylvania Emergency Management Agency, the Bureau of Radiation Protection, and the various state agencies which play a major role in the exercise.

Q During the exercise which is planned, to what extent will what has been described as simulated actions be performed? Can you address that or would it be helpful to have an example?

A (WITNESS ROGAN) Well, I think -- I think we can say, to the extent that the particular scenario provides -- and we are certainly -- we certainly have open many options in this regard. We are going to try and simulate as much of the full-scale implementation of the emergency response plan as can practically be done.

For example, it would be, I think, beyond the realm of reason to attempt to practice an evaluation of the

ETZ. On the other hand, I think it would be very appropriate to perhaps call in some emergency response from offsite -- fire, ambulance -- practice the transport of a contaminated, injured person to one of our designated facilities, actually activate all of our facilities. And I am sure the Commonwealth -- I think I can speak with some reasonable degree of assuredness that they intend to activate both their facilities and communications.

So I think, you know, to the extent that we can reasonably do this with reasonable disruption to the public at large, and yet still demonstrate that the mechanisms are appropriate and that they do in fact work, I think it is the intent of the NRC and FEMA that we do as much as we possibly can.

And that certainly is our corporate philosophy with regards to approaching this restart exercise.

Q I think perhaps you did slightly misunderstand what I was driving at. Let me give you a specific example.

Let's take the example of radiation monitoring teams. Would you have the teams actually go out into the field and use the instruments that they would normally use and make actual measurements out in the field, or would you somehow simulate that?

A (WITNESS ROGAN) No, indeed. The exercise would call for offsite and onsite monitoring, will call for the

personnel involved in dose projections, based on the scenario, to actually project the dose. And if there is an offsite exposure, which there certainly will, they will be expected to calculate that and track the plume. And we will respond with the monitoring teams.

None of that which can reasonably be expected to be done without disrupting the public will be excluded from the scenario insofar as we are concerned.

Q Of course, in the example of an exercise, the state, federal and local organizations will know in advance. But with respect to drills, does Licensee view them more as a training tool or are drills something that NRC is routinely informed about and invited to observe?

A (WITNESS ROGAN) I would say -- then I will have to ask Mr. Giangi -- I would say from our point of view the drill is really very much a training exercise, although it is also an in-house way of assuring our appropriate maintenance at a level of preparedness which permits us to do our job.

And let me just offer that that is why we have changed our title from emergency planning to emergency preparedness, because we consider very much a part of our obligation and commitment not only to plan, but to assure that we have maintained the preparedness at a level appropriate to execute.

A (WITNESS GIANGI) I would like to add to that that there are really, the way we view it in the emergency preparedness department at Three Mile Island, training drills or what I may have referred to as walk-throughs and drills.

What we normally do is give the concepts of that work area, supplement that with a walk-through or a training drill where we actually, in the course of running the scenario, if the operator were to not do something properly in the way of emergency plan implementation, we would stop him right there and inform him, this is what this procedure means, here is where this status board is kept, this is where the isopleths are, how to use them.

Thirdly, we have drills where they basically show us what they know. With regard to notification, prior to any drill -- prior to any drill we notify a number of offsite agencies. And normally that is with the understanding that we invite and welcome participation to as great a degree as they seem -- see necessary, see possible, based on their own scheduling.

We notify them for a number of reasons. One very obvious reason is to -- is the courtesy of notifying them in the event that the public may see radiation monitoring teams out there. Although we have rod monitoring drill placards on the vans and vehicles, it may still alarm some of the

public. We would like to inform them for that reason, as well as again inviting participation.

That would be -- that would include the NRC Region I, Bethesda, the Bureau of Radiation Protection, Pennsylvania Emergency Management Agency, Dauphin County, so on and so forth.

Q The NRC has a resident inspector at TMI-1, do they not?

A (WITNESS GIANGI) Yes, sir.

Q Is the resident inspector involved at all in the conduct of training drills, as they have been referred to? If so, how frequent is this involvement? Is it a routine thing or a sampling of the various exercises that go on?

A (WITNESS GIANGI) The resident inspector for Unit 1 is Mr. Haverkamp. He and I have had a number of discussions on the drill content. I have given quite a few tours on the emergency response facilities.

To the best of my knowledge, it was Mr. Conte, the resident inspector stationed at NRC, that observed one drill in 1980.

Q So Mr. Haverkamp is not routinely involved in overseeing drills?

A (WITNESS GIANGI) As far as the drills that I have observed and conducted, no, he is not.

Q One more question with regard to the emergency

plan implementing procedures. What type of a review has been conducted to assure that, for instance, security procedures, radiation protection procedures, emergency procedures, and the implementing procedures are not in conflict?

A (WITNESS GIANGI) What my department has done is coordinate to a great degree with a lot of the site departments well in advance of review. Namely, we have sat with the security personnel, we have sat with plant operations personnel, radiological controls personnel, maintenance personnel, and ensured consistency, if you will coordination, with the emergency plan concepts and the procedures.

In fact, the procedures -- as the testimony indicates, the emergency action levels have been tied in with the emergency and abnormal operating procedures in the plant. The security procedure on accountability has been reviewed and revised by my staff to ensure the coordinated effort with the emergency plan.

Radiological controls department is really hard to separate from emergency planning, since a lot of the areas directly relate to that. And we have a number of individuals -- for example, Mr. Dubiel and Mr. Potts -- actively involved in the coordinated efforts of the procedures and plan.

Q Let me move on to another subject area, this dealing with Licensee's involvement in the development of state and local plans.

MR. SHOLLY: Mr. Chairman, I do not know what the plans are for breaks this afternoon, whether it makes sense to break now or whether you wish to move on -- pursue this for some time.

CHAIRMAN SMITH: Well, customarily we go to 6:00 o'clock on the first day of the week. And with that, I would like to break about 4:00 o'clock for the afternoon break.

MR. SHOLLY: Fine.

BY MR. SHOLLY: (Resuming)

Q The testimony at page 11 indicates that there have been discussions with municipalities in developing municipal emergency response plans. It indicates that as a result of meetings between the Licensee's personnel, PEMA, and county emergency management directors, it was determined that local municipalities were in need of assistance in completing their plans.

How does Licensee define a local municipality?

A (WITNESS ROGAN) That is, under the present Commonwealth arrangement, I believe we have customarily identified or defined a local municipality as being something below the county level. And beyond that

definition I am not sure that I can define between townships and so on.

Q It definitely is below the county level?

A (WITNESS ROGAN) Yes.

Q Approximately when did the meetings occur which resulted in this conclusion that local municipalities were in need of help? What is the time frame for those meetings?

A (WITNESS ROGAN) I regret that I do not have a copy of the final report with me, which would reflect both the overall time frame and the specific dates of various meetings. My recollections are that the effort was completed and a final report was delivered very shortly after my joining the General Public Utilities Corporation, which would put it in the October time frame; and that it had involved some 33 or so local municipalities within the 5-county area.

I might add also that this was, again, by virtue of political structure, a voluntary thing. The services were offered and it was purely a matter of whether or not a particular municipality chose to accept those services. Several did not. Most, it is my understanding, did.

(Counsel for ANGRY conferring.)

Q The testimony reflects that Licensee retained a consultant identified as Kline, Knopf, and Wojak to assist

in the development of these municipal emergency plans; is that correct?

A (WITNESS ROGAN) That is correct, yes.

Q [illegible] would you say that firm's qualifications are to perform the services for which they were contracted? I am particularly interested in what the background is in this area and what type of personnel this consultant has which would allow them to provide this service.

A (WITNESS ROGAN) First, with regard to the senior management of the organization, obviously two of the names are very familiar within the Commonwealth of Pennsylvania, one the past Lieutenant Governor of the State, and the second I believe was executive assistant. I am not sure of the exact time.

In either case, their particular contribution, if not qualification, to this effort was the fact that they had a very clear and in-depth understanding of the political structure of the state and county and local municipalities within the Commonwealth structure, and were therefore, in our view, far and away more qualified to understand those political sensitivities and to work with those groups of people than would be someone who was not so well-oriented.

With regard to the particular people who went into the field, in general their qualifications were that they had had some considerable planning experience. Some had

been either directly or indirectly related to the planning staff at the Pennsylvania Emergency Management Agency, and in fact the past director of that agency was at about that time and is now a member of that organization.

So their qualifications were: one, familiarity with the political structure; and secondly, professional planners.

Q Would you characterize their background, then, as being primarily in the area of say intergovernmental relations and planning per se, rather than expertise in radiological emergency planning?

A (WITNESS ROGAN) Yes, I would. There is no question about that in my mind.

Q Is there some kind of a draft plan which KKW laid out for the municipalities to adopt or was --

A (WITNESS ROGAN) It is my understanding that in the process of this effort they did in fact develop a prototype or format for the municipalities, which in their view would serve as a very useful checklist and sort of a fill-in-the-blank sort of thing that would help some of the local municipalities who were having some trouble in their planning to at least evolve through the first iteration of the plan and give them something to work with.

Q Would you recognize that format, do you think?

A (WITNESS ROGAN) Very honestly, I have only seen

it once close up, and so I am not confident that I would recognize it at this time.

(Counsel for ANGRY conferring.)

Q There is a document in the York County plan, Annex P, which I will give you. The partiesd should have copies of it, and if need be we will certainly make additional copies and make it available.

This is Annex P to the York County emergency response plan.

(Counsel handing document to witnesses.)

(Witnesses reviewing document.)

MR. SHOLLY: If it is any help, it is approximately one-half to two-thirds of the way through the rather thick stack of documents, about that deep (Indicating), if it is any help.

WITNESS ROGAN: I am sorry. If I was to have responded to that remark, I missed it.

BY MR. SHOLLY: (Resuming)

Q I was trying to help the Board and other parties locate this other document.

A (WITNESS ROGAN) Oh. Having looked at it, I cannot attest to the fact that that is the one that in fact was shown to me and was told that is the prototype they used. I would have to check it against one that I am sure I have somewhere in my files.

Q Would it be a problem for you to do that and confirm or deny some time later during this week?

MR. ZAHLER: Mr. Sholly, we will undertake to attempt to locate the document, and we can report back to you on that.

MR. SHOLLY: I would appreciate that.

(Counsel for ANGRY conferring.)

BY MR. SHOLLY: (Resuming)

Q I might ask if any of the other witnesses recognize the document? Perhaps they have seen it?

(Witnesses reviewing document.)

A (WITNESS TSAGGARIS) I do not recognize the document.

A (WITNESS GIANGI) I would have to confirm it with the one in file in the department.

Q Fine. We will come back to that.

(Pause.)

MR. SHOLLY: Mr. Chairman, is the Board prepared to proceed? It was my intention, if this could not be confirmed, to come back to this, hopefully tomorrow. If this can be confirmed that this was the assistance or the format of the assistance which has been provided, we would have some questions on it, if that is the case.

CHAIRMAN SMITH: Well, let's see where we are going. Assume that they can confirm that this is a copy

that is in their files. What do you do then?

MR. SHOLLY: We would be interested in knowing which municipalities used this format, if plans were formalized, where they are located.

CHAIRMAN SMITH: Okay. What part of your cross-examination plan --

MR. SHOLLY: I do not have a complete cross-examination plan yet. Up through 11 or 12, I would undertake to complete that tonight.

CHAIRMAN SMITH: Single-spaced.

(Laughter.)

CHAIRMAN SMITH: Assume, then, that they reconcile -- I mean, that they identify this as being the form that they are familiar with. Will they be any better able to answer questions on the form that is a part of the emergency plan?

MR. SHOLLY: I think, having heard what I just told the Chair, I think they would be if they find, you know, that this is the document, I am sure they would have the opportunity to check their records and determine who used it and who didn't.

CHAIRMAN SMITH: Okay.

MR. SHOLLY: If the plans were completed and submitted, and if so, to whom, and so forth.

(Board conferring.)

MR. SHOLLY: Needless to say, Mr. Chairman, we are very much interested in local municipalities.

CHAIRMAN SMITH: We are not questioning it is an appropriate area of inquiry. I am just wondering what help this particular panel might be on it. It might be a problem.

MR. SHOLLY: That I do not know. We'll find out.

CHAIRMAN SMITH: Gentlemen, apparently it is an important part of the emergency plan. What do you say about it?

WITNESS ROGAN: Mr. Smith, I would just like to make a couple of observations in this regard, because this is a little different than full Licensee involvement. This was a service we provided through the State of Pennsylvania. A while we provided the service, the day to day effort and coordination were directed through the Pennsylvania Emergency Management Agency, where in fact it is my understanding that they actually shared some office space so they could make sure they were nice and close with what was going on.

CHAIRMAN SMITH: With your consultants?

WITNESS ROGAN: Yes, our consultants. And they worked for the counties, and we really, at that point in time, did not monitor on a daily basis or get involved in the details of the services rendered except as contractually

we provided for them.

So such questions as how many of those plans which were prepared with the assistance of Kline, Knopf and Wojack Associates are now approved plans for municipalities within a particular county, I must admit today I would have to go do some research in order to find out.

MR. SHOLLY: Mr. Chairman, it may well be this will come up -- we're hopeful we can find out from this panel -- again with Commonwealth's witnesses. And should the Board produce any local county emergency management agency personnel, as has been suggested, why, it will probably be brought up at that point, also.

DR. LITTLE: A couple of direct questions. Who is responsible for putting together the package of information that we got as Revision 3? Who or --

MR. ZAHLER: I undertook to Xerox it, if that is the proper --

(Laughter.)

DR. LITTLE: Somebody assembled it, obviously, and figured the Annex P was supposed to be in there. So someone must know where it came from and who was responsible for putting it together. That is where we are going.

MR. SHOLLY: It is part of the York County plan.

DR. LITTLE: So it came from York County. So York County knows where it came from.

MR. SHOLLY: I must confess that I just learned of this particular annex within the last 24 hours. So it was somewhat new to me, also.

CHAIRMAN SMITH: Well, the --

DR. LITTLE: It did not materialize. Someone must know where it came from.

(Pause.)

CHAIRMAN SMITH: How do we even know it is the York County plan?

MR. SHOLLY: That was my best guess, Mr. Chairman. Maybe I had better back off a definitive --

CHAIRMAN SMITH: Dr. Jordan has pointed out that it is an annex to Appendix 3, which has a map of York County on it.

Well, what I suggest that you do is go on with your cross-examination and allow the witnesses to do whatever they can do. And then address what you perceive to be voids in the record later on.

MR. SHOLLY: That was my intent.

MR. GRAY: I would point out that Annex P is included in the table of contents of the York County plan, and entitled "Local Government Planning Guidance." Apparently some concerted effort to include that in the York County plan.

BY MR. SHOLLY: (Resuming)

Q Regarding the involvement of the Commonwealth of Pennsylvania agencies in developing the emergency plan, it is apparent from the prepared testimony as well as the testimony offered on cross-examination that there had been a number of meetings with Commonwealth representatives. Have any of these meetings been noticed for public involvement or public participation or participation by any of the Intervenor parties to this proceeding?

A (WITNESS ROGAN) Of the ones that I have attended -- and that certainly has got to be some number less than the total number, but a significant number nonetheless -- they have not.

Q Any other witnesses have any information different than that?

A (WITNESS GIANGI) There was the Pennsylvania Emergency Management Agency's meeting prior to the July 16 exercise, that did have the public involved as well as the media. That is the only one that I could refer to in that context.

A (WITNESS TSAGGARIS) The only meeting that I recall public attendance was in September of 1979, when we met with NRC emergency planning review teams.

Q In general, in the discussions with the Commonwealth, what functional parts of the emergency planning considerations were discussed? We are particularly

interested if there was any added emphasis on any particular function, such as prompt notification, for example.

A (WITNESS ROGAN) Certainly the thrust, if one were to generalize, recognizing the danger of doing that, has been in what I would call three areas.

The first is the interface, the physical and mechanical interface between the Licensee and the Commonwealth of Pennsylvania with regards to emergency response, such things as our procedures for communicating, for notification of the counties, for identifying personalities, for just in general assuring that our plan and theirs were tightly coordinated and consistent, and that we all were operating under the same sorts of ground rules, such as emergency classification levels and that sort of thing.

The second most clearly was the issue of prompt notification of the public, and that has evolved into a number of discussions of the type system that would be used, which was, as indicated earlier, decided upon by the Licensee with the support of the Commonwealth as being a siren system. The recognition that a simple alert in its own right, without some sort of an informative message following immediately thereafter, would serve in fact to disadvantage, and therefore what we might do to ensure that there was some clarification of the alert as soon as the

siren sounded, and what needed to follow from that and what needed to in fact precede it in terms of public information and education programs.

That has certainly been a very real second issue for discussion.

And the third issue has clearly been the one of the alert -- excuse me -- the evacuation time estimate, and that one has been more along the lines of getting data from the state, from the Commonwealth, sharing with them some of the information that we have generated over time as we have studied the evacuation problem, and working very closely with them on that sort of thing.

And then finally, because I believe we have a very good and a very solid working relationship, and good lines of communication, we have had a number of meetings where we just simply were sitting down to work with each other on particular parts of a plan which may be needing some dressing up. In fact, we have been invited to participate as the Licensee representative in one of the regional advisory committee meetings, where the BAC came down and was reviewing the Commonwealth plan. We were encouraged to come in and sit in on the proceedings, so we would all be tied in together.

So that has pretty much characterized the kinds of things we have been doing.

A (WITNESS GIANGI) I would like to add just a couple more predominantly -- which have taken place prior to Mr. Rogan's employment with GPU Nuclear. Some of the items discussed at the meetings involve protective action recommendations, emergency communications and notifications, which he discussed, the verification scheme, which he also discussed, information transmitted, the logistics of the emergency, the training specifically to the fire and ambulance personnel with regards to emergency response to the facility.

(Pause.)

Q Throughout the course of these many different meetings, has there been occasion when a dispute or a disagreement between the Commonwealth and the Licensee has arisen regarding any of these primary areas of concern?

A (WITNESS ROGAN) My recollection is that there has been from time to time a fleeting disagreement on a particular issue, however, none that have failed to be reconciled in the best interest of emergency response; and that most of them reflected the genuine differences of viewpoint with regard to the Commonwealth and the Licensee as to their moral and legitimate responsibilities with regard to one thing or another.

And I must admit, I cannot even put my finger on a particular one right at the moment. But I know we have had

some interesting discussions over time.

Q One area in particular that there seemed to be, throughout the course of the proceeding, some disagreement or misunderstanding over is with regard to the plant notification system or requirement. Are any of the witnesses aware of the discussions which took place regarding this system, that would be familiar with the interchange that took place?

A (WITNESS ROGAN) I am intimately familiar. I believe I took place -- I took part in, if not 100 percent of them, very much near that.

My overall assessment of all of those meetings was that it was just a question of trying to arrive at some kind of a joint position with regard to, first, what particular participation we might expect from the state, both financially and with regards to maintenance and securing and operating the system after it was installed.

And we felt very strongly -- that is, the Licensee -- that whatever design proposal we came up with ought to be one that was consistent with both the existing system of the state and its requirements. And to the extent we may have had an occasional -- I will not even say the word is "disagreement: -- a varying approach, that evolved over time into what I perceived to be complete agreement with regard to what that system ought to be and how it ought to work.

And I think we are in complete agreement that the system design as proposed now not only meets but exceeds the minimum requirements or guidance as indicated in the NUREG, but also significantly upgrades the state's alert civil defense system within the ten-mile plume exposure pathway.

Q You mentioned discussions which took place regarding responsibility for maintaining operating the system once it is installed. How was this issue resolved? Who is ultimately responsible for the system?

A (WITNESS ROGAN) I suppose from the point of view of the state, the way it was most easily resolved was in my personal education with regard to the political structure of a Commonwealth. We had initially perceived -- or at least I had, in my naive way -- that we might procure and install a system which we might then turn over sort of as a turnkey system to the state, asking them to actively participate, the reasons being in many ways more psychological than they were financial, because we felt that public involvement in the system and ownership of the system would more likely assure its continued operation and security.

We found out very quickly that if such a proposal were followed through -- that is, transfer of title of the system to some other system than the Licensee -- that person clearly would not be the state, and in fact would in all probability not be the county, either, because of the

Commonwealth structure; and that the passage of ownership of the system, should that be our final solution, would have to be negotiated with the individual municipalities.

So from the standpoint of the state's position in maintenance, that just sort of faded away. And in fact, as it turned out by further study, that was not a big issue to start with, when we discussed and investigated the total issue of maintenance of siren systems.

Q Is the Licensee, then, retaining responsibility for operability of the system throughout the lifetime of the operating license?

A (WITNESS ROGAN) That is an issue which is not clearly resolved. And let me explain. To the best of my ability -- because there are legal issues here involved which I do not fully grasp at this time -- as we see the system at this time, we are procuring and installing at the full expense of the Licensee.

We have two options with regard to further disposition of the system. One involves retention of the system by the Licensee, and the second involves consideration of the possibility of passing ownership of the system to the various municipalities in which the systems are located.

Unfortunately, neither is a simple solution. It is my understanding -- and again let me preface by saying I

am neither legally competent to explain these issues nor am I experienced in installation. But it is my understanding that if we deed title to a system of this sort and of the dollar value of the total system, which estimates in the testimony something on the order of $1.2 million, then we are involved in some considerations of Public Utility Commission approvals, possibly SEC approvals, we have mortgage release requirements; a number of issues, as I indicate, which I do not understa the full impact of.

The other possibility -- and that would probably involve the acceptance of responsibility upon the part of the person who accepts the title of securing and assuring the operational maintainability of the system.

The other possibility is retaining of ownership by the Licensee, and the major issue here is one of right of way. While a utility has got a considerable experience base in negotiating right of way for a pole from which they string electric wires, there is a new issue to be addressed here with regards to hanging a siren on the top of a pole instead of a nice silent electric wire.

And so it is not clear to our legal offices yet what may be involved in terms of securing right of way for siren sites and what sort of right of ways would be required. Now, the speculation, if that is appropriate, is that one will eventually have to weigh the complications of

right of way procurement if we retain ownership versus the complications of the legal approvals if we try and pass title. That issue is not resolved.

I have taken a long time to explain this to you because I think it is important. In either case, the Licensee clearly accepts and understands that it is our responsibility to see that that system is put in place and that it remains operational and capable of achieving the objectives as established by the NUREG.

Q Would you not in fact be required to report to NRC at any time this system becomes inoperable or nonfunctional?

A (WITNESS ROGAN) I am not aware of a specific requirement in that regard. And I would suggest that any such requirement would have to be accompanied by some sort of a scaled degree of what constitutes an operative system.

Q We will be coming back to the plant notification system at a later point. But I thought, since you brought that issue up, we would try and clarify that now.

I would like to move into the area of emergency assessment, the declaration of emergency, which is a new functional area within the cross-examination.

Could the witnesses briefly describe the process by which the operating staff would recognize and declare an emergency based on plant parameters?

A (WITNESS GIANGI) There are predominantly two means of recognition of an emergency by the plant operations staff, and leading ultimately to the declaration of the emergency by the emergency director.

One way, and perhaps the most common way of recognition of the emergency, would be through the emergency operating procedures and the abnormal operating procedures, which would give a certain parameter or a certain scenario presenting itself to the operator such that, by referring to that procedure, the operator would be -- of course, it would be mandatory to complete the immediate actions necessary by that procedure.

Going to the follow-up steps of that procedure, it would inform the operator that he has reached or exceeded an emergency action level, and in turn refer that operator to the emergency plan implementing procedure that would be applicable for that classification.

Another way would be for the operator to recognize that the emergency action level is being reached or exceeded by virtue of the emergency plan implementing procedures, the first four specifically for the unusual event: alert site or general emergency classifications, which list the emergency action levels in column fashion, the initiating condition, and the indications for that initiating condition.

I refer back to the example I cited earlier this morning with the LOCA. For example, it would -- it would give the initiating conditions and different parameters that may be symptomatic of that initiating condition.

Both those would eventually get funneled up to the shift supervisor, his awareness, verify that it was an emergency action level reached or exceeded, and, as instructed by the emergency plan implementing procedure, any one of the first four mentioned, he would declare the emergency and perform the immediate action in the emergency plan implementing procedure.

Q Is there any type of aids available to the operator other than procedures which would allow the opeator to access those procedures? Perhaps the use of the alarm system or some other aid?

A (WITNESS GIANGI) What we are doing on the radiation monitoring systems are color-coding the alarm set points that would get him into the respective emergency action level or the emergency classification. As an example, RML-1 reaching or exceeding 6.35 times 10-4 counts per minute would have a certain color code designation at that one indicating to the operator that that was an unusual event, and that would also facilitate the recognition and the declaration of the emergency.

Q For events that are normally considered to be Class 9 incidents or accidents which are beyond the design basis for a particular plant, how do the emergency procedures, implementing procedures, use the instrumentation, the action level criteria, take into account the possibility of such an occurrence?

A (WITNESS TSAGGARFS) If you look at NUREG-0654 and NUREG-0396 which formed some of the basic planning -- planning bases for that document, to the best of my recollection NUREG-0396 does consider along with design basis accidents some Class 9 consequences in designing this planning basis. It is my understanding that these documents

and those evaluations were input into 0654 and into Appendix 1, which is the previous NUREG-0610, designing the specific emergency action levels.

The whole philosophy in the emergency planning concepts subsequent to TMI-2 is that the action levels, in my understanding, that are developed and set at graded levels such that if conditions were to deteriorate into, perhaps, Class 9 consequences, that everything would have already been mobilized, emergency response organizations would have been activated, plant operations people would have been called in to support.

So that by meeting the action levels set forth in 0654, notification and mobilization occurs well before, let's say, Class 9 consequences. It is my opinion or my understanding that 0654 takes into consideration certain Class 9 events by that graded emergency action level process.

Q Within the realm of procedures and information available to the operator, is there any indication to the operator other than the operator's understanding of how accidents develop and their understanding of past accidents, is there anything which indicates to the operator that clearly he is into a situation which is beyond the design basis? And, if so, is there any instruction or guidance to the operator that that information should be passed along?

A (WITNESS TSAGGARES) I do not know that I can offer a satisfactory answer. It is clear from the guidance in 0654 that a general emergency is one which involves core-melt type scenarios. So in that extent -- to that extent, when a general emergency is declared, it is obvious that the degradation of the plant has gone to the levels of -- designed in 0654, and I cannot remember the exact words -- severe core degradation, potential for loss of containment integrity.

By declaring that general emergency, the operators are sending a clear signal that something, you know, severe is occurring. Whether they specifically say that they have a Class 9 event, I do not know that that really adds anything to the assessment process.

Q In general, though, you would say that a declaration of a general emergency is indicative of that type of an event?

A (WITNESS TSAGGARES) I do not know that I can honestly say that. I think that might be a question that would be directed to the staff.

Clearly, in the general emergency action level, some considerations for Class 9 events, you know, have been factored in.

CHAIRMAN SMITH: The planning basis for NUREG-0654 is set forth rather clearly, I think, inside -- I mean on

pages 6 and 7 of the document.

MR. SHOLLY: I understand, Mr. Chairman. I was attempting to reach an understanding of how once the operators recognize that they have a situation which is, you know, akin to a Class 9 accident, what happens then? I mean is this something that is significant enough that that alone should be communicated to off-site authorities? Or is there some other appropriate response? And that is why I delved into this.

I think I received a basically satisfactory answer. It is something I am going to have to pursue with the Commonwealth and the staff in order to fully resolve it.

CHAIRMAN SMITH: Mr. Gray, do you intend to offer NUREG-0654 into evidence?

MR. GRAY: Yes, sir.

CHAIRMAN SMITH: Okay.

BY MR. SHOLLY: (Resuming)

Q How many persons are directly involved in the declaration of an accident, either an unusual event, alert, site emergency, or general emergency?

A (WITNESS GIANGI) There is only one person who declares an emergency, and that is the emergency director.

Q Are there no circumstances under which someone at a lower level of authority, exercising what they believe to

be their good judgment, can override that chain of command and go to someone above the emergency director or to, for instance, FEMA, and inform them in their best judgment some sort of an emergency declaration should be made?

A (WITNESS GIANGI) I am assuming what you are saying is that if the shift supervisor who is in the control room at the time did not assess the situation such that he would declare an emergency, could another person -- for example, a control room operator declare the emergency?

Q Yes, sir.

A (WITNESS GIANGI) The answer to that is "No."

Q The emergency director is the only person who has that authority?

A (WITNESS GIANGI) Yes, sir.

CHAIRMAN SMITH: Well, now, would an unscheduled shutdown of the reactor be an unusual event within the emergency planning?

WITNESS GIANGI: An unscheduled shutdown of the reactor?

CHAIRMAN SMITH: Yes.

WITNESS GIANGI: By itself?

CHAIRMAN SMITH: By the operator.

WITNESS GIANGI: The emergency action levels would give very specific examples. As an example, a reactor trip followed by an unplanned automatic ECCS initiation would

be.

CHAIRMAN SMITH: Okay. Nothing less than that?

WITNESS GIANGI: I will just look at the list. I will just look at the list.

WITNESS ROGAN: Were you asking if, as kind of an extension of the question that Mr. Sholly asked, were you asking if some operator himself took an unscheduled initiative to shut down the plant without the authority of the senior man in the control room, would that constitute --

CHAIRMAN SMITH: That was the thrust of my question, yes.

WITNESS GIANGI: The answer would be "Yes, sir."

CHAIRMAN SMITH: In that event, then, they do have the authority to do that? They would have the authority to at least bring about the declaration of an unusual event?

WITNESS GIANGI: Well, what they have done is generated a situation wherein I believe it is the last of the unusual-event categories where you have a plant trip or shutdown and it one of these general terms that gives judgment to the emergency director or to the senior man in the control room. He does not necessarily, as a result of [illegible] action, have to declare an unusual event, but certainly [illegible] been given the judgmental right to do that, because he is not sure why operator has done what he did.

Chairman Smith, if I could refer to previous

testimony by Mr. Hukill, I believe, and Mr. Toole on a similar subject, if in the assessment of a control room operator he felt the plant to be in an unsafe condition, would he have the ability to shut down the plant? I think that is unmistakably yes, he does have that capability.

CHAIRMAN SMITH: Yes, yes. We learned from the panel that there is a hierarchy of four levels, any of which can shut down the plant. I was just suggesting or inquiring whether that action in itself would be an action which would require the emergency director to declare an unusual event.

WITNESS GIANGI: Not by the emergency action levels that we adopt, no.

BY MR. SHOLLY: (Resuming)

Q This may have already been covered, but again to focus the discussion, who, by position, under whatever circumstances, can assume the position of emergency director?

A (WITNESS GIANGI) The shift supervisor initially assumes the position of emergency director. If he is incapacitated for any reason, the shift foreman has the ability to assume that role. Of course, as we mentioned earlier, within one hour supplemental to that would be the vice president of TMI-1, the director of operations and maintenance, as well as Mr. Potts, the rad con manager.

CHAIRMAN SMITH: It strikes me as unusual that Mr.

Ross is left out of that sequence entirely. Could you explain that?

WITNESS GIANGI: Yes, sir. Mr. Ross, who is the SRO, would take on the functions of operations coordinator. He would come in, in fact, and assist in the operational accident assessment that I mentioned earlier and report directly to the emergency director.

WITNESS ROGAN: In other words, he has only then one responsibility as the senior operator, and that is to direct and supervise the operators in the control room and direct his full attentions to operations, whereas the emergency director has a slightly broader responsibility, including communications of protective actions as necessary and receiving information from the RAP. Mr. Ross has one responsibility.

CHAIRMAN SMITH: There could be a time there where operators junior to Mr. Ross serve as the emergency director?

WITNESS ROGAN: I am sorry, sir, I missed it.

CHAIRMAN SMITH: If Mr. Ross were on site at the time of an emergency, at no time would he become emergency director; his shift foreman could, but not Mr. Ross himself?

WITNESS GIANGI: It is conceivable if the timing -- if within one hour, for example, either one of the three

emergency directors, the TMI-1 director of operations was not there, Mr. Ross does arrive before then, the shift supervisor would remain as emergency director until such time as one of the three did relieve him properly.

MR. ZAHLER: Mr. Chairman, might this be a good time for the afternoon break.

CHAIRMAN SMITH: It is either now or we are going to lose it. Let's take a ten-minute break.

(Brief recess.)

MR. ZAHLER: Mr. Chairman.

CHAIRMAN SMITH: Mr. Zahler.

MR. ZAHLER: Before we start again, I have one quick question to Mr. Tsaggares, which will correct a minor error in his testimony this morning. Now is as good a place as any to do it.

Mr. Tsaggares, earlier this morning you testified that you believe you had been deposed by the Rogovin group. Do you have anything to add to that?

WITNESS TSAGGARES: In reflection, my recollection was that I was interviewed and not formally deposed.

(Counsel for ANGRY conferring.)

MR. SHOLLY: My source of information did not differentiate between deposition and interview.

MR. ZAHLER: Us lawyers, unfortunately, do.

(Laughter.)

MR. SHOLLY: The Board, staff, Commonwealth, and Licensee, I am sure, are aware by now of the staff documents in front of them. These are the copies of the documents I had mentioned earlier that we had intended to use for cross-examination purposes. It may develop through either the Board's desire or our desire to attempt to introduce these into evidence. So those are the documents that will be involved.

This is not just all for this panel. This includes the Licensee and the Commonwealth.

Would it be helpful to identify these documents other than their just simple existence?

CHAIRMAN SMITH: These are potentially to be used for cross examination?

MR. SHOLLY: Yes.

CHAIRMAN SMITH: I see no need to identify them until you do use them.

BY MR. SHOLLY: (Resuming)

Q Getting back to the issue we were dealing with before the break, in raising the issue about who can function as emergency director and who has the authority to report one of the four emergency classifications, the Commonwealth, I assume, is aware of those facts as you explained them, the fact that there are a limited number of people who can function as the emergency director and that

the emergency director is the person that would be contacting or causing contact to occur to FEMA in the event that one of these four classes of alert is initiated. Is that correct?

A (WITNESS GIANGI) To the best of my knowledge, they are, yes.

A (WITNESS POGAN) In addition, Mr. Sholly, part of the initial communications is verification from -- through the BRP.

Q Before I ask my next question, I want to be sure that all parties understand that I do not raise this with any individual in mind and do not mean to imply that this is the case. I am concerned about a hypothetical possibility that for whatever reason the emergency director chooses not to declare an alert and a more junior member of the staff decides to take it upon himself to initiate the initial notification to FEMA, who would FEMA contact to verify the declaration of that alert or unusual event or site or general emergency?

A (WITNESS GIANGI) Assuming this -- this does happen the way you mention, and it is purely a hypothetical situation, FEMA, through the normal operating procedure does not in fact call back for the verification as you well know Bureau of Radiation Protection does.

Assuming the Bureau of Radiation Protection is who

you are referring to as the verification party, they would call back the Unit 1 control room, and at that point a specific checklist would have been filled out or in the process of being filled out and information would be transmitted, one of which would be emergency verification and the second of which would be radiological and operational status of the plant for their assessment to refer back to with FEMA.

Q Would -- would the Bureau of Radiation Protection attempt to directly contact the emergency director at that point? Or would they -- or would they contact whoever answers the phone in the control room?

A (WITNESS GIANGI) More than likely they would contact the Unit 1 control room, and it would be answered by a communications assistant.

A (WITNESS ROGAN) Mr. Sholly, may I offer the hypothetical situation that you have constructed here?

In order for to even get to the point of where the verification call would not accomplish its intended objectives would require the collaboration of at least the control room staff unanimously, because any sort of circumstance which might arise which would call for the then-shift supervisor or senior operator to become the emergency director and classify an emergency would also be known to everyone else in the control room and possibly to

others outside the control room.

So it would be extremely difficult for a single person to somehow or other prohibit the passage of the information in the first place, and certainly the verification of the existence of an emergency in the second place.

Q Fine. The testimony at page 18 states -- and I am going to quote a single sentence here: "We believe that the emergency could be assessed and declared within ten minutes." What is the basis for that belief? And in addressing that, could you explain when that ten-minute time period starts to run, so we understand what -- what is being asserted here as a capability?

A (WITNESS TSAGGARES) In making that statement, the foundation is the new approach that the Licensee has taken in its philosophy in emergency planning consistent with 0654 and the training that the operators are provided.

The whole philosophy behind the action level scheme in 0654 is that whether the operator understands specifically the event that is occurring, he has parameter trigger levels, et cetera, that get him into, even if it is a low-level of emergency classification, implements the plan.

We feel -- the Licensee feels that ten minutes is a reasonable amount of time for the operator to recognize an

abnormal situation and assess whatever the parameters are against the emergency plan.

Mr. Giangi testified before that there are several ways to get into the emergency plan, either through the emergency plan operating procedures, abnormal procedures, or by a direct assessment against the emergency plan implementing procedures.

As far as when the time clock starts for the ten minutes, it would seem to me that the time clock starts when the operator is first presented with an abnormal situation. I do not know that I can be any more specific than that.

Q During the ten minutes from that point then, the operator would recognize that there is an abnormal situation by whatever means, either comparing it against the implementing procedures or accessing it through another type of procedure --

A (WITNESS TSAGGARES) Yes. It should be --

Q And declare whatever situation should be declared within that ten minutes; is that correct?

A (WITNESS TSAGGARES) That is correct. That is generally correct, yes.

Q Now, were you going to say something else?

A (WITNESS TSAGGARES) I lost my train of thought. I was going to, but I cannot recall.

Q I wanted to complete that.

Are there any assumptions, broad assumptions, that go into this judgment that the plan can be implemented within ten minutes following the appearance of this abnormal situation? I do not know if I can be any more specific or not.

A (WITNESS TSAGGARES) Would you repeat that?

Q Are there any assumptions behind this belief that in fact the operators will be able to recognize and declare an emergency within ten minutes of the appearance of the abnormal condition?

A (WITNESS TSAGGARES) I would say that the assumption is that the operator is trained to recognize indications on his instrumentation and to respond accordingly. That is the way he is trained. He passes an NRC operator's licensing exam to be able to respond to plant transients.

Q There might be some time delay between the start of, say, a transient and the point at which you reach something which would cause the emergency plan to be implemented; isn't that a possibility?

A (WITNESS TSAGGARES) That is a possibility.

Q Have you made any assessment of how long a time period that might be, or is that something which is not subject to quantification?

A (WITNESS TSAGGARES) That would be difficult to

say and would depend on the particular scenario. Again, it should be kept in mind that, particularly for the unusual-event category, the action levels are set at very low levels, if I can use that as a phrase.

A (WITNESS GIANGI) Mr. Sholly, if I could also add that again the concept of the emergency action levels, we tried to take away the discretion that the operator may be faced against at 2:00 o'clock in the morning, for example, trying to delineate specific action levels and, in fact, also indicate the systematic parameters or key parameters that may be triggered as a result of that initiating condition.

I believe that that, coupled with the training and the drills that these operators have and will eventually go through completely, and the fact that the discretion for declaring an emergency at his discretion although an action level has not been reached in the scenario that was referred to earlier, would facilitate the declaration of an emergency, expedite, if you will, from the initial event of any abnormalities.

Certainly, the ten minutes is not a magical number based on a specific scenario that we presented in the testimony. It was our belief, and in our discussion with the operators, that ten minutes would in fact be approximately the number of minutes that it would take to

declare that emergency.

Q You mentioned the training that the operators have received in recognizing and declaring emergencies. What sort of specific training do they receive in this area? And I am interested in knowing if they receive simulator training in that area and/or walkthroughs involving simulated conditions.

A (WITNESS TSAGGARES) The operators do receive simulator training in their normal licensed operator training program. And in that simulator training they respond -- and the training is primarily based on responding to transients and/or abnormal situations.

In the development of the emergency plan, we felt that since there is no requirement for a time period, and we felt a responsibility to convey to the operators in a training sense that they should be able to assess and declare and get into the emergency plan if necessary as soon as possible. And we basically came up with the ten-minute figure as a target.

The operators also receive training on the specifica action levels for each of the classifications and the drills and scenarios that we present have varied responses from the low-level unusual event all the way up to a general emergency. So they get a lot of practice also.

Q The next series of questions deals with the

assessment of accidents and also the use of dose projections. On what system or systems does Licensee rely for making radiation dose projections? I mean are there any beyond MIDAS?

A (WITNESS TSAGGARES) Yes. The way the plan is designed and the emergency action levels are designed, the initial dose projections are made based on indication on the in-plant radiation monitoring system, in conjunction with the meteorological information available to the operators in the control room.

Q Is that sort of dose assessment -- is that the sort of dose assessment that makes use of some sort of a standard set of assumptions and incorporates meteorological data, goes through a set procedure to come up with dose projection?

A (WITNESS TSAGGARES) Yes, there is a set procedure.

Q Is that the sort of procedure which is intended to be performed utilizing the minicomputer which we saw on the plant tours?

A (WITNESS TSAGGARES) Yes. Those projection techniques can either be done utilizing the minicomputer or can be done manually.

Q Which staff members, by title, are qualified to make dose projections in that manner?

A (WITNESS TSAGGARES) The staff members that normally perform the function are personnel designated as the radiological assessment coordinator. Typical people filling that position are radiation protection foremen and radiation protection engineers.

The shift supervisor, shift foreman, and other personnel designated as emergency directors also receive training to be able to perform that function, although they normally would not be called upon to perform that function.

Q The testimony at pages 82 and 83 references the use of a dose projection system known as "MIDAS." I have a number of questions about how MIDAS operates.

Again, who on Licensee staff is qualified to utilize the MIDAS system in making those projections?

A (WITNESS GIANGI) We have a designated department -- namely, the Environmental Assessment Department -- who perform the environmental sampling and analyses on an ongoing basis to meet environmental tech specs. They are the individuals who eventually will tie into the MIDAS system and do this dose projection, as you mentioned, as well as implement the radiological environmental monitoring program on a long-term basis.

Q Where will the software -- I assume there is a software portion of the MIDAS system involved -- where will that software portion of the system be headquartered?

A (WITNESS GIANGI) Presently, the software system for the MIDAS is physically located at the environmental assessment command center at Harrisburg International Airport and ties into the Rockville, Maryland, computer.

Q That computer has meteorological data?

A (WITNESS GIANGI) Yes, it does.

Q Is it intended that that is where the MIDAS software will be maintained, or will that change?

A (WITNESS GIANGI) When you say "MIDAS software," the CRT has the capability of accessing that information from the main terminal.

Q In the control room?

A (WITNESS GIANGI) In the environmental assessment command center. However, the control room has the three major key meteorological parameters displayed.

Q Can you explain briefly how MIDAS functions, what kind of inputs are needed, in general how the system goes through the steps of making the dose projections, and then how those projections are used by the Licensee?

A (WITNESS GIANGI) Okay, I would like to say that I believe that is covered by Mr. Riethle's testimony, to some degree.

I not being a meteorologist, I could give you what little I do know about the system; that being that it does rely on real-time meteorological information which is

acquired and stored in the main terminal and can be accessed by the CRTs I mentioned.

Radiation monitoring system data is input into this computer. And, of course, it does the same function as the control room radiological assessment coordinator does, and that is essentially define the chi over Q dispersion factor, the source term, and project the dose rate in the affected area.

Q Does the MIDAS system, through software or inputs which can be added by Licensee's staff, take into account seasonal and diurnal variations and climatic factors, dispersion factors, and all the terrain-induced variations?

CHAIRMAN SMITH: What kind of variations?

MR. SHOLLY: Terrain-induced relating to the topography of the site and the surrounding area.

WITNESS GIANGI: Again, I am not qualified really to answer that question. I do not believe anybody on this panel is really qualified to answer that question.

To the extent that the MIDAS uses actual real-time meteorology, it does in fact take into account the climatic conditions at that time.

As far as your second question, I really would hesitate in answering that question. We have a meteorologist, incidentally, who is part of the environmental assessment command center, who is actively

involved in this MIDAS system.

Q Well, your testimony on page 82 concludes, does it not, that "MIDAS satisfied the Class 8 criteria as described in Appendix 2 of NUREG-0654"?

A (WITNESS ROGAN) Yes, it does.

Q Do the witnesses have a copy of NUREG-0654 before them?

A (WITNESS ROGAN) Yes, we do.

Q Would you refer to page II-3? I might point out that that is Appendix 2 of NUREG-0654. It is one of the items that we had planned to cross examine from.

CHAIRMAN SMITH: What page, Mr. Sholly?

MR. SHOLLY: II-3.

BY MR. SHOLLY: (Resuming)

Q Now, if you don't -- if the witnesses do not know what a site-specific climatological effect such as seasonal, diurnal, and terrain-induced flows are included in this, how can you conclude that the system satisfies the criteria?

A (WITNESS GIANGI) Based on discussions with the Environmental Assessment Department, Pickard, Lowe & Garrett, the consulting firm that we referred to earlier, they do believe that it meets the Class A model/

Based on our limited meteorological background, I could not say specifically how it does it in fact.

MR. ZAHLER: Mr. Chairman, I would note that Mr.

Riethle is going to be a witness for Licensee. One of his responsibilities is he comes from the environmental assessment group that Mr. Giangi was talking about, and I think these questions -- that is, the method by which MIDAS complies with Model A -- might be better addressed to Mr. Riethle.

MR. SHOLLY: Mr. Chairman, we certainly intended to cross examine Mr. Riethle on this material. I find it rather strange that these witnesses would testify as to whether MIDAS meets these criteria when, in fact, by their own admission, they are not qualified to make that judgment.

MR. ZAHLER: I was just trying to provide a source of information. Mr. Giangi has testified that the basis of that testimony was on what other people told him. In fact, I believe one of those people is Mr. Riethle. We can find out when Mr. Riethle is here.

I was just indicating that if Mr. Sholly had more detailed concerns in this area, Mr. Riethle was going to be available. I am not suggesting that he not examine these witnesses in this area, if he wants. I would just point out that there is another source that is available to him.

CHAIRMAN SMITH: There is nothing for the Board to rule on. I think you are in agreement.

MR. SHOLLY: If I could have a moment to confer

with Ms. Bradford.

(Counsel for ANGRY conferring.)

MR. SHOLLY: Mr. Chairman, I am not really sure how to go about this, because I have never been present when it was done. But I believe that this sentence, the last sentence on page 82 of the testimony, should be stricken from the record on the basis that these witnesses are not qualified to support that statement.

If, indeed, Mr. Riethle is qualified to do so, as far as we are concerned he is welcome to make such a statement, and we will cross examine him on that. But these witnesses, in our view, do not have a basis for asserting that this complies.

CHAIRMAN SMITH: Before we would entertain the motion, we would either ask some questions of our own or give Mr. Zahler to establish the basis for the statement. Since you are making the motion now, Mr. Zahler, would you address the motion?

MR. ZAHLER: Yes. With respect to the motion -- and this may come up again with respect to these witnesses -- emergency planning, by its very nature, is multidisciplinary. Earlier today we discussed all of the consultants that these people have relied on either in-house, other people at the plant, outside assistance used in developing an emergency plan. These people have a

general knowledge with respect to the emergency plan and what is required. In the course of their normal everyday business, they rely on other people to provide assistance to them as to the details of this.

I propose that, on the basis of Mr. Giangi's testimony, that he was provided this information by people that he normally relies on in terms of developing the emergency plan, and that in fact it is an appropriate statement for these witnesses to make.

And I realize that the level of Mr. Sholly's ability to probe that statement, that is the basis on which actual compliance is satisfied may be somewhat limited. But I think Mr. Riethle is going to cure that, in effect.

But if we set a rule that unless these witnesses, based on their own personal knowledge, can explain every nuance of the plant operations, meteorological controls, meteorological information, time evacuation estimates, in fact it is not possible in a reasonable manner to present a panel on emergency planning.

CHAIRMAN SMITH: Well, I think that the problem can probably be resolved by having the testimony, written testimony, comport to the oral testimony. They have given reason why they believe it is appropriate to rely -- to rely upon the MIDAS system. And they have explained while they believe it satisfies the Class A model described in

NUREG-0654, they were told so under circumstances under which they normally accept as reliable.

So can't the testimony be conformed to state that the Licensee has concluded that MIDAS satisfies the Class A model or Licensee is relying upon the MIDAS system as satisfying the Class A model?

It is a difficult statement for us to accept from this panel a straight, direct statement, unqualified statement. It is difficult for us to accept that from this panel. But I see nothing wrong with the method by which they have taken this information and worked it into their considerations. That is -- that has been explained. So the only problem that we have is that the testimony accurately reflect the reliability of the witnesses upon the information.

MR. ZAHLER: I certainly have no objection to the testimony being modified to reflect the oral testimony which, as I understand it, is the Licensee believes MIDAS satisfies the Class A model based on information from people they normally find trustworthy. Is that your proposal?

CHAIRMAN SMITH: That is essentially it. But I think some qualification should be inserted at this point physically, because I -- what is your view of my proposal, Mr. Sholly?

(Counsel for ANGRY conferring.)

MR. GRAY: Mr. Chairman.

CHAIRMAN SMITH: Mr. Gray.

MR. GRAY: Mr. Chairman, if I might ask Mr. Zahler will Mr. Riethle be able to support this statement?

MR. ZAHLER: I hope so.

(Laughter.)

MR. GRAY: What I was going to suggest was that if the statement is being modified, it might be modified also to indicate that Licensee's belief in this regard will be supported by Mr. Riethle, who is qualified to support it.

MR. ADLER: In that case, Mr. Chairman, Mr. Riethle can just incorporate the statement into his testimony rather than confusing the record by having it here.

CHAIRMAN SMITH: Well, the information as it is qualified by oral testimony, one way or the other, is appropriate in the evidentiary record. If their basis for it is inadequate, that should be explored now. I think it has been well explored. But what if Mr. Riethle does not know anything about this? Then what do we do? Is he here?

MR. ZAHLER: It is Riethle. Mr. Riethle is not here today, but he will be as soon as this panel is done. Rest assured, Mr. Chairman, that one way or another, Licensee is not going to let this be unresolved. We will establish someone -- if it is not Mr. Riethle, someone else

-- who provides the necessary information to establish that MIDAS complies with Class A model in 0654. And it may be a staff witness, for all I know, on cross examination

CHAIRMAN SMITH: You see, Mr. Sholly, the point we have to make here, this panel are themselves officials charged -- Licensee's officials charged with performing these functions as well as testifying about it. And if in the normal course of their duties, they receive information from a source which is customarily reliable, then they can testify that that is the case, and the information that they rely upon is appropriately in evidence. But it has to be correctly qualified.

And I think that altogether you have done it, and the oral testimony does qualify it. I recommend that the last sentence be qualified to be rewritten, maybe overnight, be written to actually comport with the oral testimony.

MR. SHOLLY: If that is acceptable to Mr. Zahler, we will subsequently withdraw our objection.

MR. ZAHLER: That is acceptable to Licensee.

CHAIRMAN SMITH: Mr. Gray?

MR. GRAY: The staff has no objection to that.

CHAIRMAN SMITH: Okay.

Mr. Adler?

MR. ADLER: We have no objection.

CHAIRMAN SMITH: If there are any objections, I

assume I will hear about them.

Well, no, I tell you, rather than overnight, because we are going to lose the transcript, let's see if it cannot be -- take a few minutes now and see if the sentence, in consultation with your witnesses, can be redrafted now so that the copy that appears in the transcript will be accurate.

MR. SHOLLY: Mr. Chairman, I think the language which was tossed back and forth would be eminently satisfactory. I believe, "Licensee believes that MIDAS satisfies the Class A model described in NUREG-0654 Appendix 2, Revision 1, Licensee's testimony of William" -- I do not know what his middle initial is.

MR. ZAHLER: Riethle.

MR. SHOLLY: "Mr. Riethle will address this in more detail."

CHAIRMAN SMITH: That seems to be simple and responsive to the problem.

MR. ZAHLER: I must confess I was talking to my witness and I did not hear the beginning part of Mr. Sholly's statement. I am sorry.

MR. ZAHLER: Mr. Chairman, the only problem I have with that is I believe Mr. Riethle can support this. I do not have positive confirmation of that. I would be unwilling to have my witness testify to that at this point.

CHAIRMAN SMITH: Why don't we take the first part of it and state that it will be addressed by other witnesses.

MR. ZAHLER: I have no problem with that.

CHAIRMAN SMITH: Okay.

MR. ZAHLER: Mr. Chairman, just so the record is clear and understood what I have just agreed to, am I correct that this sentence has been changed to say, "Licensee believes that MIDAS satisfies Class A model described in NUREG-0654 Appendix 2, Revision 1. Other witnesses will address this matter further"?

CHAIRMAN SMITH: Yes, except to be neat I would say "another witness or witnesses."

MR. ZAHLER: "Another witness will address this matter further."

Just so the record is perfectly clear, as modified, do the witnesses adopt this as their testimony?

WITNESS TSAGGARES: I do.

WITNESS GIANGI: I do.

WITNESS ROGAN: I do.

CHAIRMAN SMITH: You are making this correction on a copy that is going to be bound in the transcript. That is the point of doing it now.

MR. ZAHLER: We will arrange to make sure that that is done.

CHAIRMAN SMITH: Yes.

Okay, Mr. Sholly.

MR. SHOLLY: As the Board will note, pages 10 and 11 of the cross-examination plan deal in detail with MIDAS. Apparently, these would be more properly directed to Mr. Riethle.

CHAIRMAN SMITH: Yes.

MR. SHOLLY: If the Board will bear with us, we certainly have planned additional cross examination beyond this point. It simply has not been neatly typed and put into the form so that you would have it. We would --

CHAIRMAN SMITH: Why don't you --

MR. SHOLLY: We are determined to go ahead, if we may, with cross examination on the prompt-notification system which Licensee proposes to put into place, and also the evacuation time study which they have underway. We feel that needs to be addressed in more detail and propose to do that. And I rather think that will take up the remainder of the time we have left today.

CHAIRMAN SMITH: All right. As far as the cross-examination plan, we will excuse you from that requirement for the rest of the day.

(Counsel for ANGRY conferring.)

MR. SHOLLY: Mr. Chairman, I want to bring something up and see how the Board feels about this. I

wonder if it might not be an appropriate point to see if other Intervenors who are here, or perhaps the Commonwealth or staff have cross examination on the matters which have been raised thus far, in order to try and avoid confusing the record by continuing on for a very long period of time. I do not know how the staff or Licensee would feel about this. We are perfectly prepared to move forward. I just wonder if -- if that would be an alternative which might be feasible.

CHAIRMAN SMITH: I do not see that this is a logical breaking point. I think that you ought to continue on with your testimony.

MR. SHOLLY: Fine.

CHAIRMAN SMITH: Assuming you are prepared.

MR. SHOLLY: Yes, sir.

CHAIRMAN SMITH: Okay, go ahead. We have excused you from the cross-examination plan requirement because you would have filled out easily today on the plan that you submitted. And it was a reasonable plan.

BY MR. SHOLLY: (Resuming)

Q With regard to the prompt-notification system which Licensee is in the midst of installing or acquiring materials or whatever, could the witnesses trace the development of this system, how it was conceived, who did the work, and how we arrived at the point now where the

system that is being proposed is actually being implemented?

A (WITNESS ROGAN) Essentially, the initial development occurred before my arrival, but I think I am familiar enough with it to provide an overview which will put in substance what has finally occurred, and then I will ask my fellow panelists to add to that as appropriate.

With the development of the requirements in 0654 and the obvious requirement for some means of notifying the public in the event of a facility incident, we entered into a contractual arrangement with the Federal Signal Corporation to do a study of the ten-mile area surrounding Three Mile Island to determine what might be required in terms of notification and alert devices in order to properly and promptly alert the public.

That study took two forms. The first was actually in the form of almost a gratuitous effort, sound business practice, if you will, and they walked into the formal study, the cost of which I am not prepared to quote, which outlined for us, based on the then-guidance on siren performance requirements, the number and type of sirens we might require in order to cover the entire ten-mile area, and made some suggestions with regards to the kinds of equipment we could use and the number of devices we would require.

That study evolved over time into a -- what we then began to view as a study which, in its time, was probably valid but which needed to be reassessed on the basis of changing guidance from the NRC and FEMA with respect to the actual performance levels that would be required for sirens or other alerting devices in order to assure that the public were promptly notified.

And, indeed, the final rule and NUREG-0654 guidance on that final rule when it was published in November changed substantially the ground rules by which this system was to be designed.

So, in effect, we went back and took a look at the initial design proposal which, just as a matter of information, it called for some 152 sirens of various kinds and types, and applied new criteria which had been established by NUREG-0654 and developed a siren system which would provide for 100-percent coverage of the exposure plume pathway.

And that siren system is the one which with minor modification we are using today as our basic design. That system calls for the use of approximately 83 sirens, most of which are of an omnidirectional type; that is to say, nonrotating, 125 decibel. They will provide a minimum of ten-decibel signal over the ambient noise level in the area where the sirens are to be located.

Although the guidlines we used were those suggested for the development of proposals where you actually did not survey sites, in fact most of our sites were at one time or another surveyed for sound. And we are satisfied that we have come in very much on the conservative side with regard to the criteria.

The two criteria we applied -- for your recollection -- were that for population densities less than 2000 per square mile, we needed -- we needed to have at least a 60-decibel signal. And for an over-2000 population density or in areas where we had high-rise buildings or other installations which would raise the ambient levels, we needed to have a 70-decibel signal. Or relating that to the ambient noise levels of 50 and 60 decibels, respectively.

On that basis, then, we developed the system. We are now in the process of having the coverage confirmed by theoretical caluculation by an acoustical engineering consultant who we have retained. He has given us a preliminary verification of sound coverage to indicate that they more than adequately meet the requirement in terms of the total area, and will confirm that by documentation, I expect, sometime within the next six weeks.

But those will be theoretical calculations which will be confirmed by tests as we install the system.

We have, in fact, procured the equipment based on

the preliminary design proposal. We expect first delivery on some of the equipment at the end of March. For the balance of the equipment, we will expect delivery throughout the month of May and into early June.

We are in the process now of finalizing our approach to right-of-way negotiations, as I indicated earlier. And subject to some unforeseen circumstance, which does not at this point at least appear to include such things as material availability or installation problems, we should have a fully operational system by the first of July, as required by the NRC.

Q What factors might tend to delay final implementation of the system; in other words, that would delay operability beyond July 1?

A (WITNESS ROGAN) My only concern now -- and it is a concern born of ignorance rather than fact -- is what, if any, of the possible and perceived complications of achieving right-of-way might evolve? We just simply do not have a sufficient experience base in that regard to even say whether or not our existing and standard right-of-way agreements will be appropriate or whether there is some separate legal negotiation required.

I mention this caution -- I mention this as a cautionary note only because I have -- it has been suggested to me by my fellow members of the industry that they have

begun to have a little trouble in negotiating rights-of-way.

Q One of the things you mentioned very briefly was that sound surveys were done. Are you familiar with what was being looked for in these sound surveys when -- what conditions the surveys were done under?

A (WITNESS ROGAN) I do not have the specific details at hand at the moment. I do know that, using standard sound meters, they went out to areas where they -- where they were intending to locate sirens and in general areas to determine ambient noise levels, to determine whether or not there was some requirement which exceeded the guidelines.

Q Were the results of the sound survey made available to the Commonwealth and the NRC?

A (WITNESS ROGAN) Except as they might have appeared in the final design study of the Federal Signal Corporation, no, they were not.

Q That is the final Federal Signal study that has been submitted?

A (WITNESS ROGAN) No, that was the original study which was conducted by Federal Signal Corporation last July, I believe, the June-July time frame. And they were the ones who actually did the area sound surveys. And that study was published.

And, to the best of my knowledge, I believe that the Commonwealth had access to that study. However, I cannot confirm that at this moment.

Q Are there any special procedures or special notification systems which might be specific to certain types of installations, like factories, hospitals, apartment complexes, this sort of thing, where a general-purpose siren signal may not be heard? Are there any special procedures for involving those types of facilities in the emergency notification scheme?

A (WITNESS BOJAN) We are considering at this time a rather significant program of tone alert devices. But I would like to say, before I continue, that the idea is not in the event a particular institution would not hear the signal, because we feel that our system as designed is going to give more than adequate coverage to the entire EPZ, but rather as a practical matter because some of these installations and institutions might have specific requirements which are much more difficult to manage than the normal family situation.

We are looking at the possibilities of installing institutional tone alerts in, for instance, hospitals, homes for the elderly, convalescent facilities, schools, jails.

And in fact we have not arrived at a specific decision on this, but we are trying to work out the

technology involved in whether or not these systems can not only be tonal alert in terms of some sort of a buzz or siren or signal but also possibly something over which a voice transmission could occur which could alert special institutions perhaps earlier than the public at large, in order to give them a little additional planning time.

I mention this only as a concept we are considering, and we do not know for a fact that we can accomplish it at this point.

Q Has consideration been given to using the NOAA weather radio stations for that purpose? There are tone alert radio devices on the market which utilize signals brodacast by NOAA stations.

A (WITNESS ROGAN) We have considered using that and a number of other commercial devices. I would only note that NOAA has not presented itself as perhaps the best solution.

Q You mentioned that you did not feel that installation of the siren system would be a problem in terms of meeting the July 1 date; is that correct?

A (WITNESS ROGAN) I am sorry, could you ask that question again, please?

Q Did you not testify that you felt that procurement problems and installation problems would not delay Licensee's capability to meet the July 1 deadline?

A (WITNESS ROGAN) That is correct. Our understanding of delivery schedules and other arrangements suggest no problem in terms of meeting the 1 July deadline.

Q Do you have any idea how long it takes to install one of these systems?

A (WITNESS ROGAN) As a matter of fact, we do. We just completed a rather extensive meeting discussing the installation of siren systems. And we would anticipate once a crew has been properly trained and considering the particular device that we are using, estimates of from one to two sirens per day per crew. And the systems are going to be installed by three separate organizations, as we see the plan right now. So in fact the workload per group will not be beyond their capability to meet the deadline.

Q A little bit about the system itself. How is the system activated?

A (WITNESS ROGAN) The system is going to be activated by remote radio control.

Q Who -- who would exercise that control?

A (WITNESS ROGAN) That will be exercised by each of the five counties. Each county will have the capability to activate the sirens for the system within their county.

Q Could the system be activated by FEMA?

A (WITNESS ROGAN) It is my understanding that that is neither their capability nor the policy.

Q Take a look at how long it might take for the signal to go out. Let us assume that Licensee is correct in that within ten minutes of abnormal conditions presenting itself, Licensee is able to correctly identify emergency situation and declare it. So, at most, we are ten minutes into the situation. Is that correct, so far?

A (WITNESS ROGAN) Under your scenario so far, that is correct: ten minutes.

Q Did the emergency planning regulations not provide that within 15 minutes following a decision to declare an accident or emergency situation, that within those 15 minutes there must be a capability for the Licensee to notify off-site authorities, which in this case I assume would be FEMA? Is that correct?

A (WITNESS ROGAN) That is correct. That is, within 15 minutes of determination of an incident, a declaration incident.

Q That brings us to 25 minutes so far.

A (WITNESS ROGAN) No, no, I would object to that sort of cumulative mathematics. You have --

Q Let me begin again then, please. At maximum, you are saying it could take you as long as ten minutes to recognize and declare an emergency; is that correct?

A (WITNESS ROGAN) Yes.

Q And under the regulations, it could take as long

as 15 minutes to contact FEMA; is that not correct?

A Yes.

Q So, so far it could take as long as 25 minutes?

A (WITNESS ROGAN) Yes.

Q Do not the regulations also provide that there be the capability for the public to be notified within an additional 15 minutes following notification, in this case, of FEMA?

A (WITNESS ROGAN) I believe that that is a question of controversial interpretation which I do not believe I am qualified to pass judgment on, because I think the issue is one of demonstrating a 15-minute capability after the governmental authority determines that notification of the public is appropriate.

Q I will accept that. Let us assume that the government is able to reach this determination immediately upon receiving notification from the Licensee, so that the total time which might expire would be ten minutes to recognize and assess and declare the accident, 15 minutes maximum for the Licensee to notify FEMA, and 15 minutes following a decision to implement an evacuation or other protective action for the alert to go out.

So that brings us to a total of 40 minutes, is that correct, maximum?

A (WITNESS ROGAN) Maximum of 40 minutes, according

to the worst scenario, yes.

Q Are you familiar with the notification capabilities of FEMA in terms of contacting the five risk-area counties?

A (WITNESS ROGAN) The exact details of the mechanisms, I am not, except that I know they are in direct contact with all five counties.

(Counsel for ANGRY conferring.)

Q I think, in order to finally clarify this, it is going to take some cross examination of Commonwealth witnesses. But we are satisfied that it could take at least a maximum 40 minutes to complete the initial notification. Is that -- is that your view, that under worst-case maximum conditions, that your ten-minute scenario for assessing the accident and the two 15-minute periods provided for in the regulations, that 40 minutes could expire?

A (WITNESS ROGAN) I could not agree with that conclusion as it is stated, because inferred in your conclusion is that the 15-minute requirement that has clearly been established by the regulatory agencies as a maximum allowable time, has been -- has been used as in fact the maximum time it would take.

And my assessment of that, my personal judgment of that, is that I cannot first conceive that having met the ten-minute assessment of accident and classification of

accident, that it would then take me 15 minutes to make a single call to Dauphin County and a single to FEMA.

Neither can I accept, in my judgment, that having made the decision that the public would be notified, that it would take 15 minutes to activate the siren system.

Those are regulatory requirements to put an upper bound on what design ought to provide for. But in both cases, I think they are far beyond what would normally reasonably be expected to occur, given the systems that we have.

Q Is it not correct, though, that the regulations do provide that as long as 15 minutes can be taken to complete the notifications from the Licensee to the outside authorities and also that as long as 15 minutes can be taken for the outside authorities to complete the initial notification of the public within the plume exposure emergency planning zone?

A (WITNESS ROGAN) Well, my position is that the regulations say it must occur within that time frame.

CHAIRMAN SMITH: Do you want him to agree with your arithmetic?

MR. SHOLLY: Yes, sir. He seems reluctant to do so.

MR. ZAHLER: I do not know that he seems reluctant, but I will stipulate that 15 plus 15 plus 10 is

40.

MR. SHOLLY: That is not sufficient.

(Laughter.)

MR. SHOLLY: Mr. Chairman, the Licensee's witnesses have clearly testified that they can classify and declare an emergency within ten minutes. I am willing to accept that. I think it is also equally clear that the regulations that were adopted by the Commission on August 19, 1980, provide that a total of 30 minutes can elapse between the time the Licensee declares an emergency and the initial notification to the public within the plume exposure EPZ is completed.

CHAIRMAN SMITH: Is there any dispute about that?

MR. ZAHLER: No, sir.

MR. SHOLLY: Then it is possible and it is acceptable under the regulations, and assuming that Licensee's ten-minute period is accepted by everyone, it is conceivable then that as long as 40 minutes could pass and be acceptable under the regulations.

CHAIRMAN SMITH: Is that your --

WITNESS HOGAN: I have no objection to the statement "It would be acceptable under the regulations." My objection is that it would be in fact what would be likely to occur.

BY MR. SHOLLY: (Resuming)

Q I missed your last statement. Could you repeat that, please?

A (WITNESS ROGAN) I said my objection to the previous discussion was the implication that that 30-minute delay, although acceptable by regulation, would be likely to occur.

Q In your judgment, what is the fastest the public could expect to be notified? What is the elapsed time from the time the emergency director declaring an emergency situation to exist to the completion of the initial notification of the population within the ten-mile EPZ?

A (WITNESS ROGAN) I have to take -- I have to respond in the same way that you developed your discussion, by taking it a step at a time.

Q Fine.

A (WITNESS ROGAN) First, with regard to notification of Dauphin County and FEMA, once the emergency director has declared the emergency, I would be very disappointed personally if both FEMA and Dauphin County had not been notified within two minutes. Having received that notification, the next question becomes one of when the public is notified, a question which I am totally incompetent to pass judgment on, because the time that passes between notification of FEMA and the decision by FEMA or the Governor or his appointed designee to alert the

public is a yet-undefined quantity, as far as I am concerned.

Having made that decision to notify the public, I would be equally disappointed if within five minutes of having authorized and directed that the public be notified that the five counties could not activate their siren systems.

We are talking about a mechanism which they use everyday to alert for ambulances, fires, and other emergencies. The procedure is no different.

Q Okay, now, I want to make sure I understand the testimony. As I understand it, you are saying that except for the time lapse which would occur when the Commonwealth officials would decide whether or not to initiate the alert, except for that, you would view that seven minutes would elapse from the time the emergency is declared until the public receives notification?

A (WITNESS ROGAN) Restating, in my judgment, two minutes to notify the State and Dauphin County, no reason that I can construct why it would take more than five minutes to activate the siren system once the decision was made to do so.

(Counsel for ANGRY conferring.)

Q Does the prompt-notification system -- I am referring to the siren alert system which Licensee proposes

to install -- have any type of redundancy built into the system? I am thinking in terms of a backup power source and an alternate place from which to initiate the system or another means to initiate the system. Is there any redundancy of that type built into the system?

A (WITNESS ROGAN) Only as such redundancy already exists with regard to first the common power grid which the sirens will operate off of and secondly the redundancies which currently exist within the county emergency operations centers.

And that is significant because while we will provide the controller equipment for those systems, they will operate off of the counties' emergency transmitter systems, which to my understanding are redundant.

So, in summary, it is my understanding from consulting with the transmission and distribution personnel in both utilities involved, that the grid is developed such that it would be a highly improbable occurrence which would permit any significant part of the system to be rendered without power; and that in the case of all five counties, that the control systems would be operating under backup power.

A (WITNESS GIANGI) In addition, I would like to add one thing: that the concept of the early-warning system, when the sirens blow, if you will, the public will be

instructed to go to their radio or to the television and seek additional instructions or messages. In the event of a blackout, if you will, one would expect that the public would also refer to their radios to find out what was going on.

Q How do you reach that line of conclusion? What is the basis for it?

A (WITNESS GIANGI) Based on my experiences.

Q Your experience in what capacity, sir?

A (WITNESS GIANGI) In several blackouts in New York, the majority of the individuals I have talked to at that time, whether by word of mouth with their neighbors or their portable radios, wanted to find out what was going on as most -- as I am sure you can imagine to be the case.

(Counsel for ANGRY conferring.)

Q Is there any --

A (WITNESS ROGAN) We, however, do not depend on that response for prompt notification of the public.

Q Is there any backup power to the sirens themselves other than the power which they would draw from the grid?

A (WITNESS ROGAN) No, there is not. They depend upon the common grid.

Q Do you know if the sirens which the Licensee is going to have installed can be powered by batteries?

A (WITNESS ROGAN) It is my understanding that they

cannot. The radio equipment which remotely controls them could, but it would provide no -- no particular solution to the problem, because they still would not be able to drive the siren itself.

Q Will the witnesses refer to NUREG-0654, Appendix 3, page III-3?

CHAIRMAN SMITH: Mr. Sholly, when you come to a convenient stopping point, we will adjourn for the evening. If this is one --

MR. SHOLLY: Pardon?

CHAIRMAN SMITH: If this is a change of subject, I think it would be a good time to adjourn for the evening.

MR. SHOLLY: I think it would be more beneficial to complete this thought. I do not anticipate it will take long.

CHAIRMAN SMITH: I see. Go ahead.

BY MR. SHOLLY: (Resuming)

Q Criterion 2 -- I am sorry, it is not a criterion. A minimum acceptable design objective 2C on that page states that special arrangements will be made to assure 100-percent coverage within 45 minutes of the population who may not have received the initial notification within the entire plume exposure EPZ.

It further states that the basis for any special requirements and exceptions -- for example, for extended

water areas with transient boats or remote hiking trails -- must be documented.

How does Licensee propose to comply with that acceptable design objective?

A (WITNESS ROGAN) We have two specific approaches. The first is the basic design of the system. Design objective C suggests an approach which has been followed by some, and that is population coverage versus area coverage. As I indicated earlier, our design objective for our system calls for 100-percent coverage for the entire EPZ area, with at least the minimum 10-decibel over-ambient noise level for the entire area, including areas which are, for all intents and purposes, unpopulated areas, such as parks and farmlands where there may be just a few houses.

Let me say that there are two reasons for doing that. One, we believe that it is important because of personnel moving in the area, not necessarily transients, but because of the nature of the area, farmers working in the fields and so on, that we have the target on the area rather than the populated areas themselves.

Secondly, such a system is a long-lived system estimated from 20 to 30 years if it is properly maintained. And a total coverage of the area provides for populations shifting and rearrangement and so forth.

So, in the first case, we see no area within the

ten -- within the exposure plume pathway which is not covered by at least the required sound of siren signal, and most areas covered by more than that.

Secondly, we have a commitment from the State Police of the State of Pennsylvania, as reflected in a letter of agreement in our plan, which suggests that if helicopters are available and weather and other conditions permitting, they will in fact broadcast notification in places such as gamelands and other areas.

And we also have the dedicated assistance of the Coast Guard with regard to the Susquehanna River.

So, in combination, those three backed up by institutional alerts, which we are, as I indicated, studying, I find it very difficult to conceive of an area which would not be covered.

But let me go one step further. I was asked a question earlier about the kinds of things we have discussed with the State and counties in our meetings.

And one of the thrusts that we have continuously projected was that even the best of mechanical systems needs to be backed up.

And the example I use is "poor Mrs. Smith," who is either blind or deaf and does not have a car and may not hear the signal or may not know where to go." And the only guaranteed provision for that sort of assurance that 100

percent of the population is provided for evolves at the local neighborhood level and the local municipality level where these people are identified. Their locations are well known, police or fire departments or other personnel have either responsibility to provide for them. Or in some cases, they use just a good old neighborhood door-knocker.

And we believe that that combination and, very importantly, that local participation in that notification scheme is what assures us 100-percent notification.

(Counsel for ANGRY conferring.)

Q One additional question. Are there any plans or means to notify factories where there would be very high levels of noise? I am thinking perhaps of fabrication, steel fabrication facilities, or steel plants such as you find in Highspire and Steelton.

A (WITNESS ROGAN) It is my understanding we are revising the institutional list right now. But it is my understanding that some of those sorts of facilities are included on that list. And very honestly, it is an area we have yet to thoroughly investigate.

Either they must make -- and probably routinely have made -- provisions for their own go-to-work and quit sirens, or we will try to work with them to assure that anywhere where there is a fairly large population that may have difficulty hearing the signal, we will assure that they

are taken care of.

Q One final question. The islands in the Susquehanna River around the plant, a number of them hold summer homes, cabins, fishing facilities, this sort of thing. Are those islands covered by the siren notification system?

A (WITNESS ROGAN) Most assuredly. 100 percent.

MR. SHOLLY: I think that concludes the line of questioning here. We do have additional cross examination of these witnesses, of course.

CHAIRMAN SMITH: All right.

Mr. Aamodt, now we will turn to the proposal that we hear argument tomorrow morning on your expert witness.

MR. AAMODT: I appreciate that, Mr. Smith. I would like to -- I would like to ask your help in regard to this. I was just sitting here thinking I feel a little bit like the woodchuck in a farm feels like when our dogs have got him cornered away from his hole. I have three groups of attorneys here who would like to prove that our Contention, for one reason or another, should not be admitted. And we are not attorneys.

I would appreciate it if you could help me by defining for me those elements that I should have prepared to prove to you tomorrow.

CHAIRMAN SMITH: Well, the basic --

MR. AAMODT: In terms of specifics.

CHAIRMAN SMITH: We cannot go too far on that, Mr. Aamodt. But the Board itself, upon receiving the testimony, observed some difficulty relating to the Contention. And that is your basic problem: getting the testimony related to the Contention.

MR. AAMODT: Yes, sir. What --

CHAIRMAN SMITH: What standards?

MR. AAMODT: Yes, sir.

CHAIRMAN SMITH: We cannot give you standards; just ordinary English-language meaning of the Contention compared to the thrust of the testimony. There are no legal standards that I am aware of.

MR. AAMODT: Is that the only criterion that we must meet, that we relate to our Contention?

CHAIRMAN SMITH: If it relates -- if you can get it significantly related to your Contention -- and, of course, you can relate eventually almost everything to everything --

MR. AAMODT: I acknowledge that.

CHAIRMAN SMITH: -- but reasonably and significantly related to your Contention, I think you have met the only requirement that I know of. Then you might have a problem with expertise, but I do not think -- I do not know the nature of the objection yet.

MR. ZAHLER: Mr. Smith.

CHAIRMAN SMITH: This is the problem. I do not want to anticipate what their objections are going to be.

MR. AAMODT: I understand that, sir.

MR. ZAHLER: I did not want to put you out on the legal limb there. Licensee does plan, in addition, objecting to the notion that this particular witness can incorporate the articles at the back of his testimony which do not qualify under any of the exceptions for learned treatises or articles. He was not presently involved with them, and I do not know how this witness can just attach those articles to his testimony.

CHAIRMAN SMITH: If you would like to outline the basis for your objection so that Mr. Aamodt can prepare, it might be helpful.

MR. ZAHLER: I have no problem with that. I am not fully prepared to argue this second, but I can say it is in those two areas: one, that it is not within the scope of the Contention, it is unrelated to emergency planning; and secondly, that the witness is incompetent -- and I use that in the legal sense, not as -- that means he is unable to sponsor the exhibits attached at the back of his testimony.

Just so the record is accurate, I would like to note that I informed Mr. Aamodt about two weeks ago that Licensee would object to the testimony on this basis, at

least on the scope basis. I had not yet seen the testimony itself.

CHAIRMAN SMITH: Mr. Aamodt, in preparing for tomorrow, I do not know how you can do it, but you might bear in mind that there were Contentions earlier in this proceeding, TMIA Contentions 1 and 2, I believe -- and this is not reliable, I am going from memory. TMIA Contentions 1 and 2 took this subject matter of residual effects much as your witness described his purpose of the testimony this afternoon.

Those Contentions were withdrawn some time ago, months and months ago. The Board for a while considered the possibility of adopting a form of the Contention, and then decided not to. No motion was made to adopt the withdrawn Contentions or any other approach to it. So you may have -- I just want you to bear in mind that there was at one time, in my view, an opportunity to pursue the subject matter of your witnesses.

So that puts us in a situation where tomorrow I think we are going to have to look at it solely as how it relates to the Contention.

MR. AAMODT: Mr. Smith, we will be prepared to do just that.

The other point was that when the earlier Contentions were dropped from consideration, we had not had

the experience that we have in this area, you rememner, with the neonatal hyperthyroidism. So the issue then became moot at that point. That is why we did not pursue it.

CHAIRMAN SMITH: I wanted to bring to your attention all the factors that could enter into the argument tomorrow.

MR. ADLER: Mr. Chairman, there is an additional factor I should probably put on the record with respect to Dr. McCloud's article, which is one of the appendices to Dr. Molholt's testimony. We would object to the relevance of certain state political and jurisdictional issues discussed in that article to this proceeding.

CHAIRMAN SMITH: So there are not the objections yet, Mr. Aamodt. These are just courtesy --

MR. AAMODT: I appreciate that.

CHAIRMAN SMITH: -- courtesy advance warning to you.

MR. GRAY: Mr. Chairman.

CHAIRMAN SMITH: Mr. Gray.

MR. GRAY: The staff, in presenting Mr. Chestnut in support of his testimony, would also like to include along with Mr. Chestnut Mr. Brian Grimes, who is the director of Division of Emergency Preparedness of the Office of Inspection and Enforcement and who was somewhat instrumental in the preparation of NUREG-0654.

We believe he would be valuable in answering questions and providing information on the development of the standards of NUREG-0654 and the like. In that regard, I do have some professional qualifications of Mr. Grimes that I would like to distribute to everyone now, if I can.

CHAIRMAN SMITH: Okay.

If there is nothing further, we will adjourn for this evening and meet again at 9:00 a.m.

(Whereupon, at 6:00 p.m. the hearing was adjourned, to reconvene at 9:00 a.m. Wednesday, March 4, 1981.)

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

in the matter of: METROPOLITAN EDISON COMPANY (TMI UNIT 1)

Date of Proceeding: March 3, 1981

Docket Number: 50-289

Place of Proceeding: Harrisburg, Pa.

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)