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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
SUBCOMMITTEE ON RELIABILITY AND PROBABILISTIC ASSESSMENT  
AND  
LIMERICK UNITS 1 AND 2

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NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE ON RELIABILITY AND PROBABILISTIC ASSESSMENT

AND

LIMERICK UNITS 1 AND 2

1717 H STREET, N.W. ROOM 1046

WASHINGTON, D.C.

10.9.84

The Panel met, pursuant to Notice, at 1:00 p.m.

SUBCOMMITTEE MEMBERS PRESENT:

WILLIAM KERR, Chairman

JESSEE C. EBERSOLE

CARLYLE MICHELSON

CHARLES J. WYLIE

J. CARSON MARK

CHESTER SIESS

CONSULTANTS AND STAFF AT TABLE:

P. DAVIS

M. BENDER

A. GARCIA

D. POWERS

RICHARD SAVIO

A G E N D A

		<u>PAGE</u>
1		
2		
3	Executive Session	ACRS 3
4	NRC Staff Report	R. E. Martin 5
5	Region 1 Status Report	H. Kister 12
6	Comments from Philadelphia Electric Company	G. M. Leitch 46
7		
8	Discussion of Emergency Planning	r. a. Kankus 71
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

P R O C E E D I N G S

(1:15 p.m.)

1  
2  
3 MR. EBERSOLE: Gentlemen, we are going to start the  
4 meeting. I will read the standard form here, the meeting  
5 will now come to order.

6 This is a combined meeting of the Advisory Committee  
7 on Reactor Safeguards and the Subcommittee on Limerick Units  
8 1 and 2, and the Reliability and Probabilistic Assessment.  
9 I am Jay Ebersole, I am just serving in lieu of the sub-  
10 committee chairman, who would have been Bill Kerr. David  
11 Okrent, the chairman of this committee, will be attending  
12 the meeting tomorrow.

13 The other ACRS members present today are Dr. Mark  
14 and we have Charlie Wylie at the moment. We expect Mr.  
15 Michelson shortly.

16 We have in attendance the consultants, Mr. Bender,  
17 Dr. Davis, Dr. Garcia, Dr. Powers, and Dr. Trifunac is not  
18 here.

19 Mr. Michelson has just arrived.

20 Dr. Savio is the designated fellow employee for this  
21 meeting.

22 The rules for participation in today's meeting have  
23 been announced as part of the notice of the meeting, previously  
24 published in the Federal Register on Wednesday, September  
25 26th, 1984. A transcript of the meeting is being kept and

1 will be made available as stated in the Federal Register  
2 notice.

3 It is requested that each speaker first identify  
4 himself, or herself, and speak with sufficient clarity and  
5 volume, so that he or she can be readily heard. We have  
6 received no written statements from members of the public,  
7 and we have received no requests for time to make statements  
8 from members of the public. However, we will entertain  
9 such requests, if you will give them to Dr. Savio.

10 I will ask the other subcommittee members here  
11 if they have any comments, prior to our entering the meeting  
12 proper. And seeing none --

13 MR. MICHELSON: Just to get oriented here, real  
14 quick, sometime today and tomorrow, are we talking about the  
15 SARA as it relates to fire protection, fire events? Is that  
16 somewhere on the agenda?

17 MR. EBERSOLE: Tomorrow.

18 MR. MICHELSON: Thank you.

19 MR. EBERSOLE: Any other questions?

20 (No response)

21 MR. EBERSOLE: There being none, I am going to go  
22 straight into the meeting with the NRC Staff Report. I  
23 believe Mr. Tom Novak is in charge of that -- he is not  
24 here either.

25 VOICE: The project manager Bob Martin will make the

1 staff presentation.

2 Mr. Martin, it's yours.

3 MR. MARTIN: Good afternoon, I am Bob Martin, the  
4 NRR project manager for the Limerick review. I will attempt  
5 to share with you some information on the status and schedule  
6 licensing activities for the Limerick project. I have  
7 several slides I would like to present and touch on briefly.

8 In addition to my branch chief, Al Swensor, I have  
9 with me today are people from the NRC staff Region 1, for  
10 later portions of the agenda; also staff members will address  
11 emergency planning, plant security, and several other issues.

12 The committee's letter, the interim report of  
13 October 18th, 1983, indicated the committee wished to return  
14 to the review of certain areas, those being listed generally  
15 as I have shown here on this slide. I would like to summarize  
16 briefly, and note with respect to emergency planning, which  
17 we do have a slot on the agenda later in this meeting, the  
18 review of the on-site plans as necessary to support a decision  
19 to issue a low power after 5 percent license are essentially  
20 complete.

21 The review of the off-site plans by various groups,  
22 including the Pennsylvania Emergency Management Agency, the  
23 Federal Emergency Management Agency, and the NRC staff is  
24 continuing.

25 With respect to plant security, we find that our

1 review of that subject is essentially complete at this time,  
2 some minor details are being cleaned up in the latter part of  
3 the schedule.

4           With respect to the seismic events, more severe than  
5 the safe shutdown earthquake, we plan to address that issue  
6 within the context of tomorrow's discussion on the probabilistic  
7 assessment and the severe accident risk assessment.

8           With respect to the effect of cooling tower failures  
9 on safety related piping and electrical bus ducts in the  
10 vicinity of the cooling tower. I have an additional slide  
11 at a little later time I will highlight on some of the aspects  
12 of the staff's review of that subject, and how we came to a  
13 finding that the safety related equipment is protected.

14           With respect to the other item in the committee's  
15 letter, the PRA and the severe accident risk assessment, we  
16 plan to address that all day tomorrow.

17           I will just touch briefly on some of the major  
18 milestones in the review. Beginning with the OL Application  
19 in 1981; coming down to recently we have issued major documents  
20 such as the SER, the FES. We now have two supplements to the  
21 SER and advanced stages of approval about to be issued. With  
22 respect to hearings that have been held on various matters,  
23 there were hearings held on -- I have grouped them into three  
24 areas, three major areas: supplementary cooling water systems,  
25 as addressed by partial and initial decision issued in 1983.

1 There are several issues with respect to that area that remain  
2 under consideration, namely the remanding by the Appeal Board  
3 to the Board of two issues directing the Appeal Board to  
4 consider them further. That is a very recent development and  
5 it is still being followed on a day by day basis.

6 A second partial initial decision issued in October  
7 of this year addressed the hazards from pipelines near the  
8 site, environmental qualification, welding and so forth.

9 The further hearings are expected to be on off-site  
10 emergency planning. The testimony date for that is very near,  
11 the exact date of the hearings hasn't been set yet, but it  
12 is anticipated to be in the near future.

13 And, finally, plant construction for Unit 1 is very  
14 near conclusion, the precise determination of when and how  
15 it is complete is reached by our Region 1 people in a document  
16 and information which they communicate to us to support the  
17 decision to issue the license.

18 Now the next several pages -- fear not, I am not  
19 going to go into detail on each one of these items on the  
20 next several pages of your handout. I did want to put them  
21 together in this manner to show you where each of the items,  
22 open and confirmatory items, listed in Supplement No. 1 to the  
23 SER -- where the resolution of those items will be addressed.  
24 I have indicated the section of the supplement that they will  
25 appear in and the right-hand column indicates either



1 Supplement No. 3, No. 2 or No. 1; No. 1 having been issued  
2 in December of 1983.

3 As I said earlier, Supplements No. 2 and No. 3 are  
4 very close to issuance at this point in time.

5 MR. MARK: Does that remark mean that we may regard  
6 these as closed by now?

7 MR. MARTIN: Yes, sir, it does. These will be -- the  
8 vast majority of these have already been closed. The few that  
9 have not, will be closed in the very near future, by the time  
10 we issue -- by the time we are ready to make a decision on  
11 the will power license.

12 In addition to those issues which were listed in the  
13 first supplement to the SER which I have just gone through  
14 with you, we have since then identified certain other issues  
15 which in a similar manner have been pursued and either have  
16 been resolved, or are expected to be resolved in the next  
17 week or so. And to give you an idea of what those might be,  
18 I have listed the more significant ones here.

19 MR. MICHELSON: Excuse me, could I ask, the issues  
20 that were previously confirmatory, I guess that means that  
21 agreements were reached and they are just waiting to carry  
22 out certain actions, is that a correct interpretation?

23 MR. MARTIN: That's correct, yes.

24 MR. MICHELSON: In the case of fire protection, then  
25 which was listed as Item 35 through 59, I guess the

1 assumption is that you are happy, you have gotten all of your  
2 agreements and you are just now waiting for them to be carried  
3 out?

4 MR. MARTIN: Well, in the SER it indicated that the  
5 applicant had committed to do certain things, and we were  
6 awaiting documentation, at that time Revision 4 to the Fire  
7 Protection Plan. We have since received that revision, we  
8 have accepted the applicant's response on it. And this SER  
9 that I refer to now is near publication and indicates the  
10 resolution of those issues. All fire protection issues are  
11 resolved.

12 MR. MICHELSON: Thank you.

13 MR. MARTIN: In the committee's letter of October  
14 1983, each of the items in that letter, major areas, are  
15 to be addressed either tomorrow, or by other presentations  
16 today, with the exception of the cooling tower. To give you  
17 a bit of an idea on what the staff has done on this issue,  
18 in the hearing which has been held during the last year, a  
19 very similiar, if not identical issue, was treated. And while  
20 addressing that issue, we assessed the effects on the buried  
21 piping and power supplies in the vicinity of the cooling  
22 tower. The cooling tower being assumed to fail from either  
23 explosions of material on trains passing near-by, or whatever.

24 The several failure modes considered were over-  
25 turning, and buckling. The opinion being that overturning

1 about its base as a rigid body is rather unlikely mode of  
2 failure, that it would essentially fail by buckling mode, and  
3 that the debris would largely come down within the base area  
4 of the cooling tower.

5           Conservative assumptions were proposed by the  
6 applicant with respect to the velocity of the debris impacting  
7 the earth cover above the pipelines and above the electrical  
8 bus ducts. Conservative assumptions were also made with  
9 respect to the size of that debris. This information was  
10 reviewed by the staff, discussed with the applicant, addressed  
11 by the staff and direct testimony by several of our different  
12 technical reviewers.

13           We found that the penetration depth from these  
14 missiles would be less than the protection that has been  
15 provided over the pipes and bus ducts. The assesement was  
16 with respect to the protection provided to protect from  
17 tornado missiles, the approach to how far the missiles would  
18 penetrate and so forth, was much the same manner as it would  
19 have been for postulated tornado missiles.

20           We also considered the effect of water which would  
21 be assumed to leave the cooling tower basin, in the event of  
22 such failure. That water which might flow down the hill and  
23 into the backside of the turbine building. Our reviewers  
24 conducted an on-site review and followed the path of the  
25 water. We went into the turbine building, investigated there

1 and so forth. We also looked at the applicant's proposal  
2 that flooding of the electrical duct bank manholes which  
3 would be in the path of the water could be accommodated.

4 This assessment will be addressed in Supplement No. 3,  
5 of the SER.

6 MR. MICHELSON: Excuse me, you said this assessment,  
7 you mean the assessment of the cooling tower failure mode  
8 and effects?

9 MR. MARTIN: That's correct.

10 MR. MICHELSON: And you are going to put that in  
11 Supplement No. 3?

12 MR. MARTIN: Yes, sir.

13 MR. MICHELSON: I assume that the basis for your  
14 review was a document which Philadelphia Electric sent to you  
15 on January 18, 1984, which transmitted a report called Report  
16 on the Effects of Postulated Failure of Cooling Tower, is  
17 that the report that you reviewed?

18 MR. MARTIN: That is one of the reports, one of the  
19 pieces of information. It is very similar to additional  
20 information which was also submitted in the hearing by the  
21 applicant as exhibits attached to their testimony.

22 MR. MICHELSON: I just wanted to establish the fact  
23 that you did review -- essentially, we received a copy of  
24 this report in answer to the questions that we raised in our  
25 letter of October 18th. I just want to establish you did,

1 indeed, review this report and found it acceptable?

2 MR. MARTIN: We did.

3 MR. MICHELSON: Thank you.

4 MR. MARTIN: If there are no further questions, that  
5 would complete my initial presentation on where we are in an  
6 overall sense with Limerick at this time. And we would go  
7 then into the regional discussions, the Region 1 discussion.

8 MR. MICHELSON: I would also like to ask is the  
9 applicant going to discuss at all the cooling tower failure  
10 during its presentation today or tomorrow?

11 VOICE: No, sir.

12 MR. MICHELSON: I believe that takes care of my  
13 question. Thank you.

14 MR. MARTIN: Okay.

15 MR. KISTER: Good afternoon, gentlemen. I am Harry  
16 Kister, I am the Chief Reactor Projects Branch, responsible  
17 for Limerick in Region 1. We appear before you today and  
18 will offer you some information that has occurred subsequent  
19 to the previous subcommittee meeting in October of '83, and  
20 provide you with an update on the status of where we are  
21 from a regional viewpoint, both in our inspection status and  
22 the licensing actions towards the issuance of fuel load  
23 licenses.

24 Very quickly, I think you all are familiar with the  
25 overall information on the facility and the contractors and

1 construction dates. A comment, the resident inspector status,  
2 we had a resident inspector established at Limerick in 1979;  
3 a second pre-op senior resident was assigned in September of  
4 '83, due to the pre-op work at Limerick.

5 Just a brief overview of the number of inspection  
6 hours completed at the Limerick facility, total overall as  
7 of the 1st of October has been 15,000, for fiscal 84 alone  
8 we have expended 7,000 manhours of inspection time at this  
9 facility.

10 As Mr. Martin indicated, the facility is 99 percent  
11 plus completed. The areas that we looked at in particular  
12 are -- that we are particularly interested in are common areas  
13 between Unit 1 and Unit 2, they are completed; Unit 1 is  
14 adequately segregated. The work that inter-faces with  
15 Unit 1 from Unit 2 is at a status where future work would not  
16 have any effect on operations, from our viewpoint.

17 Special inspections have been conducted, going back  
18 to 1980. We had a mid-construction, heating, ventilation and  
19 air conditioning inspection; a construction team inspection  
20 in 1982. In 1984 we did a team inspection to verify as-built  
21 condition and also two NDE inspections for the facility, one  
22 in 1982 and one in 1984, and no significant problems were  
23 indentified in that area, all looks well.

24 Construction deficiency status, these are the 50.55(E)  
25 reports that the utility issues; 29 since September of 1983,

1 only one remains open in that area, an open item that should  
2 be cleared up very quickly.

3 Allegations, three open allegations in the con-  
4 struction area, the investigation work has been completed.  
5 We are in the process of documenting that effort, and as far  
6 as we can see there is no impact on safety.

7 Pre-operational test program, as of the 1st of  
8 October, a total of 90 pre-operational tests required for  
9 fuel load, 90 have been completed and now, as of today,  
10 89 of those have been reviewed by Region 1.

11 With regard to the overall conduct of the pre-op  
12 test program, there were some difficulties early-on and  
13 Region 1 with several discussions and meetings with the  
14 utility, they responded very well and the problems were  
15 resolved early-on.

16 As indicated on the right-hand side there, there  
17 are 20 deferred tests that will be part of the Attachment 1  
18 to the proposed license.

19 MR. MARK: In the listing you showed, there doesn't  
20 seem to be room amongst the deficiencies and allegations for  
21 the average current number of QA complaints. Is that because  
22 Region 1 doesn't look at that particularly, or because this  
23 job has been well done?

24 MR. KISTER: I think this job has been well done, sir.

25 MR. BENDER: Did you say something the concerns that

1 arose about control of pre-op program, what kinds of questions  
2 are of concern that have now been resolved?

3 MR. KISTER: I think the concerns evolved out of the  
4 compacting of the pre-op test program because the utility got  
5 kind of a late start on the pre-op test program. It involved  
6 procedure, conduct and procedure, preparation, the involvement  
7 of AE start-up engineers and perhaps, somewhat less than  
8 desired involvement of the PECO test program engineers. Their  
9 fix on that was to get PECO test engineers involved with  
10 each specific test, that would resolve that problem very  
11 quickly.

12 MR. EBERSOLE: May I ask, have there been any  
13 surprises as a result of the pre-op test program? I am  
14 thinking of Palo Verde, when I say that, where it was just  
15 a succession of surprises.

16 MR. KISTER: No surprises, sir, that I am aware of.  
17 The program went well. In fact, we reviewed all most all of  
18 the test results and we have found no significant problems.

19 MR. EBERSOLE: No serious departures from performance  
20 parameters of any kind?

21 MR. KISTER: Not that I am aware of. I might ask the  
22 senior resident to comment on that, if he is aware of anything  
23 that I am not aware of.

24 MR. WIGGINS: Jim Wiggins, senior resident. No  
25 big surprises, about what I would say are the normal amount



1 of problems with test -- like meeting test exception criteria.  
2 To answer your question, I don't know of any real surprises.

3 DR. DAVIS: The second item up there has to do with  
4 adequate segregation between the units. It was my understand-  
5 ing that one of the conclusions of the PRA was that the RHR  
6 system reliability could be improved by cross-connecting the  
7 service water supplies between the two units. And I thought  
8 I understood that that had been committed to.

9 Is that a conflict with the segregation criteria?

10 MR. KISTER: I don't think so.

11 Jim, any comment on the RHR system and the segregation  
12 between Unit 1 and Unit 2?

13 MR. WIGGINS: No, the applicant may have something to  
14 say about the commitment. I think the spirit of the comment  
15 that we were making about the segregation applies to the  
16 fact that the applicant, from as much as a year or more ago,  
17 conducted their completion of construction activities such  
18 that they would minimize the impact of the involvement of  
19 common areas on Unit 1 completion. There was a lot of plan-  
20 ning work, designing what would be done in the common area,  
21 particularly in the control structure and common systems  
22 like ESW and RHR, make them not as susceptible as other people  
23 who have had problems, where the Unit 2 figures are a couple  
24 of years down the line, we haven't seen anything like that.

25 That is what the comment slide was meant to present.

1 I don't think I could address the other issues.

2 MR. KISTER: Would the applicant like to make a  
3 comment?

4 MR. BOYER: I am Vincent Boyer, senior vice president  
5 of Philadelphia Electric Company. The importance of the  
6 cross-connection in the RHR service water system was brought  
7 out through the application of the PRA. In the first modeling  
8 it hadn't been modeled down to that detail, and in doing the  
9 work we found that in improving the modeling and making it  
10 more to actual conditions, we were able to see the importance  
11 of that cross-connection.

12 DR. DAVIS: So, you do intend to have that cross-  
13 connection?

14 MR. BOYER: It is there, it has been there.

15 DR. DAVIS: The Unit 2 portions will be finished  
16 and be available?

17 MR. BOYER: Yes, yes, they are, they are available  
18 now.

19 DR. DAVIS: Mr. Boyer, you know the classical thing  
20 is that even if you had a duplicate system, Unit 2 to help  
21 Unit 1, the theoretical advantage you could get in reliability  
22 is a factor of two. Are you talking about that sort of  
23 improvement in reliability?

24 MR. BOYER: I don't know, I would have to talk to  
25 some of the fellows. Perhaps we could address that tomorrow.

1 MR. MARK: I had read the segregation remark to  
2 imply -- and perhaps you can tell me if this is correct --  
3 that the work force involved with Unit 2 will not be in a  
4 position to stray into or wander into, or interfere with  
5 activities required in connection with the plant that is  
6 essentially starting up operation?

7 MR. KISTER: That's correct. The common areas that  
8 are in the same buildings, or in the same space that is  
9 completed will be very, very small, if any. The fences are  
10 high and the areas that are common have been completed, so  
11 there would be no reason for construction workers in those  
12 areas.

13 I think if you visit sites you see there is a real  
14 good distinct difference, it is very hard to stray from one  
15 area to the other without getting into a lot of trouble,  
16 especially now with the security system in force.

17 MR. BOYER: We will be addressing the security  
18 system a little bit later, and that will be brought out.

19 MR. KISTER: As I said earlier, the steps taken by  
20 PECO in June to improve the pre-op program resolved all of  
21 the problems and resolved all of the issues that Region 1 had.

22 With regard to allegations in the pre-op area there  
23 were two, one has been resolved, one requires documentation,  
24 no impact on safety. The second is under investigation, and  
25 as far as I can tell it will not have any impact on safety.

1 Facility readiness for low power operation - in the  
2 area of staffing, the utility has provided five shift rotation;  
3 four of the five shifts have shift superintendents, each with  
4 about five years of licensed experience. The experience over-  
5 all of the operating staff at Limerick is high, based on  
6 PECO's involvement with the HTGR and the two units down at  
7 Peach Bottom.

8 The remaining shift, the fifth shift, has a shift  
9 advisor on that shift with previous SRO experience at Peach  
10 Bottom to supplement the lesser experienced of the shift  
11 superintendent on that shift.

12 In the area of emergency preparedness on-site,  
13 Region 1 appraisal of implementing procedures in June, also  
14 there was an emergency preparedness exercise in July of 1984.  
15 On-site-wise that went well in terms of the utility preparation  
16 and performance, to assure protection to health and safety  
17 of the public in that area.

18 There were some appraisal findings, of which there  
19 are four left that require resolution, and I understand of  
20 those four the utility has offered two of those four to us  
21 for review. So, those are quickly going by the wayside.

22 In the area of radiation protection and radwaste,  
23 we had a meeting with the applicant back in February 1984,  
24 to discuss the radiation protection program and their  
25 radwaste program. They directed significant attention on that

1 area, were very responsive to our meeting. We had a health-  
2 physics appraisal inspection in August of '84, and there are  
3 seven issues that require resolution prior to fuel load. And  
4 those are all implementing type outstanding items, and we  
5 see no problem in getting them resolved.

6 MR. MARK: On that radiation protection, Philadelphia  
7 Electric is operating another BWR plant or site currently, is  
8 it not?

9 MR. KISTER: That's correct. Philadelphia Electric  
10 has Peach Bottom, two units at Peach Bottom.

11 MR. MARK: And how does their record on occupational  
12 exposure at Peach Bottom compare with some average, or some  
13 other indicator for their effectiveness in controlling  
14 occupational exposure?

15 MR. KISTER: I think, looking back, they probably  
16 fall in the area of average, and the utility could challenge  
17 me on that.

18 The one exception now, of course, is the Unit 2  
19 at Peach Bottom, that is undergoing a re-circulation pipe  
20 replacement, and that is going to offset their overall  
21 exposure average for this year and going into the coming year.

22 MR. MARK: Has that man-rem per year, apart from  
23 the special feature of this sort, been increasing or holding  
24 steady, or decreasing?

25 MR. KISTER: Bob, can you help me on that?

1 VOICE: No, I cannot.

2 MR. MARK: I am mentioning it because it is something  
3 which has, in a generic sense, a great concern for the whole  
4 US picture.

5 MR. KISTER: Yes, sir.

6 MR. MARK: And one would like to find examples where  
7 things are going in the right direction.

8 MR. KISTER: I think at Peach Bottom they have had  
9 some problems early on and they have done some overlay welding  
10 of their research pipes and that has caused some of their  
11 averages to go up.

12 But overall I would say they are probably average or  
13 better. They are in the process of implementing a rather  
14 extensive LARA program and are looking very closely at those  
15 areas, as are most utilities in Region 1.

16 MR. MICHELSON: As long as you have had a little bit  
17 of break point, let me go back to to emergency preparedness  
18 for just a moment.

19 At the time of the subcommittee meeting, we had some  
20 discussions -- and I think there was a gentleman that came  
21 in and expressed some concern about the ability of the  
22 emergency response people to handle senior citizens home, I  
23 think that was a couple of miles away and required a lot of  
24 ambulances, or something, to transport them. Could you tell  
25 me how that has been resolved?

1 MR. KISTER: No, sir, I can't address anything off-  
2 site.

3 MR. MICHELSON: Is there somebody who can tell us  
4 the present state of that?

5 MR. BOYER: Yes, I think that may have been referring  
6 to Penn Hurst. Let me refer you to Roberta Kankus.

7 MS. KANKUS: The previous reference was to Montgomery  
8 County -- they presently have an existing plan which has  
9 been through the approval process, through Montgomery County  
10 and has been submitted for informal review, and later this  
11 year that will go in for a more formal review. But Montgomery  
12 County Geratic Center has worked and developed with Montgomery  
13 County for ambulances and buses.

14 MR. MICHELSON: Have the staff reviewed the emergency  
15 preparedness plan in this regard and satisfied themselves  
16 that everything is all right?

17 MR. MARTIN: This has been reviewed by the staff.  
18 I don't know what the specific disposition of this matter was.  
19 Our emergency planning people will be with us later in the  
20 day.

21 MR. MICHELSON: Maybe they can answer it.

22 DR. DAVIS: There was also, I believe, a prison in  
23 that area that was of concern.

24 MR. BOYER: Yes. The state has worked out a plan  
25 with the Bureau of Corrections for the evacuation of the

1 prisoners. The plan has been explained to the Montgomery  
2 County Commissioners, and to the supervisors of the township,  
3 where the prison is located. I attended a meeting with the  
4 Pennsylvania Emergency Management representatives and the  
5 Bureau of Correction people to discuss the furnishing of  
6 certain safeguards, equipment, handcuffs and so forth that  
7 would be needed for the evacuation of the prisoners, as well  
8 as a training program for the prison guards who would be  
9 escorting the prisoners. And we expect that to be worked  
10 out without any great complication. We have it in-house and  
11 are just reviewing it now.

12 MR. MARK: Has that also been discussed with the  
13 authorities of the county into which the prisoners will be  
14 moved?

15 MR. BOYER: That is being moved to a federal army  
16 facility.

17 MR. MICHELSON: Has any of this actually been tested  
18 by an exercise or is this just a paper plan?

19 MR. BOYER: I didn't hear the question.

20 MR. MICHELSON: For instance, on that geriatric center,  
21 have you actually tested your ability to evacuate it by doing  
22 an evacuation, or is this just a paper study?

23 MS. KANKUS: July 25th, 1984 we had an exercise,  
24 various facilities were picked out to participate in that  
25 exercise. Montgomery County Geriatric did not fully remove



1 personnel. Under their normal planning, for any other type  
2 of evacuation, fire or something else at the facility, they  
3 move their patients, so they have exercised it in that sense.  
4 And the state accepts those as demonstrations of their ability  
5 to move patients at anytime, as do the accrediting institutions  
6 for those type of facilities.

7 MR. MICHELSON: Thank you.

8 MR. KISTER: Moving on to the security plan implica-  
9 tion, inspections were conducted, and resulted in 19 issues  
10 requiring resolution prior to fuel load. There are three  
11 allegations concerning the security program, all under  
12 investigation and have been turned over to the Office of  
13 Investigation.

14 During our meeting with the utility on 9-24-84,  
15 Region 1 stressed the importance of the utility increasing  
16 their oversight of the security contractor that was going to  
17 be used at Limerick once the license was issued.

18 Overview of readiness for power operation - organ-  
19 izationally, again, a sufficient number of licensed operators,  
20 a sufficient number of staff engineers, STA's have been  
21 certified, routine shift operations in the control room began  
22 on the 24th of September, and continue in normal shift action.  
23 The plant operations staff has a total of 139 years of  
24 nuclear experience, 58 years of operating BWR experience; the  
25 electrical production staff, corporate management has 142 years

1 of nuclear experience and 31 years operating BWR experience.

2 MR. MICHELSON: Before you leave that slide, there  
3 must be an operating procedure now in place for emergency  
4 conditions?

5 MR. KISTER: Yes, sir.

6 MR. MICHELSON: Are those based on the new guidelines,  
7 the symptomatic guidelines?

8 MR. KISTER: Yes, that was reviewed by the NRR staff  
9 and accepted, they are all in place.

10 MR. MICHELSON: So these are based on the new guide-  
11 lines?

12 MR. KISTER: That's correct.

13 MR. BOYER: In fact, we were a leader in the pre-  
14 paration of those procedures.

15 MR. MICHELSON: Is this the first set of procedures  
16 written to the guidelines, or have other utilities already  
17 completed, or is yours the first?

18 MR. BOYER: I don't believe we are the first.

19 MR. EBERSOLE: As I recall, this is the first plant,  
20 and I consider this a marker plant, which has formally developed  
21 the method of cooling, that requires virtually no AC power,  
22 almost no machinery, and in essence, of course, has open  
23 boiling to (inaudible) and vents to atmosphere, as a pre-  
24 ventative measure for core damage. This is an extremely  
25 simple operation and I have been promoting this for 15 years,

1 without success, except at this time.

2 Have the procedures for that mode of operation which  
3 require virtually none of the complicated features that are  
4 all around the plant, has that been developed yet?

5 MR. KISTER: You are speaking of the steam cooling  
6 mode, sir?

7 MR. EBERSOLE: I don't know what you call it, but  
8 I know it is open boiling through the SARs, to the suppression  
9 flow --

10 MR. KISTER: As far as I know those procedures have  
11 been developed and are in place.

12 MR. EBERSOLE: Could we have a particular copy of  
13 that one?

14 MR. KISTER: We can arrange to see that you get it,  
15 sir, yes.

16 MR. EBERSOLE: I am interested primarily in the  
17 follow-on, of course, you are going to discharge small  
18 negligible amounts of reactivity in the interest of preventing  
19 much larger consequences. I am interested in how you strike  
20 a balance and where you draw lines.

21 MR. KISTER: We will get you that procedure.

22 MR. EBERSOLE: Thank you.

23 MR. MICHELSON: Has that process been identified, or  
24 described in a supplement to the FSAR, and evaluated in an  
25 SCR?

1 It wasn't in the original --

2 MR. BOYER: I understand it was provided in a letter,  
3 and I am a little hazy on the exact status.

4 MR. MICHELSON: I would like to get a few words on  
5 the design intention, description to go with this procedure.

6 MR. BOYER: All right.

7 MR. EBERSOLE: My impression is that Limerick is  
8 rather a center point in this type of ultra-simplified cooling.  
9 I think it would make great public impact for the public to  
10 find out that all you have to do is keep the fuel covered,  
11 like steam in the kitchen, and that's about the essence of  
12 cooling the core. It is a center point in the context that  
13 other plants are going backwards to develop this process, and  
14 of course, the BAWR is going forward to develop it. And I  
15 am much interested in the whole spectrum of where we are going  
16 in this direction.

17 So, I will be looking forward to the procedure.

18 MR. KISTER: Yes, sir.

19 Just a slide for your information, I am sure during  
20 the October presentation Mr. Starostecki went through this  
21 SALP process with you, up to 1983, and including in here 1984  
22 SALP results which were the assessment period between December  
23 '82 and November of '83. The results were, again, improved  
24 performance on the part of Philadelphia Electric in all  
25 categories and no major issues as a result of the SALP.

1 I will discuss at length some of the activities that  
2 will be conducted by the region between our low power license  
3 and full power license, with regard to SALP and some other  
4 areas we plan to look at.

5 The start-up test program, our review of the start-  
6 up test program began in August with 37 test procedures for  
7 start-up; 10 of those 37 required for fuel load and initial  
8 criticality and are all completed and approved, and procedure  
9 acceptance is progressing in that area.

10 Operational assessment team - again, some of the  
11 initiatives that the region is going to be undertaking between  
12 low power and full power licensing is an operational assessment  
13 team inspection. This concept was developed by Region 1  
14 to go out with an experienced senior resident inspector lead  
15 by a supervisor of the regional office, to take a look at  
16 several attributes of the licensee's performance, particularly  
17 during the fuel load process and the low power testing, in  
18 terms of procedure implementation, the activities in the control  
19 room, maintenance and I&C group work activities, to see how  
20 the maintenance and I&C people are integrating into the staff  
21 function of supporting the operational aspects of the plant,  
22 look very closely at surveillance test implementation and  
23 see how that is going, look at tech spec compliance, look at  
24 the operator's responses to alarms and transients in the  
25 control room, and several other areas.

1           Once we develop the team and develop the inspection  
2 plan, we will be looking at the overall facility housekeeping,  
3 cleanliness, QA, QC integration into the operational aspects  
4 of the plant.

5           This incidentally is an indicator that the region  
6 uses for recommending full power license.

7           Also, during that period -- I don't have it on the  
8 slide -- we will be conducting the annual systematic assessment  
9 of licensee performance, the period going from last November  
10 to this November will be assessed for the licensee's per-  
11 formance at that time. So, those two task done, we will be  
12 in a position to determine if the facility is ready for full  
13 power license and to recommend --

14           MR. MICHELSON: Perhaps you could answer a question  
15 for me on operator training. In the case of the last ditch  
16 use of the suppression chamber or suppression pool, for  
17 instance, as a heat sink and then boiling into the atmosphere,  
18 the procedures were written relatively recently and now my  
19 question is how are you assured that the operators have been  
20 trained on this particular procedure, for instance, as an  
21 example, and that adequate procedures have actually been  
22 written to implement this design feature.

23           Is this your responsibility, or the headquarters?

24           MR. KISTER: The emergency procedure guidelines and  
25 the procedures --

1 MR. MICHELSON: It won't be in the emergency procedure  
2 guidelines though, because this is a unique feature --

3 MR. KISTER: It is a procedure that is developed  
4 from the guidelines.

5 MR. MICHELSON: Yes, that's right.

6 That's right, but since it is a unique feature, it  
7 won't really be addressed in the general guidelines, so you  
8 have to look for it now in the plant specific procedures.

9 Do you people in Region 1 do that, or --

10 MR. KISTER: The operating license people, sir, when  
11 they examine the applicants for operator licenses look at  
12 this area, but the specifics of it I don't have at hand.

13 MR. MICHELSON: Yes, that was really my question.

14 MR. KISTER: They most recently have been licensed,  
15 and I suspect very strongly that they have looked at that  
16 area. I am hopeful that they did look at the area, because  
17 they did look at the procedure items and passed it on.

18 I was wondering on the testing of the operators, to  
19 see that they are really up-to-date. Do they go in and use  
20 that particular procedure, for instance, and check the  
21 operators to see if they understand it?

22 MR. KISTER: I can answer that in a general way,  
23 Limerick does have a plant specific simulator.

24 MR. MICHELSON: I doubt seriously that this is on  
25 the plant specific simulator, but it might be.

1 MR. LEITCH: We have trained the operators on the  
2 -- my name is Graham Leitch, plant superintendent for  
3 Limerick -- and we have trained the operators on the  
4 transient response procedures that you are referring to, on  
5 the simulator.

6 MR. MICHELSON: You actually have this last ditch  
7 cooling program in the simulator now?

8 MR. LEITCH: Yes, the simulator -- that is the  
9 operator response on the simulator. The simulator doesn't  
10 necessarily respond in a creditable predictable function  
11 in the last ditch mode, it can test that the operator's  
12 actions are proper and that he is following his procedures  
13 properly.

14 MR. MICHELSON: That is as far as it needs to go,  
15 it doesn't need to be an exact engineering to that function.  
16 But it is in there in an approximate way, at least?

17 MR. LEITCH: Yes, and in that range the simulator  
18 is really a training tool, not necessarily an engineering  
19 predictor of what really is going to happen.

20 MR. MICHELSON: What I was really trying to determine  
21 was I thought this was a fairly recent development, and I  
22 wondered if you had gotten it to the point where the  
23 operators were trained on it, and your answer is yes.

24 MR. LEITCH: Absolutely, yes. In some cases some  
25 of the early on training was done without it and those



1 operators were re-cycled back through the simulator, the  
2 more recent training has been done with that in place.

3           Actually, we have reduced these procedures to flow  
4 charts and the flow charts are present in the simulator as  
5 they are in the control room and the operators train on them.

6           MR. MICHELSON: Thank you.

7           MR. KISTER: In the area of technical specifications,  
8 Region 1 has done several reviews of the various drafts of  
9 the technical specifications. An administrative review was  
10 done by the Region 1 staff. We also contracted to have an  
11 outside consultant come in with some regional assistants to  
12 look at the effort from the PRA standpoint -- I'm sorry, to  
13 look at the technical specifications at the plant and the  
14 effort from a technical specification aspect, to see whether  
15 or not the systems that are sensitive to PRA have been looked  
16 at closely.

17           Systems review, as a result of our tech spec as  
18 built review of the RHR system, the emergency on-site power,  
19 service water and containment systems.

20           With regard to PRA, Region 1 is beginning a very  
21 elementary approach to PRA from the standpoint of developing  
22 or attempting to develop inspection procedures and develop a  
23 sensitivity to the PRA in terms of those systems and com-  
24 ponents that are the largest contributor to the risk.

25           We are working with IE in terms of the program, and

1 at Limerick we have used in a very elementary way the PRA for  
2 doing the pre-op inspection program and start-up inspection  
3 program.

4 MR. MICHELSON: Did you say you use the PRA for your  
5 inspection program, do you also use the results of the SARA  
6 for your inspection program?

7 MR. KISTER: No, we did not, sir.

8 MR. MICHELSON: You are just using the PRA portion?

9 MR. KISTER: That's right.

10 MR. MICHELSON: And most elementary in terms of  
11 those systems - - I am thinking in terms of fire events,  
12 flooding events and so forth. Then you really aren't  
13 addressing those from a PRA viewpoint in your inspection  
14 process, then, because they are covered by the SARA.

15 MR. KISTER: That's correct.

16 MR. MICHELSON: Do you intend to cover those later?

17 MR. KISTER: I think we will look at the entire  
18 spectrum of the PRA in our inspection program, in conjunction  
19 with IE.

20 MR. MICHELSON: By entire spectrum, do you mean you  
21 will include the severe accident analysis, as well as what  
22 they normally call the PRA?

23 MR. KISTER: We have with us Ken Murphy, a technical  
24 assistant from Region 1 who is well versed in the PRA  
25 inspection program.

1 MR. MURPHY: Yes, so far we have only looked at the  
2 system -- the primary front line systems, and we haven't  
3 worked in the SARA. As a matter of fact, that's why we are  
4 here to listen to what SARA people have to say, to figure  
5 out what our future role will be in bringing that information  
6 out to the region.

7 MR. MICHELSON: There are a number of interesting  
8 things covered by SARA relative to external events that I am  
9 sure an inspector ought to be aware of, to see to it that  
10 such features are preserved. For instance, because they can  
11 be easily violated, if one is not aware of their importance,  
12 and you get that from looking at the SARA.

13 MR. MURPHY: Well, as an example of what we are  
14 trying to do in fire protection is we are looking at the  
15 various fire zones and essentially coming up with a prioritized  
16 list in terms of risk importance of the various zones. And  
17 this type of thing would be very handy for the fire inspector  
18 when he comes out.

19 MR. MICHELSON: Thank you.

20 MR. EBERSOLE: At this time, are there any inspection  
21 reports that are outstanding, where maybe substantial re-  
22 investigation has to occur on quality control, on welding, or  
23 any such thing as thing, structural aspects of the design?

24 MR. KISTER: No, sir. We have completed all of the  
25 inspections, but all of the reports themselves have not been

1 issued, we have taken the issues and developed those issues.

2 MR. EBERSOLE: So this difficult matter of late  
3 coming allegations, you think, are well in-hand?

4 MR. KISTER: I think so, sir.

5 MR. EBERSOLE: Thank you.

6 MR. KISTER: In summarizing, Philadelphia Electric  
7 had a good QA organization with strong technical expertise  
8 and in the construction QA area and the pre-operational area,  
9 once the applicant took steps to resolve our initial findings,  
10 overall QA performance was acceptable in the pre-op area.

11 With regard to management, we see many years of  
12 nuclear/BWR experience in the facility; they are attentive  
13 and involved, and they are very responsive to any concerns  
14 that develop, a competent organization.

15 The licensee's actions are continuing to resolve  
16 all fuel load inspection open items and the regional staff  
17 are on board.

18 With regard to Region 1, this is a follow-up to  
19 assure ourselves that all questions are being answered, and  
20 all questions are being identified and answered. We conducted  
21 a professional survey requestings comments by the region  
22 staff on Limerick, and we had no comments as a result of  
23 that survey. And, again, we are reviewing actions in resolv-  
24 ing fuel load inspection open items and resolutuion of open  
25 allegations.

1 Yes, sir, you had a question?

2 MR. EBERSOLE: It pertains to the MARS study, I just  
3 want to ask the applicant to look into a little matter for me.  
4 I have just come back from Humbolt Bay which is being shutdown  
5 because of the presumed cost of bringing it up to regulatory  
6 requirements, and a fault that is relevant to it.

7 I observed there a feature in the control system  
8 which I have often wondered -- the current model, BWR did not  
9 have. It was an individual discharge from each rod, discharge  
10 line to an open collection system, thereby precluding that  
11 solid fill of the dump volume would stop a rod from inserting.

12 I would like to ask the applicant to look into what  
13 has happened to that feature which is certainly not in the  
14 positive direction of safety, and find out how we did a  
15 reverse turn to again submit the reactivity control system  
16 to common duct volume closure.

17 It is a little bit of a historical evolution problem,  
18 why did we abandon that obviously advantageous feature in the  
19 evolution of the BWRs? And that can go into the PRA study.

20 MR. LEITCH: I had a quick one, in 1068, which is  
21 the NRC's review of the PRA and insights from that PRA, it  
22 is recommended that a safety assurance program be undertaken  
23 by the applicant. Is that something that is being done now,  
24 or how does that fit into the schedule of activities?

25 MR. KISTER: Is that something related to the Indian

1 Point question?

2 MR. LEITCH: No.

3 VOICE: That would probably be directed to the NRR  
4 headquarters group. I would suggest you might want to bring  
5 that up for tomorrow's discussion on the PRAs and SARAs.

6 MR. WYLIE: I have a question. Back on the slide  
7 you had for the overview of readiness for power operation for  
8 an organization, it indicates that 45 operator licenses have  
9 been issued and a total of 139 years nuclear experience, 58  
10 years BWR experience, which would average out to around four  
11 years average on overall nuclear experience and one year on  
12 BWR.

13 Could you comment, or the applicant comment on the  
14 average experience of his senior reactor operators and his  
15 senior staff engineers, and the reactor operators average  
16 experience?

17 MR. LEITCH: I am Leitch, Philadelphia Electric,  
18 plant superintendent at Limerick.

19 I guess the question is how is that experience  
20 distributed among our senior reactor operators.

21 MR. WYLIE: Well, I assume that the overall numbers  
22 here include all of these classifications, the senior reactor  
23 operators, and staff engineers and reactor operators, is that  
24 correct?

25 MR. LEITCH: Yes, that's right. The senior man on

1 shift that we call the shift superintendent, I think in most  
2 regulatory matters he is referred to as the shift supervisor.  
3 Four of the five shift superintendents were previously licensed  
4 at Peach Bottom and have a large number of years of Peach  
5 Bottom experience, not only on the boiler reactor, but in two  
6 cases the high temperature cooled reactor at Peach Bottom.

7 I would say that those people have, generally, 10 to  
8 12 years average among those four people operating BWR exper-  
9 ience at Peach Bottom.

10 MR. WYLIE: That would be 58, that doesn't leave  
11 too many.

12 MR. LEITCH: What number are you referring to?

13 MR. WYLIE: Well, it indicated there was a 58 year  
14 total operating experience with BWRs.

15 MR. LEITCH: That is total overall operation staff,  
16 that includes the staff engineers, the SROs, ROs -- I am  
17 -- yes, 58 years. I was just trying to get the number in my  
18 mind, the 56 years operations staff, that includes the four  
19 people that I referred to, and it also includes one of our  
20 shift supervisors who has some years of Peach Bottom  
21 experience, I would say in his case it is about eight, although  
22 he was not licensed at Peach Bottom.

23 Our operations engineer was senior licensed at Peach  
24 Bottom, and has, I would say also about eight years of  
25 operating BWR experience at Peach Bottom.

1           So that is the summation of our Peach Bottom  
2 experience, four of those five superintendents, one shift  
3 supervisor and the operations engineer, that is the summation  
4 of that Peach Bottom experience in the operations group. There  
5 is other Peach Bottom experience, but that is it in the  
6 operations group.

7           MR. KISTER: We have a matrix of that.

8           MR. WYLIE: I would like to see that. The numbers  
9 don't add up.

10          MR. EBERSOLE: Let me ask a quick question. Do you  
11 have your operators study the LERs and the significant events  
12 that occurred with BWRs? I am thinking particularly of the  
13 Hatch accident which is now pretty well documented, and  
14 do they understand what happened there, as a case in point,  
15 what could have been done to reduce the challenge to the  
16 systems? What wasn't done? What they would do, in lieu of  
17 that, or why it wouldn't happen to their plant?

18          I am just asking do you have a procedure in place  
19 or some sort of a program for your operators, the ones on the  
20 board, to study these things and translate it into what they  
21 would do, or what they wouldn't have to do, because of their  
22 design being different?

23          MR. LEITCH: Yes, we have such a program, it will  
24 become more formalized as part of the re-qualification training  
25 program. That is one of the things we intend to do in re-qual



1 training. But at the present time the Hatch being a specific  
2 case, I think at the present time, as we receive information,  
3 there is a monthly training package distributed to the senior  
4 -- excuse me, all of the licensed operators, and indeed, a  
5 number of those who are not licensed, a required reading  
6 package that includes events that either I, or any other  
7 member of the senior staff considers to be of significance in  
8 the BWR operating area -- the Hatch was one of those that we  
9 specifically did distribute, yes.

10 MR. EBERSOLE: Well, when you give it to them, do you  
11 then close out by having a meeting subsequent to their study  
12 of this, and ask them what they would do, without prior  
13 preparation on your part, tell them what to do?

14 MR. LEITCH: We document that they have read that  
15 material. The actual training on that particular material and  
16 closing out formally, in some kind of an examination, we  
17 plan to make part of the re-qual program, which is not pre-  
18 sently in place.

19 MR. EBERSOLE: Did you notice the strange inhibition  
20 in that particular accident, the de-pressurization to reduce  
21 the leakage rate?

22 Or maybe that is too detailed.

23 MR. LEITCH: Well, --

24 MR. EBERSOLE: There was no attempt to reduce the  
25 discharge from the dump volume valves by depressurizing the

1 plant, although that was clearly one route that could have  
2 been followed.

3 I take it you do analyze these and discuss the  
4 various routes to success?

5 MR. LEITCH: That's right. We also have in place  
6 an independent safety engineering group that has specific  
7 responsibility to look at other industry experiences that we  
8 receive from a number of sources, one of those being Info  
9 Note Pad, and so forth -- to disseminate that information and  
10 to recommend appropriate actions to it.

11 MR. EBERSOLE: Thank you.

12 MR. MICHELSON: Let me follow-up just a little bit.  
13 Since the Hatch event was essentially a blow down of the  
14 reactor outside of primary containment, and an inability to  
15 isolate it and a reluctance to reduce the pressure to reduce  
16 the amount of affluent, did you, as a result of reading and  
17 thinking about that event, do anything to your operating  
18 procedures to make provisions for such an event?

19 MR. LEITCH: I don't recall that there were any  
20 specific changes to the operating procedures.

21 MR. MICHELSON: The AEOD report on this, which I am  
22 sure you must have seen -- among the recommendations, of  
23 course, was that there would be -- that operating procedures  
24 be changed and operators be trained to reduce the pressure  
25 as quickly as possible. That was a part of the lessons learned

1 from the event.

2 I am just wondering if you people agreed that that  
3 was a correct lesson, and took steps to do something about it?

4 MR. LEITCH: As far as I know, those steps have not  
5 yet been implemented.

6 MR. MICHELSON: Of course the event occurred in  
7 August of '82, and that was quite a while back.

8 MR. LEITCH: I am, perhaps, not referring -- not  
9 remembering the right Hatch event, I think I am off on the  
10 wrong track. I am thinking about the cold nitrogen and --  
11 okay, I am on the wrong event.

12 MR. MICHELSON: I thought that was what you were  
13 referring to, that's why I repeated it. No, the Hatch event  
14 of August of '82, was the case where the drain valve on the  
15 scram discharge volume failed to open, and they also got a  
16 lock in on the reactor containment pressure, such that they  
17 could not reset the scram valves, and they blew down the  
18 reactor for, I think, some 40 minutes, or so, to the reactor  
19 building, and held reactor pressure in the process, which was  
20 the wrong thing to do. And there were a lot of lessons to be  
21 learned from that event, and that event was sometime ago, and  
22 a lot of documentation has poured out of it, complete analyses.

23 And I just wondered if you people picked up on it,  
24 because if you had I wanted to look at your operating procedures  
25 that you think now addresses that type of event.

1           You may recall it as an incident which General  
2 Electric previously had been said to have a probability of  
3 10 to the -10.

4           MR. BOYER: I recall that event. And I know that we  
5 have looked at it, and I will get the details -- one of our  
6 engineers, Tom Shannon has followed that. And I know -- I  
7 believe I am right in recalling that I have seen some of those  
8 changes in the Limerick procedures, but it could have been in  
9 some of the generic information. My memory isn't quite that  
10 sharp on that particular event at this time.

11           But we will check on that, and give you a status  
12 report tomorrow morning, if you would like.

13           MR. MICHELSON: Yes, when we discuss the aspects of  
14 the SARA I would like to include it because I think the SARA  
15 treatment does not pay recognition to the Hatch event at all.  
16 And that will be one of my questions, why does SARA not seem  
17 to address it.

18           MR. BOYER: Of course the volume, the chamber, the  
19 piping, the vent valve controls and what not, have all been  
20 incorporated into Limerick, I can assure you of that.

21           MR. SCHWENHER: Mr. Ebersole, with regard to the  
22 operating experience, I thought it might be helpful just to  
23 read one of the conclusions that is going to be in Safety  
24 Supplement No. 3 in the experience of the staff. The report  
25 says, "Overall, we find the applicant's program for providing

1 operating experience on each shift to be in accordance with  
2 the Commission's guidelines, and therefore, acceptable".

3           There is another comment in here that "We find the  
4 criteria with regard to the performance evaluation of their  
5 shift supervisors to be among the best that the staff has  
6 reviewed todate". I thought this might be appropriate to have  
7 those words --

8           MR. EBERSOLE: Yes, thank you, Al.

9           Before we take up anything else, let me remind the  
10 subcommittee members and consultants that we are about to lose  
11 some staff members now, because the remainder of the afternoon  
12 will be entirely devoted to emergency planning and security  
13 plans, and other non-mechanical, technical matters.

14           So, if you want to pump the staff on any aspect of  
15 these matters, now is the time to do it. Are there any  
16 questions that are not related to emergency planning and  
17 security?

18           DR. GARCIA: Yes, I have a question. One of the  
19 slides that was presented regarding technical specifications  
20 indicated that the systems that were reviewed were selected  
21 based on the use of the PRA, four systems were listed as  
22 having been reviewed, RHR, emergency on-site power, service  
23 water, containment systems.

24           My question is does it end there? Will any other  
25 systems be reviewed, and will the information concerning those

1 reviews be available?

2 MR. SCHWENHER: I would like to try to answer that,  
3 and then refer to Mr. Kister. Those slides refer to an  
4 extra effort that the region did, using a PRA technique for  
5 finding the best bang for the buck, if you will, for looking  
6 at somethings.

7 All of the technical specifications were circulated  
8 throughout the NRR staff and the region, asking for comments  
9 on the entire package. So, all of the systems were looked at,  
10 but this was an extra effort, as I understand it.

11 MR. KISTER: That was an extra effort on the part of  
12 Region 1, based on what had happened at Randolph and the  
13 extra exercise that we went into to make sure that we were  
14 satisfied.

15 MR. BOYER: The applicant, also, made some extra  
16 effort in review of the technical specifications by having  
17 an independent group at Bechtel and at General Electric go  
18 over their appropriate portion of the technical specifications.

19 DR. GARCIA: Is there any documentation of this  
20 extra effort concerning these four systems?

21 MR. GALLAM: Bob Gallam; somebody on staff was on the  
22 inspection with the contractors. There is an inspection  
23 report which will be issued shortly, I believe it is number  
24 8450 or 8452 -- 8452. It will be out shortly. We have the  
25 contractor's report and we should be receiving their final

1 package, it should be in the office today. The inspection  
2 report will be issued very shortly.

3 DR. GARCIA: Would you see that we get a copy of it?

4 MR. GALLAM: No problem.

5 MR. EBERSOLE: Any questions?

6 (No response)

7 MR. EBERSOLE: If not, then I guess the next item  
8 is Comments from Philadelphia Electric, and Mr. Leitch.

9 MR. LEITCH: Good afternoon.

10 You have heard a bit about the conduct of what we  
11 refer to in the FSAR as phase one of the initial test program,  
12 that is the pre-operational test program, which is essentially  
13 complete.

14 I would like to spend just a few minutes discussing  
15 the start-up test program which is really phase one, phase  
16 two, three and four of the pre-op test program. I would like  
17 to talk about the start-up test program, particularly  
18 implementing procedures, test sequences, to give you some  
19 idea of our schedule and just some summary remarks.

20 First of all, the start-up test program is described  
21 in Chapter 14 of the FSAR, it is based on Reg Guide 1.68 and  
22 1.70, in addition to vendor specifications, the nuclear steam  
23 supply system, manufacturer is General Electric Company. There  
24 are some Bechtel recommendations for initial test programs to  
25 be done.

1           We have written start-up test procedures, as was  
2 mentioned. We are also writing a few procedures which we call  
3 hot functional procedures, which are miscellaneous tests that  
4 are advisable to do.

5           In the preparation of these implementing procedures  
6 they are, first of all, prepared in draft form by writers;  
7 they are given a supervisory review; they are then reviewed  
8 by Philadelphia Electric Company engineering department, and  
9 by the electric production quality assurance and quality  
10 control group. Finally, they are reviewed by the -- given a  
11 technical review by the people on my staff, the Philadelphia  
12 Electric production department.

13           These procedures are then taken before the PORC, which  
14 is the plant operations review committee, the senior members  
15 of the plant staff, they are reviewed as required by the PORC;  
16 then approved. In the pre-operational test program we use  
17 a group called the test review board, or the PRB, to review  
18 the pre-op procedures and the results thereof.

19           In the start-up test program we are using the plant  
20 operations review committee to make that review.

21           The PORC approves also the results of the tests, the  
22 results are then reviewed by our nuclear review board, which  
23 is our off-site management oversight committee, and then given  
24 to the Nuclear Regulatory Commission.

25           So, this is basically the cycle for review and



1 approval, preparation of the procedures, and review and  
2 approval of those procedures.

3 As was mentioned earlier, most of the procedures,  
4 indeed all of the procedures have now been written, they are  
5 in the approval process at the moment; those procedures  
6 required for initial fuel loading and initial criticality have  
7 all been reviewed and approved, and most of the ones that are  
8 required further downstream have also been approved, and  
9 indeed, that review process is on-going even today.

10 DR. BENDER: Can I ask a question on the preparation  
11 procedures? First, how many of them are there?

12 MR. LEITCH: There are 37.

13 DR. BENDER: Peach Bottom 1 and 2, or 2 and 3, I  
14 forget which, was started up, were similar procedures prepared?

15 MR. LEITCH: Yes.

16 DR. BENDER: Are these like those, or are they  
17 different?

18 LEITCH: We have used those as a point of  
19 departure all we say. We have based these procedures on  
20 our Peach Bottom experience, and subsequent experience from  
21 the nuclear steam supplier. These are to a very large extent  
22 based on the experience with the nuclear steam supply system.

23 DR. BENDER: Thank you.

24 MR. LEITCH: At each particular test condition, we  
25 first of all review core performance at that particular

1 plateau, do any steady state testing that may be required,  
2 do control system tuning, and only after those three things  
3 are confirmed, do we move into major trips where there are  
4 severe dynamic actions in progress.

5           One of the things that we are doing is in order to  
6 gain more current experience, is that we are reviewing  
7 experience that comes from plants that are currently in start-  
8 up, such as the Susquehanna, LaSalle, Hanford No. 2. Also,  
9 we are reviewing some data from Hatch which is coming back  
10 from the major pipe replacement and is going through a large  
11 segment of what would be similar to a start-up test program.

12           There are a number of sources of that information,  
13 but most importantly in that are the daily start-up reports  
14 that nuclear steam supply vendor on-site receives from these  
15 other facilities, and we factor in various problems that are  
16 encountered, and try to adjust our start-up test program to  
17 eliminate those problems, wherever they can be foreseen.

18           MR. EBERSOLE: Could you give me an idea of how you  
19 formulate the procedures for the sort of test programs, as  
20 well as for the routine operating procedures? Through what  
21 hands does it go, what sort of supervision does it get? Does  
22 it go into the designers' hands, does it sign off that it  
23 represents his design intent?

24           In what way do you close on all participants having  
25 had whatever they need to say?

1 MR. LEITCH: The start-up test procedures are written,  
2 they get a review by the supervisor of that writing group; they  
3 then go to the Philadelphia Electric engineering department for  
4 their review.

5 MR. EBERSOLE: Stop at the writers. That's where you  
6 say it starts, the writers. Now, what guidelines do they  
7 have to start writing?

8 MR. LEITCH: Well, they have previous -- the tests  
9 that were used on previous sites.

10 MR. EBERSOLE: But do they have P and ID?

11 MR. LEITCH: Yes.

12 MR. EBERSOLE: Do they have narrative conceptual  
13 descriptions of the design intent from the designers?

14 MR. LEITCH: They have abstracts, test abstracts are  
15 furnished, I think that's the type of narrative information  
16 that you are referring to, yes.

17 MR. BACHAN: My name is Peter Bachan, I am with  
18 General Electric start-up. To help answer that question, the  
19 procedures are written by engineers who have access to vendor  
20 specifications, which provide the narrative, they provide  
21 objectives, criteria, when, where, how.

22 In addition to that, we have test instructions which  
23 are generic in nature, they give an outline of the test, they  
24 can tell you specifically how do jumper out -- what is a  
25 jumper, or what switches to throw, they give the outline. We

1 have access to various sites start-up test procedures for  
2 similar units, Susquehanna is a very good example. We had --  
3 the other sites that were mentioned, we also had material  
4 available from them.

5 We have a direct line into the vendor for DOP related  
6 tests now at the plant, and that would be Bechtel in this  
7 case, for triple S it would be General Electric. So, now we  
8 have all of the basic information at the site, and we have  
9 elementary diagrams, electrical schematics, system descriptions,  
10 we have Chapter 14 of the FSAR.

11 So with Reg Guide 1.68, Chapter 14 of the FSAR,  
12 vendor specifications, we know what we need. Now, again, having  
13 the outline, now we have to develop the site specific test,  
14 which is unique for Limerick. And we have access to quite a  
15 bit of experience, operating experience, and testing experience  
16 within the utility and outside the utility.

17 MR. EBERSOLE: So, all of this is input to the  
18 writers?

19 MR. BACKAN: Yes, the writers have access to that  
20 information, the supervisor will review this always by  
21 senior experienced individuals who has previous operating  
22 and testing experience, in this case one of the more important  
23 parts is the testing experience.

24 MR. EBERSOLE: Well, I go back to this incident at  
25 Hatch, I say if that is true that all this care is exercised,

1 how could we have an event like Hatch. And something falls  
2 in the cracks someplace, and I am trying to find out how it  
3 does that.

4 MR. BACKAM: Part of the preparation for these is  
5 to make sure that the appropriate source documents are reviewed,  
6 and the specifications, and experience reports, whether they  
7 be vendor experience report, or information notices, informa-  
8 tion letters, the vendor type information letters. But docu-  
9 ments that are specific to the utility, the FSAR.

10 So, by the time it gets into the engineering depart-  
11 ment, if you are getting at someone who is a little bit  
12 distant from the specific writing taking a look at it, by the  
13 time it gets to that point, it is not a guess --

14 MR. EBERSOLE: How do you handle the part of the  
15 procedure which you read, which is the negative part, which is  
16 what isn't there? You know, there are two parts to every  
17 check, checking what is there, but then the more difficult  
18 part, is checking what isn't there, and checking the negative  
19 instructions -- do not ever do this, or that, or whatever.

20 Who does that? I see so often that is not really  
21 covered in the analysis of what one is supposed to write in  
22 procedures?

23 MR. BACKAM: Well, I know in a few cases these PORC  
24 reviews have resulted in some of those types of comments being  
25 incorporated.

1 MR. EBERSOLE: Is there an explicit instruction to  
2 look for what isn't there and to look for the absence of  
3 denials to operating in certain modes?

4 MR. BACKAN: Specific instructions --

5 MR. EBERSOLE: Is this part of a procedural check,  
6 in examining --

7 MR. LEITCH: I would be hard pressed to show you  
8 chapter and verse whether there are specific instructions to  
9 do that, but I can assure you that in our PORC review sessions  
10 we do consider that type of thing, and often it does result  
11 in some precautionary note being added to the procedure.

12 MR. EBERSOLE: Do you have a fairly rigid paper  
13 trail, that says you have sign-offs with hard line responsi-  
14 bilities and plenty of finger-pointing, in case things are  
15 missing?

16 MR. LEITCH: Yes.

17 MR. EBERSOLE: Thank you.

18 DR. POWERS: It looks like this is a purely in-house  
19 review, all the way down, until you get down clear to the  
20 bottom. Do you at any point request a formalized review of  
21 your plan, either from the vendor, the AAE, or the other  
22 institutions where you are deriving all of the variety of  
23 information on start-up procedures on that slide?

24 MR. LEITCH: This supervisory review is, in many cases,  
25 by General Electric, but General Electric must also sign.

1 Al Jenkins is the site operations manager, and must sign these  
2 procedures, as well as myself. His signature is immediately  
3 before mine.

4 DR. POWERS: I guess that is something that I would  
5 worry about, if I was in your position is the possibility that  
6 at a given site a group of people working together become  
7 convinced that you are right, whereas another group, feeling  
8 somewhat competitive from a difference site might spot some-  
9 thing that --

10 MR. BOYER: Let me ask Lou Perry, who is the engineer  
11 in charge of our licensing and environmental section at  
12 Philadelphia Electric's engineering and mechanical engineering  
13 division to speak to that, because in the slide that is up  
14 there you have PE engineering department review. And Lou can  
15 speak to how that is done.

16 MR. PERRY: In the procedures that engineering  
17 reviews, the individual system engineers review the procedure  
18 to make sure that the system is operated as intended. So,  
19 in essence, this was my partial answer to Mr. Ebersole's  
20 question, on how do you make sure that those things that aren't  
21 there don't bite you. And that gives us that extra additional  
22 assurance that it got a second look from someone who was not  
23 initially involved in the preparational procedures.

24 DR. GARCIA: In considering the writing and checking  
25 of these procedures, is any consideration given to the

1 relative importance of the systems, that is by using PRA  
2 information, or systems interaction information that has  
3 been developed elsewhere?

4 I recognize that much of this is done for start-up,  
5 that you are talking about now, but does this consideration  
6 come in to play anywhere in the procedure writing, verification  
7 process?

8 MR. LEITCH: I can think of no occasions where we  
9 have had specific reason to use the probability risk assessment  
10 in the preparation of these procedures. I don't know of such  
11 a case.

12 MR. EBERSOLE: Let me ask, I have seen so many  
13 procedures where one is told to do something, and then if that  
14 doesn't work, then do the alternate of which there is only  
15 two choices. And then everything falls apart because there  
16 is nothing beyond that, when the alternate doesn't work the  
17 operator is left stranded.

18 Is that a characteristic of your procedure, when you  
19 get past the two channel redundant mode that there is a big  
20 void?

21 MR. LEITCH: The operators -- these procedures we  
22 are speaking about here govern specific start-up tests. The  
23 operators' emergency procedures always override --

24 MR. EBERSOLE: I guess I am in the wrong ballpark  
25 here, I am talking about emergency and abnormal procedures.



1 MR. BOYER: Systematic procedures they state the  
2 conditions, if one condition doesn't exist, it directs you  
3 down with an arrow to go into the appropriate box and follow  
4 down through there. So, the various contingencies are con-  
5 sidered in the preparation of those procedures.

6 MR. EBERSOLE: We are not talking about them here.  
7 Are we going to talk about them any in this session here,  
8 the emergency and abnormal procedures? Are they now developed?

9 MR. BOYER: Yes, they are developed and the operators  
10 have been trained in their use.

11 MR. EBERSOLE: I suspect maybe tomorrow some portion  
12 of the discussion will be devoted to these sorts of things.

13 What do you do when you lose your redundant path?  
14 You know, as part of the PRA.

15 MR. LEITCH: I am not sure of tomorrow's agenda.  
16 I don't think that specifically is on for tomorrow.

17 MR. EBERSOLE: Well, PRA is bound to have these  
18 escape routes in it.

19 DR. BENDER: Could I ask one more question? The  
20 37 procedures that you are developing, where did that list  
21 come from?

22 MR. LEITCH: They were primarily submitted to us  
23 -- I guess really the genesis of them was Chapter 14 in the  
24 FSAR. We took our experience, and basically, were involved  
25 with the writing of Chapter 14 and the FSAR a number of years

1 ago. And updating that in conjunction with the recommenda-  
2 tions as the nuclear supplier, I woul' say it is primarily  
3 input from General Electric that yielded the list and the  
4 acceptance criteria for those particular tests as stated in  
5 the FSAR.

6 DR. BENDER: How long has the list been in existence  
7 in its present form?

8 MR. LEITCH: I would say several years.

9 MR. BACKAN: Yes, several years is correct. This  
10 testing is done from site to site, similar tests were done  
11 at Peach Bottom, maybe not the exact number, but very similar  
12 tests.

13 DR. BENDER: Well, the thrust of the question is  
14 really to see whether the current pre-op procedures reflect  
15 the most recent experience, that is sort of the thrust of  
16 the question. I don't have any reason to think they don't, but  
17 I wondered whether that direct thought had been given to it.

18 MR. BACKAN: As Chapter 14 says it requires recent  
19 experience, if start-up testing needs to be reviewed, to  
20 assure that that is incorporated into Limerick's plan. That  
21 was done in the development of this plan, and in the develop-  
22 ment of Chapter 14.

23 MR. SCHWENHER: Mr. Ebersole, the staff would also  
24 review this, of course. It is in Chapter 14 of the safety  
25 evaluation. Just a couple of items, the start-up reports of

1 other BWRs were reviewed - - this is staff speaking -- to  
2 identify problems areas that should be identified in the  
3 Limerick initial test program. And of course the genesis for  
4 this is Reg Guide 1.68, which is pre-operational start-up  
5 test programs for water cooled reactor, revision two was the  
6 one that was used. And just maybe in conclusion, the  
7 applicant made a number of changes to the initial test program  
8 because of NRC comments, and then listed in here are 10  
9 specific things that the applicant did.

10 So, we feel reasonably sure that, one, we did have  
11 available to them, and we did, also, and our consultant,  
12 Bechtel Pacific Northwest Labs, experience from recent  
13 facilities, and we concluded that they are acceptable.

14 MR. EBERSOLE: Thank you.

15 MR. LEITCH: This list is in the handouts, it is a  
16 list of the tests that are involved. Notice the various test  
17 conditions, open vessels heat up one through six, and the  
18 warranty run, "X" indicate that that particular test will be  
19 performed at each one of those test conditions. So, many of  
20 these tests have separate sub-tests associated with them to  
21 be performed at each one of those various test plateaus, or  
22 conditions.

23 MR. BOYER: I might point out that I would bet that  
24 water level reference leg temperature was one that has been  
25 added to the list, probably certainly since Peach Bottom. I

1 think probably a few more, too. So, I think there has been  
2 an evolution that we keep abreast to this.

3 MR. LEITCH: The percent core flow and percent power  
4 map indicating the various regions in which we will be operat-  
5 ing for these test conditions, test condition one, two, three,  
6 and we go to five, trip the recir pumps to four and then come  
7 back up to test condition six.

8 Then just a word about the schedule, --

9 MR. EBERSOLE: Before you leave this matter of the  
10 operational power flow map. To what level can you get in  
11 temperatures and pressures using the recir pumps, are you  
12 raising pressure and temperature up to what levels?

13 MR. LEITCH: Well --

14 MR. EBERSOLE: Are you getting the pipes hot?

15 MR. LEITCH: Yes.

16 MR. EBERSOLE: To normal temperatures?

17 MR. LEITCH: Yes, these are test conditions one through  
18 six which are in excess of 5 percent, yes. These are after  
19 heat up.

20 MR. EBERSOLE: No, I am talking about just the test--

21 MR. LEITCH: We get up to 545 degrees.

22 MR. EBERSOLE: With just mechanical pump heat up?

23 MR. LEITCH: No, not in this region here.

24 MR. EBERSOLE: Well, I am talking about when you are  
25 running the plant up without any fission power, to what

1 temperatures do you go? Do you get actually one of the pipes --

2 MR. LEITCH: Oh, excuse me, before we get into this  
3 region -- what would be a good temperature, 180 degrees?

4 MR. EBERSOLE: So you don't get anywhere near opera-  
5 tional temperature on just the pumps?

6 MR. LEITCH: That's right.

7 Now, I want to make sure that I am answering your  
8 question, -- go ahead, Al.

9 MR. JENKINS: I am Al Jenkins, General Electric,  
10 start-up ops manager.

11 The heat up under recir pumps or some other type of  
12 mechanical heat up would be only to achieve, say, something  
13 like an operational hydro following the fuel loading. Once  
14 the operational hydro has been completed, then the remainder,  
15 or the heat up itself is all nuclear heat up.

16 MR. EBERSOLE: If you use operational hydro, I  
17 suggest you raise saturation temperature up to normal level.

18 MR. JENKINS: Not at all, the hydro temperature is  
19 probably around 100 degrees, so at some --

20 MR. EBERSOLE: 100 degrees?

21 MR. JENKINS: Yes, that's true.

22 MR. EBERSOLE: Wait a minute, I don't understand  
23 that 100 degrees.

24 MR. JENKINS: Once the fuel loading has been com-  
25 pleted and the vessel head is installed, then there is a hydro

1 just for leakage, an operational hydro. And the only thing  
2 there is to make sure you are above MPT, which is around  
3 100 degrees.

4 MR. EBERSOLE: At that point you are on the recir-  
5 culation pump, full blast for some long time, what is the  
6 ultimate temperature and pressure you obtain without any  
7 fission power?

8 MR. JENKINS: You could reach full --

9 MR. LEITCH: It is not our intention to do that.

10 MR. EBERSOLE: You don't do that as a baseline against  
11 which to measure pipe movements and other things?

12 MR. LEITCH: Our vessel internals vibration test was  
13 performed in September of '83, at which time the research  
14 system was operated at speeds -- at pump speeds to achieve  
15 rated core flow. The actual vessel water temperature was  
16 between -- well, it reached a peak of about 205 degrees. The  
17 majority of the testing was done between about 185 degrees  
18 and 205 degrees.

19 MR. EBERSOLE: Well, that is a long way from operation-  
20 al temperature, which is about 550, isn't it?

21 MR. LEITCH: Yes, 545.

22 MR. EBERSOLE: So you haven't gotten up to 550 on  
23 the pump, but you will?

24 MR. LEITCH: No, there is no plan for that.

25 MR. EBERSOLE: You don't take it up to mechanical

1 terminal pressure and temperature on just the pumps?

2 MR. LEITCH: For a BWR-4, earlier models, the vessel  
3 internal vibration test can be done at less than rated  
4 temperatures. For the later models, BWR-5s which used a two  
5 speed recir pump, typically they have to reach rated or near  
6 rated temperatures, it is a different plant model.

7 MR. EBERSOLE: You don't do it for this one, but you  
8 do it for the later ones, is that what you are saying?

9 MR. LEITCH: Only because of the difference in the  
10 pump design and the fact that they use a flow control valve  
11 instead of a variable speed pump.

12 MR. EBERSOLE: Thank you.

13 MR. LEITCH: Just a word or two about the schedule,  
14 the so-called Phase One of the program, that I mentioned, the  
15 pre-operational test phase. Phase Two is the fuel load and  
16 zero power testing, which we expect to take a little over  
17 seven weeks. The low power testing which we expect to take  
18 a little over three weeks, basically, we are saying in about  
19 11 weeks from the time of initial fuel load, we would expect  
20 to be ready to exceed 5 percent power, and that is the Phase  
21 Four, or the so-called power ascension testing phase of the  
22 program.

23 The power ascension phase has six phases that I  
24 described in the program earlier on the power flow map,  
25 and finally culminating in the warranty run. So, we estimate

1 that the total time from fuel load until completion of the  
2 warranty run is about 31 weeks.

3           Very much the same information provided in just a  
4 slightly different format, this is time from the start of  
5 fuel load, fuel loading complete in about four weeks; the  
6 5 percent power is expected to be exceeded in about 11 weeks,  
7 and finally the completion of the warranty run in about 31  
8 weeks from the time of initial fuel load.

9           This is just a quick representation of the percent  
10 core thermal power that we expect to produce during the  
11 various phases of the test program.

12           And, finally, winding up with 100 percent core flow  
13 before and during the warranty run, during test condition  
14 six.

15           DR. MARK: Tell me, is that list of milestones which  
16 you had one, is that more or less typical, for other BWR users?

17           MR. LEITCH: The way we arrived at that was to take  
18 the best that anyone has done in each one of those test  
19 conditions and add 20 percent to that number, so that what  
20 I am saying is I don't know that anyone in recent BWR history  
21 has actually completed the program in that length of time.  
22 But what we are saying is we took the various segments and  
23 added 20 percent to each segment, and that's what we think is  
24 a reasonable target to shoot for.

25           So what I am saying is someone has done each one of



1 those segments in 20 percent less time than I have shown, but  
2 no one has done all of them in that time shown.

3 MR. SCHWENHER: From the staff there is an experience  
4 factor for the last five boilers that were started up, this  
5 takes on the order of three and a quarter to four months. So  
6 they are certainly within the ballpark of what the recent  
7 experience has been on starting up boilers.

8 MR. BOYER: And you must recognize the schedule will  
9 go as rapidly as we can in a conservative manner.

10 MR. LEITCH: So our conclusion is that we have  
11 completed essentially the pre-operational test program, we  
12 have the procedures ready for the start-up test program, two  
13 of those are still in the approval cycle, but the ones that  
14 we need for fuel loading initial criticality are all in place.  
15 The plant construction is complete, the people are trained,  
16 our nuclear review board has reviewed our operational readiness  
17 and they have concluded that they feel we are ready for fuel  
18 load.

19 And, as I say, you have heard the presentations from  
20 the NRC here today, and we feel that we are ready to put in the  
21 fuel and begin the start-up test program.

22 MR. EBERSOLE: Thank you.

23 Any questions?

24 DR. MARK: There was mentioned earlier some impending  
25 hearings, the resumption of some hearings. Is there a feeling

1 as to when and through what time that will preoccupy things?

2 MR. LEITCH: That relates to off-site emergency  
3 planning.

4 MR. BOYER: The off-site emergency planning is not  
5 required for fuel loading. So, all of the hearings are  
6 accomplished that are required for fuel loading, except this  
7 one which maybe a potential review, that the appeal board  
8 remanded back to the licensing board, the consideration of  
9 two contentions relating to Point Pleasant, environmental  
10 effects at Point Pleasant related to the salinity in the  
11 Delaware River and the other to the effect on the national  
12 historic district of Point Pleasant being potentially declared  
13 a national historic district.

14 The appeal board said that the hearing board should  
15 allow the intervenor to restate these contentions and then in  
16 view of the information available in the final environmental  
17 statement, and other places that is available now, the board  
18 should determine whether these contentions are suitable to be  
19 heard.

20 We have petitioned the board, Philadelphia Electric  
21 has petitioned the board to issue an order saying that they  
22 do not effect the fuel loading license -- the issuance of the  
23 fuel loading license, and that if necessary, they can be  
24 carried on in parallel with that effort.

25 The staff of the NRC has indicated that they concur

1 in that opinion. The board has given the intervenor until  
2 either today or tomorrow to respond, and then will make a  
3 decision.

4 MR. MICHELSON: I wonder if I might ask the staff,  
5 the operating procedures have now been received, I guess, by  
6 the NRC, how many of those procedures do you sample as a  
7 review, since these are fairly new and unique procedures?

8 MR. MARTIN: The NRR staff reviews the emergency  
9 procedure guidelines from which the procedures --

10 MR. MICHELSON: I am talking now of the operating  
11 procedures. I thought the human factors people --

12 MR. MARTIN: They review some of the operating pro-  
13 cedure guidelines, as well. I believe the actual physical  
14 review, the procedure itself is done largely by regional  
15 staff.

16 MR. MICHELSON: Now, if I wanted to persue some of  
17 these operating procedures, where might I find the library  
18 containing the procedures? In other words, where do your  
19 people go to read the procedures?

20 MR. MARTIN: We would obtain them from the applicant.

21 MR. MICHELSON: So, do you know if you have any of  
22 these on hand, or do you have to go to the regional office to  
23 get them?

24 MR. WIGGINS: Jim Wiggins, senior resident.

25 To my knowledge, NRR is not in possession of a

1 complete set of licensee procedures, since that is not the  
2 normal course of events in our review. As far as the region  
3 is concerned, we also, as the organization, are not in possession  
4 of a complete set of licensee documents, however, in my per-  
5 formance of my duties, I have access to everything that the  
6 utility has. And I know a number of places where I can get  
7 my hands on the procedures, if I was of a mind to do so.

8 MR. MICHELSON: I fully appreciate that.

9 MR. WIGGINS: What I am trying to say is NRC is not  
10 in possession of any of them.

11 MR. MICHELSON: They must have reviewed a few of  
12 them. How do I know which ones the staff might have reviewed?

13 MR. WIGGINS: I know that there are some administra-  
14 tive procedures that are described in the SER as being ones  
15 that the staff and NRR reviewing drafts of them.

16 The regional inspectors have reviewed selected  
17 procedures and the procedures that have been reviewed are  
18 documented in the inspection reports.

19 MR. MICHELSON: If I wanted to look at a procedure  
20 that I was assured the NRC had already reviewed and approved,  
21 how would I know which procedures to select? Where can I get  
22 a list of the ones that you might have reviewed?

23 MR. WIGGINS: To my knowledge, there is no composite  
24 list. You would have to look at inspection reports to determine  
25 what procedures had been reviewed, and we did do a procedure

1 type of inspection a few months back, where we looked at a  
2 selected --

3 MR. MICHELSON: Headquarters apparently doesn't look  
4 at these procedures to speak about.

5 MR. WIGGINS: I would have to defer to Bob Martin.

6 MR. MARTIN: That's correct.

7 MR. EBERSOLE: Suppose I take a procedure like what-  
8 ever procedure there is for total loss of AC power. Do you  
9 review that?

10 MR. MARTIN: That would be an emergency procedure.

11 MR. EBERSOLE: Yes, I know, but would you review it?

12 MR. MARTIN: It would be on a case-specific situation.

13 MR. EBERSOLE: I just picked that one out of the blue  
14 as being one of the popular ones..

15 MR. MARTIN: There have been a few procedures --

16 MR. EBERSOLE: Did you review those procedures for  
17 this plant?

18 MR. MARTIN: I don't know if we did, or not.

19 MR. EBERSOLE: Do you routinely do this particular  
20 procedure for all plants?

21 MR. MARTIN: It was a customary part of our review  
22 to focus on certain things, the reviewers established that  
23 they had a particular interest in a procedure and requested  
24 some from the applicant. It was never 100 percent of the  
25 procedures.

1 MR. MICHELSON: Can you give us a feel as to what  
2 percent you looked at, either regional or headquarters level,  
3 or both?

4 MR. EBERSOLE: One of the criticisms of the TMI-2  
5 case, nobody ever looks at procedures.

6 MR. MARTIN: I would have to consult our technical  
7 staff that does that review, in order to respond to that.

8 MR. EBERSOLE: Why don't you look that up for us, to  
9 what degree do you examine emergency and abnormal procedures.

10 MR. MICHELSON: I would like for you, if you would,  
11 in the case of Limerick, provide us a list of those procedures  
12 that you did review. I realize that you don't look at all of  
13 them, you don't have the time, but you must have looked at a  
14 certain set, and I would like to know which ones are in that  
15 set.

16 MR. MARTIN: That is the emergency operating pro-  
17 cedures?

18 MR. MICHELSON: That's correct, not normal.

19 MR. BOYER: I believe I can state that all of the  
20 on-site emergency planning procedures. Now, differentiate  
21 from emergency procedures, were reviewed by an NRC reviewer.

22 MR. MICHELSON: That is not what we are getting at.  
23 We want to see the emergency operating procedures and what  
24 fraction of them was reviewed, and which ones specifically  
25 were reviewed. And I will look at one or two of those.

1 MR. EBERSOLE: Any other questions in this area?

2 (No response.)

3 MR. EBERSOLE: If not, I am going to declare a 15-  
4 minute recess, be back at 3:15, please.

5 (Whereupon, a short recess was taken.)

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1 MR. KERR: Can we pick up where we left off, and  
2 continue.

3 MS. KANKUS: Good afternoon. I'm Robbie Kankus.  
4 I'm Director of Emergency Preparedness for Philadelphia  
5 Electric. I'd like to discuss with you briefly this afternoon,  
6 emergency planning program at generating station units 1 and  
7 2. I'd like to briefly discuss our on-site appraisal and re-  
8 sults, the radiological emergency response plans for off-site  
9 emergency at Limerick, public alert and notification system,  
10 our public information program, the evacuation time estimate  
11 and then some conclusions regarding emergency preparedness.

12 As we heard earlier this morning, an on-site appraisal  
13 was conducted in June of 1984. There were 49 items identified  
14 for corrective action, and to this date we have corrected  
15 approximately of those 18, and there are four outstanding that  
16 we are in the process of resolving.

17 We have agreed, under those items, to clarify our  
18 organization description, centralize our emergency plan train-  
19 ing responsibilities, complete equipment installation, clarify  
20 procedure steps, complete training of emergency response per-  
21 sonnel, and complete the storage of supplies necessary for  
22 emergency response.

23 After the appraisal in July of 1984, an on-site  
24 exercise was complete.--

25 MR. KERR: Excuse me. Are you going to go into a



2  
1 bit more detail on these individual items, or is that what  
2 you are now doing?

3 MS. KANKUS: No, I was not planning to.

4 MR. KERR: Can you tell me what is meant by clarify-  
5 ing an organization?

6 MS. KANKUS: Yes, sir. The Region, in their apprai-  
7 sal, asked us to provide a greater description of the responsi-  
8 bilities and duties of our various organizational personnel  
9 who respond in an emergency, clarify them and make them a bit  
10 more clear.

11 MR. KERR: Is this something you had failed to do,  
12 or was it in NRC's mind not descriptive enough?

13 MS. KANKUS: I believe in their minds it was not  
14 descriptive enough. It was only certain elements of the  
15 organization that they asked us to make interfaces between  
16 various emergency response personnel more clear and their  
17 specific duties more clear.

18 MR. KERR: And you are convinced you can do that to  
19 the NRC's satisfaction?

20 MS. KANKUS: Yes, we are.

21 MR. KERR: Thank you.

22 MS. KANKUS: Subsequent to the appraisal, we did  
23 have our first annual emergency response exercise on July 25,  
24 1984, and the inspection team found that there were no viola-  
25 tions and response was adequate. There were areas for

3  
1 improvement, and we are incorporating those into our pro-  
2 cedures and plans at the present time.

3 This ends my discussion of on-site emergency planning  
4 unless there are any questions on that.

5 MR. KERR: Are there questions on on-site emergency  
6 plans?

7 (No response.)

8 I see none, so why don't you continue, please.

9 MS. KANKUS: What I would like to discuss with you  
10 now is the off-site emergency planning. I'd like to start  
11 out by discussing the scope of the radiological emergency  
12 response plans that have been developed for Limerick.

13 At the present time, we have three risk county  
14 plans, we have two support counties, these being counties  
15 which would provide facilities, equipment or personnel to  
16 those risk counties in the event of an incident.

17 We have 43 municipal plans, municipal plans being  
18 required because of the fact that Pennsylvania is a common-  
19 wealth and the local level of government is municipality.

20 There are ten health care facilities, ranging from  
21 hospitals to nursing homes. There are 13 school districts  
22 within the EPZ, and 35 private schools, for a total of 106  
23 plans that have been developed.

24 The extent of the EPZ and its designation have been  
25 determined in the ten-mile radius and allowing the municipalities

4  
1 in concert with the counties and the Pennsylvania Emergency  
2 Management Agency to define particular boundaries of that EPZ.  
3 These boundaries are based upon either geographical features,  
4 such as roadways or rivers and demographics features, such  
5 as township boundaries.

6 The furthest extent of the EPZ in some areas to the  
7 south carries out to approximately 12 miles in the Chester  
8 County area. To give you an idea of the process that we've  
9 gone through and the timing of this activity, I'd like to go  
10 over the various activities we've undertaken.

11 In March of 1982, the EPZ was designated, as you  
12 saw in the previous overhead. This is between the counties  
13 and municipalities to develop these boundaries. Based upon  
14 these boundaries and the RERP prototype which was provided  
15 by the Pennsylvania Emergency Management Agency, draft plans  
16 were begun from April of '82 to September of '82, for the  
17 counties, municipalities, schools and health care facilities.

18 From August of '83 through December of '83, those  
19 draft plans were reviewed by the Pennsylvania Emergency  
20 Management Agency for conformance with that prototype and  
21 a technical review. This was considered to be an informal  
22 review and not a formal approval.

23 The Regional Assistance Committee of the Federal  
24 Emergency Management Agency then received those plans in  
25 December of 1983, and reviewed them until March of 1984 -- I'm

5

1 sorry -- May of 1984.

2 Those comments from the PEMA and the Federal Emer-  
3 gency Management Agency were then taken back and incorporated  
4 and the most revisions of the plan have been issued this week.

5 We have had on-going orientation and training of  
6 the various municipal agencies and health care facilities  
7 and school districts from November of '83 to July 25, 1984.  
8 Training is still continuing, but that was the target cutoff  
9 date to help people participate in our exercise.

10 Besides the training, practice drills and critiques  
11 were scheduled with the various off-site groups from May to  
12 July of 1984. A full-scale observed exercise by the NRC and  
13 FEMA was conducted on July 25, 1984.

14 We are now in the process, based upon the results  
15 of that exercise, of incorporating the comments from the  
16 various agencies, including the local levels.

17 Projected that a public meeting required by 44 CFR  
18 350 will be held in the beginning of December, 1984. Antici-  
19 pated findings by FEMA would be the Spring of 1985, with  
20 preparedness established in 1985.

21 I'd like to point out here that the annual RERP  
22 review and revision and training is an ongoing process, that  
23 as municipalities gain more experience in this area, they  
24 are revising their plans on a regular basis.

25 The next biannual exercise as required by regulations

6

1 would be in 1986.

2 MR. KERR: Excuse me. Let me make sure I -- you  
3 mentioned that something had been revised within the last  
4 week. What is it that has been revised?

5 MS. KANKUS: Yes, sir. All those 106 plans have  
6 recently completed a revision and have been issued again  
7 within the last week.

8 MR. KERR: And these are issued and are sent to  
9 FEMA and NRC both?

10 MS. KANKUS: Yes, sir. They are sent by the various  
11 agencies, whether they be the health care and municipalities,  
12 to the county and/or to the Pennsylvania Emergency Management  
13 Agency. It depends upon the review process for that plan.

14 MR. KERR: And then is there a further iteration,  
15 or does this depend on the review of this revision?

16 MS. KANKUS: After review of this revision, the  
17 Pennsylvania Emergency Management Agency forwards the formally  
18 approved plan to the Federal Emergency Management Agency for  
19 review. That's what they would use to establish the finding  
20 of preparedness in the Spring of '85.

21 MR. KERR: And you expect a finding of some sort  
22 in early '85?

23 MS. KANKUS: Yes, sir.

24 MR. KERR: Thank you. Questions? Yes, sir, Mr.  
25 Davis?

7  
1 MR. DAVIS: Maybe you have covered this, but I may  
2 have missed it. Can you tell me how the EPZ boundary was  
3 established?

4 MS. KANKUS: Yes. The actual process was the Penn-  
5 sylvania Emergency Management Agency approached the three  
6 risk counties -- Montgomery, Berks and Chester -- and requested  
7 them to contact the municipalities that would be touched by  
8 a ten-mile circle, and request their determination of whether  
9 they wished to be included in the EPZ and, if so, how much  
10 of their particular municipality would be included.

11 Some chose to break the municipality because of a  
12 roadway that was familiar to people, or a river; some chose  
13 to include the entire municipality because that boundary was  
14 just easier for them to plan with.

15 MR. DAVIS: So it was based on a ten-mile radius  
16 rather than any goal projection or accident consideration?

17 MS. KANKUS: Right.

18 MR. DAVIS: And, presumably, a county could opt  
19 not to participate and be within the ten-mile radius?

20 MS. KANKUS: Technically, the counties did not  
21 approve their plans, but we have not had any situation where  
22 anybody has opted not to participate.

23 MR. DAVIS: Thank you.

24 MS. KANKUS: During the process of RERP development,  
25 PECO has been providing support to the government agencies.

8  
1 One of the first activities we did to help with the process  
2 was to hire a consultant firm, energy consults, to assist  
3 the counties, municipalities, health care facilities,  
4 school districts, private schoole in plan development.

5 This was done at the behest of the Pennsylvania  
6 Emergency Management Agency, as they felt that it was a large  
7 undertaking in the Limerick area, and the consulting firm  
8 was independent from the various utilities and regulatory  
9 bodies to be of assistance.

10 PECO also undertook with the counties and the  
11 Pennsylvania Emergency Management Agency a public needs  
12 survey, which we distributed and analyzed for the surrounding  
13 counties. This public needs survey was sent out to determine  
14 those people in the population regarding specialized trans-  
15 portation, specialized care in evacuation, specialized com-  
16 munications assistance, such as those for the hearing im-  
17 paired, or any other type of special communication needed,  
18 such as bilingual communication.

19 This information has been fed into units for  
20 county plans, at this point. PECO has also installed a public  
21 alert notification system based upon county input. I will  
22 discuss this a little bit further on. The last time we talked  
23 with this committee, we were discussing a telephone system  
24 as opposed to a siren system. We have now installed the  
25 siren system, and I will discuss that in more detail.

9  
1 We are also developing with the Pennsylvania Emer-  
2 gency Management Agency and the counties public information  
3 brochure which is distributed to all businesses and residences  
4 within the emergency plan itself.

5 Another activity that we undertook was to hire  
6 HMM Associates to develop the evacuation time estimate in  
7 concert with the counties and PEMA.

8 We have also provided equipment and fiscal resources  
9 to the various municipalities and counties for their participa-  
10 tion. We have also undertaken an extensive training program  
11 for staff and volunteers.

12 MR. KERR: Does fiscal services mean money?

13 MS. KANKUS: Yes, sir, it does.

14 MR. KERR: Thank you.

15 MS. KANKUS: In terms of the equipment that we've  
16 provided for the various municipal EOCs and counties, this  
17 gives a rough example of what we've got. Telephones, status  
18 boards, tables, chairs, maps, generators, radio equipment and  
19 office supplies. This equipment was developed by looking at  
20 other areas where emergency response has occurred and deter-  
21 mining what would be needed in those 43 municipalities to  
22 enhance their response.

23 The training program that PECO has undertaken --

24 MR. KERR: Excuse me. What will this equipment be  
25 used for if there isn't a radiological emergency, anything?



1 MS. KANKUS: They are free to use it for their  
2 other activities.

3 MR. BOYER: It was used in a flood emergency in  
4 Collegeville a few months ago.

5 MR. KERR: Thank you.

6 MS. KANKUS: The most extensive program that has  
7 been undertaken todate is the RERP training. The RERP train-  
8 ing is divided into basically three stages, stage 1 being  
9 the introduction to nuclear power and radiation; phase 2 being  
10 the specific duties of those various groups that we are ad-  
11 dressing; and the third program being a drill and exercise  
12 program we have critiqued for these groups.

13 The groups that we've covered and the approximate  
14 numbers of people who have been trained in those areas are  
15 county staff and municipal volunteers, which encompassed  
16 approximately 1200 people; police, being both local, state,  
17 fire companies and ambulance companies, approximately 2100  
18 people have been trained.

19 With farmers, we have trained approximately 100;  
20 school staff and teachers, approximately 1700 people have been  
21 trained; 175 bus drivers have been trained, and 2300 hospital  
22 and nursing home staff, for a total of 8,000 personnel being  
23 trained.

24 DR. GARCIA: Excuse me. What is the extent of the  
25 training? Can you give us some definition, time, type, any

11 1 additional information?

2 MS. KANKUS: Phase 1 is about two hours, and that  
3 covers an introduction of nuclear power, how nuclear power  
4 plants operate, what the potential hazards are from it. It  
5 relates radiation to them in terms of other items, such as  
6 the color television set, so it's put in lay terms recognizing  
7 that those people are not nuclear engineering people.

8 Phase 2 which they come back and take at a later  
9 date varies from one hour to four hours, depending upon the  
10 group and their specific duties. Phase 2 is oriented towards  
11 their actual group in a radiological emergency. It would  
12 go into whether they are traffic control and how they direct  
13 traffic, whether they are a county staff person who would  
14 be responsible for all police activity in the area.

15 The drill and training program applies primarily  
16 to municipalities and the counties, and what they do in that  
17 program is, they actually go in and perform their notifica-  
18 tion process, and they are more or less tabletop an exercise  
19 in that activity, and then they are critiqued and commented  
20 on so they could go back and revise their procedures and/or  
21 would go in and perform retraining if necessary.

22 DR. GARCIA: Thank you.

23 MS. KANKUS: As I indicated, we have changed our  
24 public alert notification system. We now have installed  
25 165 rotating mechanical sirens controlled by each county.

1 These are similar to the sirens at Peace Bottom, Susquehannah  
2 and Three Mile Island.

3 They are controlled in each county by a computerized  
4 system with radio signals, with a back-up controller at  
5 Limerick Generating Station. It has a two-way radio system  
6 operation which not only sends out a control signal for activa-  
7 tion, but sends feedback back to indicate failure of the  
8 siren.

9 Sites for the sirens were selected by coordination  
10 with the counties and municipalities accounting for county  
11 property and any particular concerns in townships relating  
12 to residents.

13 The site coverage was developed by computer analysis  
14 and included the siren characteristics, such as topography,  
15 meteorology and vegetation.

16 Philadelphia Electric has agreed to maintain the  
17 siren system for the counties, and we are now developing a  
18 testing program wherein the counties will test the systems  
19 and PECO will respond to any failures or any further modifi-  
20 cations to it.

21 The system was used during the July 25 exercise  
22 and had favorable results.

23 DR. DAVIS: Question. What powers the sirens?

24 MS. KANKUS: I don't think I can answer that.

25 MR. BOYER: Philadelphia Electric Company service --

13  
1 or a utility service drop powers the sirens. It is an air-  
2 driven siren, but it is a compressor that has to develop the  
3 air pressure, plus another motor which rotates the siren, but  
4 it is from a normal power line in the area.

5 DR. DAVIS: I was just concerned, if you have a  
6 loss of off-site power which affects the area.

7 MS. KANKUS: I believe that they are actually split  
8 up between three utilities. There is Metropolitan Edison,  
9 Philadelphia Electric Company and Pennsylvania Power and  
10 Light supply the sirens in the three areas.

11 As a supplement in Pennsylvania, there is a require-  
12 ment that route alert of a sector is being developed on the  
13 45-minute requirement for all siren sites. So at the present  
14 time, all municipal plans contain a route alerting by fire  
15 companies that is no more than 45 minutes. So in the event  
16 of a failure of the siren, that can be done. That is also  
17 why the feedback system was installed, so that there is  
18 immediate feedback if a siren does fail for loss of power,  
19 even to an individual siren, it does alarm at the county to  
20 alert them before they have to use that siren, so they have  
21 a jump on getting the route alerting completed.

22 DR. DAVIS: Thank you.

23 MR. KERR: Are those sirens used to alert for any  
24 other sort of emergency?

25 MS. KANKUS: They have the nuclear attack warning

14 1 signal on them, and they have been, or will be software con-  
2 trolled so municipalities could use them for other activities,  
3 such as the flood that they had.

4 Their general inclination is not to use them for  
5 other things, but to have that available in case they really  
6 needed it.

7 MR. KERR: So if you hear a siren, it means that  
8 there might be a flood, nuclear attack, or possibly a reactor  
9 accident?

10 MS. KANKUS: The two sounds that are on it definitely  
11 -- we are providing information to the public to indicate  
12 either an incident at Limerick or a nuclear attack. If they  
13 were used for anything else, one of those two sounds would  
14 have to be used for that.

15 MR. BOYER: The siren sound means turn on your  
16 radio. Turn on your radio and find out what's going on.

17 MR. KERR: So the information transfer, other than  
18 the alert, comes on another channel, and the siren simply  
19 means go find out what's going on.

20 MS. KANKUS: Right. In Pennsylvania, the sirens  
21 are always used for an informational purpose, to alert anybody  
22 to turn on the emergency broadcast system, and they intend  
23 to use, even at Limerick, --

24 DR. GARCIA: Doesn't the same question about power  
25 apply to the radios that people would have?

1 MS. KANKUS: Unless they had battery operated  
2 radios.

3 MR. KERR: In Pennsylvania, they have battery  
4 operated radios.

5 MS. KANKUS: The route alerting equipment is self-  
6 powered from the various fire trucks and police trucks.

7 A FEMA-43 report has been submitted to the Federal  
8 Emergency Management Agency for review of the siren system  
9 and approval. One item to be completed on the backup trans-  
10 mitter to be provided. To ensure that we don't lose the  
11 system under signal failure, we will be installing a backup  
12 transmitter.

13 To give you an idea of the coverage of the siren  
14 system, since FEMA-43 was published, while the Limerick system  
15 was being designed -- there is a map of this in your handout  
16 -- we've been conservative in our design of the siren system,  
17 The requirements are 60 dB and 70 dB. The system has been  
18 designed at 65 and 75, and I think if you look at the map,  
19 you can see there are areas of high population that have  
20 quite a bit of overlapping coverage of the siren system.

21 To go along with the siren system, obviously,  
22 people need to turn on their radios. PECO has undertaken an  
23 extensive public information program. Part of the activity  
24 is monthly local newspaper advertising that relates to  
25 Limerick and emergency planning. These ads were started about

1 six months ago, and they do include such things as turn on  
2 your radio when you hear the siren, how to contact your local  
3 emergency management agency for general information, other  
4 things about emergency planning, what the evacuation routes  
5 are, how the plans were developed.

6 We also have a biweekly newspaper that's published  
7 by PECO called the Limerick Light. The contains information  
8 not only on emergency planning, but about Limerick in general,  
9 to keep the public informed.

10 A major undertaking is the public information  
11 brochure and its distribution. Following this overhead in  
12 your handout is a copy of that public information brochure.  
13 This is being developed in concert with the Pennsylvania  
14 Emergency Management Agency. It is similar to that of  
15 Susquehannah and TMI and Beaver Valley. The state is using  
16 a consistent format in these activities.

17 It does address actions to be taken, the directions  
18 people would take if they were evacuated, and what to do when  
19 the siren sounds. Quite comprehensive, and it will be dis-  
20 tributed on an annual basis.

21 MR. KERR: I think as evidence of the effectiveness  
22 of your communication system, I remember at the subcommittee  
23 meeting that was held near the site, one gentleman arose and  
24 said, "This thing must be terribly dangerous or you wouldn't  
25 be going to all this effort to alert us to accidents".

1 MS. KANKUS: Yes. There's a lot of that belief  
2 up there. I think to combat that, we've tried to do a lot of  
3 public information in the last year, including things like  
4 radio advertising. We have taken out ads to notify people  
5 of the monthly testing of the sirens, the exercise that has  
6 come up, or other activities, such as the public needs survey  
7 to ensure that it was filled out by the public.

8 In order to help even further, we've undertaken  
9 some programs with the media, including an annual briefing  
10 with the media at Limerick, to give them some familiarity  
11 with the site, to make them aware of the emergency planning  
12 officials, which would include the state emergency management  
13 agency officials as well as the local officials.

14 To help the media along between their annual brief-  
15 ings, we have provided a media press kit, which provides  
16 background information on Limerick and emergency planning.

17 This is a draft copy of the cover of the --

18 MR. KERR: What sort of reaction do you get from  
19 the press, or can you characterize it in any way?

20 MS. KANKUS: Well, I think it ranges between two  
21 extremes. We've had various people that are not particularly  
22 interested in listening and have made up their minds, and  
23 some other people, particularly the local reporters, who will  
24 come out and are interested in learning about the plant and  
25 emergency planning, and really do walk away with an education.



18  
1 It may not have changed their minds about anything, but they  
2 do usually walk away with some information they did not have  
3 before that.

4 I think, in general, we've seen a more favorable  
5 response from the press. We've been in more in coordination  
6 with them, and they've been learning a lot more about the  
7 plant.

8 MR. BOYER: We got a fair coverage from the press  
9 on the July 25th emergency drill, and the FEMA report which  
10 came out subsequent to that.

11 DR. DAVIS: In line with Dr. Kerr's comment, I  
12 don't see anything in this draft copy that warns the reader  
13 that we really don't expect this to happen, or that such an  
14 event is extremely rare. And it looked to me like this might  
15 be reviewed as somewhat alarming. I don't know what the  
16 perception would be. You know, even on airplanes they say,  
17 "In the unexpected event".

18 MS. KANKUS: We have discussed that with the state.  
19 These are state written brochures. Basically, Philadelphia  
20 Electric provides distribution of the brochure. And I believe  
21 it is their feeling that this really is designed for people  
22 to use in an emergency, not as an educational media about  
23 what nuclear power plants are. This is what you pick up and  
24 run with if you have to run, so it is not used in the context  
25 of teaching.

1 DR. DAVIS: Thank you.

2 MS. KANKUS: I'd like to switch and talk about the  
3 evacuation time estimate at this point.

4 DR. GARCIA: Excuse me. Before you leave this subject,  
5 I notice on the second page a footnote that indicates that  
6 this is going to be included in the telephone directory. Is  
7 that, in fact, the intention?

8 MS. KANKUS: Yes. We are making an arrangement with  
9 Bell Telephone and Conestoga Telephone and I believe some  
10 General Telephone customers, to put this material in a special  
11 section in the telephone book. That's previously been done  
12 in Pennsylvania and has had quite a good response.

13 DR. GARCIA: Will you initially be distributing it  
14 separately?

15 MS. KANKUS: Yes. There will be a mailing to all  
16 the households, residences, businesses, recreation facilities  
17 within the area.

18 DR. GARCIA: And is that only for the townships  
19 that are within that EPZ or the ten-mile area?

20 MS. KANKUS: Generally, yes. What we do is we're  
21 mailing by Zip code, so it does go over sometimes across the  
22 boundaries, depending upon the post office.

23 MR. KERR: Is this similar to what you have done  
24 for, say, Peach Bottom?

25 MS. KANKUS: Yes, sir, it is. We have Maryland for

20

1 the last two years, and the Pennsylvania brochure has just  
2 been completed and is now being distributed.

3 MR. KERR: Thank you.

4 MR. WILEY: Question. I notice you have a note  
5 to the farmers to contact agricultural agents. Are they  
6 alerted as part of your drill?

7 MR. KANKUS: Yes, they are, from the county level  
8 and from the state level.

9 Philadelphia Electric undertook to hire HMM Associ-  
10 ates to develop an evacuation time estimate study. HMM was  
11 familiar with the Pennsylvania approach to emergency planning  
12 and, therefore, was familiar with the various assumptions  
13 that were needed.

14 MR. KERR: Excuse me. I probably should know what  
15 HMM Associates is, but are you going to tell me?

16 MS. KANKUS: HMM Associates is a consulting firm  
17 from Boston. HMM is their name.

18 MR. KERR: That means Hodges, Morrison --

19 MS. KANKUS: Bob Clemm from HMM can explain what  
20 the HMM stands for.

21 MR. CLEMM: My name is Bob Clemm, from HMM. It is  
22 Holtzeimer, Melino and McHamlis (phonetic).

23 MR. KERR: What do you do besides planning emer-  
24 gencies?

25 MR. CLEMM: We do a lot. We are involved, in

1 addition to the nuclear engineering fields, environmental  
2 engineering, civil engineering --

3 MR. KERR: It is primarily an engineering --

4 MR. CLEMM: Engineering planning.

5 MR. KERR: I apologize for not being familiar with  
6 it, but I --

7 MR. CLEMM: We've done probably more evacuation  
8 time estimates than anyone else. We've worked on, I think,  
9 23 different sites throughout the country, 19 of those using  
10 -- 19 or 20 using the NETVAC computer simulation model,  
11 Susquehannah being one of those.

12 MR. KERR: Thank you, sir.

13 MS. KANKUS: HMM's process in that activity was to  
14 meet with PEMA to develop the basic assumption. They and  
15 PEMA ended with the counties to obtain detailed information  
16 on the county plans and evacuation routes.

17 They used this input into their NETVAC program,  
18 and they also went out and collected field data on roads and  
19 traffic to input in the NETVAC. The draft evacuation time  
20 estimate was provided to PEMA and the counties for their  
21 review and comment.

22 We did incorporate some changes into that in a  
23 revision in May of 1984, and has been since incorporated in  
24 the Limerick emergency plan.

25 To give you an idea of the data that was used in

1 this activity, the population for the EPZ surrounding  
2 Limerick, in Montgomery County it is approximately 110,000  
3 people; Chester County approximately 56,000, and Berks County  
4 being approximately 18,000, with a total 1980 permanent  
5 population of 185,000.

6 The basic assumptions that we used were that three  
7 people would travel in each vehicle. They would then use  
8 the road network on the next slide. As you can see with  
9 Limierick there is quite an extensive roadway network there  
10 ranging from very small back roads to major four-lane highways.

11 Each county and municipality has worked out their  
12 various evacuation routes, so it is specific and it is based  
13 upon knowledge of that particular area. There have been  
14 worked on with the Pennsylvania Emergency Management Agency  
15 and the Pennsylvania Department of Transportation, to ensure  
16 the road capacity and information about the roads.

17 MR. KERR: Once you get this set of results from  
18 NETVAC, what do you get, a probablistic distribution of  
19 evacuation in X-hours, or a mean evacuation time? In what  
20 form are the results presented?

21 MR. CLEMM: The results are presented in terms of  
22 an absolute time for a number of different cases. This  
23 particular table on the screen represents the times associated  
24 with evacuation of the entire EPZ under various summer and  
25 winter conditions, fair and adverse weather. That represents

1 the maximum time to evacuate the entire EPZ under those  
2 different conditions.

3 In addition to that, we've also generated a number  
4 of results for evacuation of smaller areas, pursuant to  
5 NUREG 0654, Rev 1, Appendix 4, the areas out to 2 miles, out  
6 to 5 miles, basically representing 90-degree sectors.

7 MR. KERR: Thank you. That's helpful. Mr. Garcia?

8 DR. GARCIA: How sensitive are these numbers to the  
9 assumption of three people per car?

10 MR. KERR: Did you understand the question?

11 MR. CLEMM: Yes, I did. The numbers are very sensi-  
12 tive because that is what generates the amount of vehicles,  
13 which is very much a part of the total evacuation time. In  
14 this particular, there are a lot of vehicles, and the evacua-  
15 tion is due in large part to congestion, which results because  
16 of the number of vehicles. So, I guess the answer is, yes,  
17 it is sensitive to that.

18 DR. GARCIA: Do you have any other numbers? For  
19 example, two people per car? The evacuation estimate for  
20 the time required if the assumption were only two people per  
21 car?

22 MR. CLEMM: No, we don't.

23 MS. KANKUS: I think one of the reasons that three  
24 people per vehicle was used is because that is the standard  
25 data, knowing that families tend to evacuate as a family unit,

24  
1 and looking at past experiences in evacuations, three is the  
2 number that normally arises.

3 DR. GARCIA: I don't know that that would generally  
4 be true during the workday, for example, but I am no expert  
5 on that.

6 MR. CLEMM: I might add to that that the three  
7 people per vehicle only applied for the permanent residences.  
8 We attempted in our study to come up with a more realistic  
9 estimate of how many vehicles might be in an area under vari-  
10 ous conditions.

11 We took into account vehicles associated not only  
12 with permanent residences where we used three people per  
13 vehicle, but also at major workplaces, major recreational  
14 places, at hotels and motels and general overnight accommoda-  
15 tions and special facilities, such as schools, hospitals,  
16 nursing homes, et cetera.

17 I think in each of those different categories, there  
18 are different assumptions on vehicle occupancy. Three people  
19 per vehicle only applied to the permanent residents.

20 MR. KERR: Does this assume that evacuation does  
21 not occur, doesn't even begin until somebody gives an evacua-  
22 tion signal, and then one begins evacuating, or does it take  
23 into account the possibility that some people perhaps would  
24 become concerned before an evacuation signal occurs and,  
25 therefore, you might have 10 percent or 15 percent less people

1 to evacuate? How do you look at it?

2 MR. CLEMM: These time estimates were prepared  
3 assuming, I guess, the former, that the people would be  
4 notified and then begin their response to evacuate.

5 MR. KERR: No evacuation until a signal or sugges-  
6 tion to evacuate occurs, and that these times are after that  
7 signal?

8 MR. CLEMM: That's correct.

9 MR. KERR: Have you looked at the sensitivity of  
10 damage or risk or whatever, to these times? For example,  
11 how much difference would it make if instead of 6 hours and  
12 45 minutes the time turned out to be 10 hours, or 8 hours?  
13 Is the risk very sensitive to that time?

14 MR. CLEMM: I'm not sure what you mean by risk.

15 MR. KERR: Whatever you calculate --

16 MR. CLEMM: The times would be used in the decision-  
17 making process. There are no guidelines that an evacuation  
18 has to be --

19 MR. KERR: Let me try to make my question clearer  
20 because it's not very clear to me. In determining how many  
21 people are exposed to how much radiation, you make some assump-  
22 tion about evacuation in the CRACK code or some other code,  
23 I assume.

24 Is the final result which is in terms of man-rem  
25 exposure, let's say, very sensitive to these times? Does it



26

1 matter, for example, if a time is twice this or half this?  
2 I'm trying to get an idea of how accurately one needs to know  
3 this.

4 MR. CLEMM: I think in terms -- you can add on this,  
5 Robbie, perhaps -- I think in terms of what you are referring  
6 to is the radiological consequence modeling --

7 MR. KERR: Yes, sir.

8 MR. CLEMM: -- which is not what we did.

9 MR. KERR: You will recall that I turned toward  
10 Ms. Kankus to ask the question.

11 MS. KANKUS: I think you're deviating more to what's  
12 been corporated in the PRO, and it really needs to be dis-  
13 cussed by those people.

14 I can say that these times that are generated here  
15 are incorporated into the plant procedures and the county  
16 plans in order to be used in making that actual decision.

17 MR. BOYER: Bill, if we could defer that question  
18 until tomorrow, we will have the people here who use this  
19 information in a consequence model.

20 MR. KERR: Thank you.

21 MS. KANKUS: In terms of off-site emergency planning,  
22 we have one outstanding issue, which is a supplemental exer-  
23 cise which will be held after November 16, sometime in the  
24 time frame November 16 and November 30, and will incorporate  
25 non-municipalities that either did not participate in our

1 July 25th exercise or were not observed by PEMA at that time.

2 It will also be used by several of the other  
3 municipalities as an enhanced training activity. We will  
4 incorporate school district participation as the schools  
5 were not in session on July 25. It will have limited par-  
6 ticipation by the counties and states since they participated  
7 on a full-scale basis on July 25.

8 MR. KERR: Is there really a place called  
9 Schwenksville?

10 MS. KANKUS: Yes, there is.

11 MR. BOYER: 1500 people.

12 DR. MICHELSON: What is someone from that locality  
13 called?

14 MS. KANKUS: I don't think we've ever asked them.  
15 We just refer to them as residents.

16 And in summary, with the completion of that supple-  
17 mental exercise which would correct deficiencies identified  
18 by FEMA during the July 25 exercise, emergency preparedness  
19 will be established off-site.

20 MR. KERR: Are there questions? I see no additional  
21 questions. Thank you.

22 VOICE: Before you go on, if you want to, we have  
23 an answer to -- oh, Mr. Ebersole is not here -- we had an  
24 answer to the question on Humbolt Bay.

25 MR. KERR: Let's get the answer, and Mr. Ebersole

1 can read it.

2 VOICE: I talked to several G.E. people in design  
3 engineering responsible for the CRD systems. The basic design  
4 difference between the Humbolt Bay design and the current  
5 BWR design is that the earlier plants, the typical BWR 1s,  
6 because of their few numbers of control rods, I think approxi-  
7 mately 32 control rods, utilize a scram dump tank. It is  
8 a code tank, same radius as the reactor vessel, same vent  
9 and drain configuration as the scram discharge volume. For  
10 the larger plants, with the 137 or 185 control rods, the --  
11 G.E. went to a header system to accommodate the water from  
12 the numerous control rods.

13 The design parameters for the scram discharge volume  
14 is the same as for the scram dump tank. The operational  
15 vent and drain valves for the scram discharge header is the  
16 same as for the scram dump tank. That's the only difference  
17 I know of.

18 MR. KERR: Thank you, sir. Are there any questions  
19 on that topic?

20 VOICE: I'd also like to respond on the Hatch  
21 incident.

22 MR. KERR: Yes, sir. Go ahead, please.

23 VOICE: The info that I have indicates that on the  
24 25th of August of '82, that Hatch experienced a primary con-  
25 tainment leak which resulted in the loss of the primary cooling,

1 the dry wall chiller system. This resulted in a continuous  
2 scram signal from high dry wall pressure.

3 One of the scram discharge instrument volume valves  
4 -- and I'm going to assume the drain valves, but was not  
5 specifically identified -- had a bent stem. When the scram  
6 signal occurred, the valve, because of the bent stem, failed  
7 to fully close, and so there was a compromise of that integrity.

8 The water from the reactor vessel, through the  
9 drying mechanisms, to the scram discharge volume, the instru-  
10 ment volume, and out through some drain tank. That was the  
11 event.

12 The original design of the Hatch plant for the  
13 scram discharge volume utilized one drain valve and one vent  
14 valve. I do not know if that has been improved, but the  
15 original design was one of each.

16 The Limerick design utilizes two series valves  
17 in the drain line and in the vent line. The problem, the  
18 Hatch problem has been eliminated at Limerick via a design  
19 change, and I think also from a procedural standpoint it has  
20 also been addressed.

21 MR. KERR: Any questions about this issue? Mr.  
22 Powers?

23 DR. POWERS: I think that the question that Mr.  
24 Ebersole would ask if he were here, his concern was over the  
25 reluctance to depressurize the reactor as a procedure. Has

30 1 that procedure been adjusted?

2 MR. LEITCH: I was going to address that point.  
3 This topic that is basically secondary containment control  
4 was discussed at the BWR owners group generically, and as  
5 a result of that meeting, we at Limerick developed a procedure  
6 which we call T-103, a procedure for secondary containment  
7 control. It is one of our emergency procedures.

8 It is presently available in what is defined as a  
9 smooth draft form. It has not yet been PORC approved. It  
10 will be PORC approved prior to exceeding 5 percent power,  
11 and it does instruct the operators on the procedure to be  
12 followed in that situation.

13 Basically, it does describe attempting to isolate  
14 secondary containment, but if secondary containment cannot  
15 be isolated, it instructs the operator to depressurize. That  
16 procedure, as I say, has been written and typed, but not  
17 PORC approved at the moment.

18 MR. MICHELSON: What does secondary containment  
19 have to do with it? We are dealing now with failure to iso-  
20 late primary containment -- in other words, a blowdown out-  
21 side primary containment. So how does isolation of the  
22 secondary containment do you any good because the problem is  
23 blowdown of reactor outside of containment? If anything,  
24 you would like to ventilate the secondary containment real  
25 well and get the steam out of the building. So, I'm not sure

1 that's the procedure to site.

2 MR. LEITCH: They attempt to isolate the leak.

3 MR. MICHELSON: That's different. That's not isolat-  
4 ing secondary containment, that's isolating the primary  
5 pressure boundary.

6 MR. LEITCH: I misspoke.

7 MR. MICHELSON: So, T-103 then deals with if you  
8 can't get the primary pressure bottled back up again, then  
9 depressurize.

10 MR. LEITCH: Yes, sir, it does.

11 MR. MICHELSON: Could we get a copy of T-103 in  
12 that smooth draft form?

13 MR. LEITCH: You certainly can, yes, sir.

14 MR. MICHELSON: Would you just send it to the ACRS  
15 then if you will, please?

16 MR. LEITCH: Yes, sir.

17 MR. KERR: Are there further questions on this?  
18 Does the staff have any comment on the presentation on emer-  
19 gency planning? Can you tell me what the status of the  
20 staff's review, whatever it is staff does, please?

21 MR. MARTIN: Mr. Kantor will make comments on that  
22 subject.

23 MR. KERR: Thank you.

24 MR. KANTOR: My name is Paul Kantor, I am Section  
25 Chief of Emergency Preparedness Branch. I have also here

1 today Mr. Robert Wilkerson, Technical Hazard Group Chief  
2 of PEMA, and Terry Harkster, a Section Chief in our Emergency  
3 Preparedness Branch of NRC Region 1, if you have any ques-  
4 tions.

5 What I have presented here, and hopefully you can  
6 see it, is an overview of our review effort on the Limerick  
7 enerating Station.

8 Basically, our review covers an on-site emergency  
9 plan as done by the NRC. There is an emergency plan imple-  
10 mentation appraisal, or pre-operational inspection, if you  
11 will, that is done on-site, and that is primarily by our  
12 NRC Region 1. There is a review of state and local emer-  
13 gency plans, and that is done by FEMA.

14 There is a full participation exercise that is  
15 conducted. The on-site portion is evaluated by the NRC and  
16 the off-site portion by FEMA. And another aspect of this  
17 effort is also an emergency preparedness hearing has been  
18 conducted, the on-site portion has been conducted, the off-  
19 site portion is to be scheduled.

20 I have a slide that quickly goes over each one of  
21 these different areas.

22 MR. KERR: Instead of showing me the slide, I'd  
23 just like to get some indication of the staff's evaluation  
24 of whether the plan looks reasonable, is going to require a  
25 lot of additional work, is like some other good plan or some

1 other lousy plan, or any comments that you could give that  
2 would be helpful to the committee and our evaluation.

3 MR. KANTOR: The staff has reviewed the on-site  
4 plan against the requirements of the regulation, and we find  
5 at this time there are no open issues. We find the plan  
6 adequate for licensing, I might say for fuel load and low  
7 power operations up to 5 percent.

8 MR. KERR: Now as far as your review is concerned,  
9 and if I understand correctly, you review on-site and then  
10 FEMA -- do you have any additional on-site review work to do  
11 before one would go from 5 percent to 100 percent?

12 MR. KANTOR: We are, like I mentioned, the appraisal  
13 has been conducted, and our Region 1 is the lead in that  
14 area. They have identified some issues which I believe still  
15 remain to be closed. I could get Mr. Harkster here to address  
16 those. I think the majority of those issues have been re-  
17 solved satisfactorily for fuel load. I'm not sure at this  
18 time to what extent anything remains open as far as require-  
19 ments for fuel load, but the appraisal was conducted back  
20 in June. It was a full two-week on-site inspection, a quite  
21 comprehensive inspection effort.

22 Terry, would you like to --

23 MR. KERR: Would you comment, Mr. Harkster, if you  
24 have any relevant comments?

25 MR. KANTOR: I might add there was a followup



1 inspection done just last Friday.

2 MR. HARKSTER: We have a list of the items for 5  
3 percent power, which I would be glad to collate and provide  
4 the ACRS after the meeting. Right now, I have them in a  
5 form where they are divided among fuel load criticality.

6 MR. KERR: What additional remains to be done  
7 beyond 5 percent before full power?

8 MR. HARKSTER: There's no items from the appraisal  
9 outstanding which are beyond 5 percent. They were all divided  
10 into fuel load, initial criticality and the 5 percent power  
11 milestones. There are no significant items which we will  
12 accept after 5 percent power. They will be closed out by  
13 then.

14 MR. KERR: In your view, without going over these  
15 item by item, do you anticipate any difficulty in clearing  
16 up whatever discrepancies you now have identified, or lack  
17 of information, or whatever?

18 MR. HARKSTER: No, sir, I don't believe so. There  
19 are some hardware problems which will take some time, but  
20 they have the time, I believe, by 5 percent.

21 MR. KERR: What do you mean by hardware problem?  
22 They don't have the hardware? It doesn't work? It's the  
23 wrong kind of hardware?

24 MR. HARKSTER: They have problems with installing  
25 some of the phone systems that are required to be installed

1 in their technical support center.

2 MR. BOYER: The phone between the technical support  
3 center and the NRC, I think it is, and it's a Bell Telephone  
4 component or relay that's needed to make it a dedicated  
5 phone. There are other phones available, but to comply with  
6 the regulation of a dedicated phone, we need a part from the  
7 Bell Telephone Company.

8 MR. KERR: Is a dedicated phone one that has  
9 "Dedicated" written on it?

10 MR. BOYER: It's a flashy color, like a red phone,  
11 that only goes to that point, between the two points. When  
12 you pick it up, it rings at the other end.

13 MS. KANKUS: The phones that have not been installed  
14 yet are the emergency notification system and the health  
15 physics network to the NRC. Alternate commercial lines have  
16 been provided, but those dedicated ones, there's been some  
17 problems between AT&T and Washington and AT&T and Philadelphia  
18 in getting that resolved.

19 MR. KERR: Excuse me. I thought you said a dedicated  
20 phone, a dedicated health physics phone to the NRC?

21 MS. KANKUS: Yes, sir. It's part of their health  
22 physics network.

23 MR. KERR: What is it dedicated?

24 MS. KANKUS: It's a sophisticated circuit that is  
25 a ring-down between their various facilities on their health

1 physics network and our various facilities.

2 MR. KERR: What's it for?

3 MS. KANKUS: What's it for? It's to provide  
4 radiologic data amongst the NRC people. Perhaps they should  
5 really discuss it because it is for their emergency response  
6 team.

7 MR. KANTOR: If there was an instrument at Limerick,  
8 this telephone would be used to connect the site with the  
9 NRC office both in Bethesda and at Region 1, and it would  
10 be primarily for the exchange of radiological data. And at  
11 that time it would be dedicated in the sense that only the  
12 NRC and Limerick people would be on the phone.

13 MR. KERR: And they would only talk about radiolo-  
14 gical data?

15 MR. KANTOR: Well, it could be used to transmit  
16 other information, but it is primarily for the radiological  
17 data. The other phone, the emergency notification system  
18 is used primarily to transmit plant parameters operational  
19 data. And I think early on, when the system was developed,  
20 it was found during exercises that additional phone capacity  
21 was needed for the radiological data, in addition to the  
22 plant operational data.

23 MR. KERR: That's two dedicated phones between  
24 Limerick and what, Limerick and Washington?

25 MR. KANTOR: The NRC Operations Center in Washington

1 and the Regional Operations Center in King of Prussia.

2 MR. KERR: Are there any other dedicated phones of  
3 that kind?

4 MS. KANKUS: Of that nature? No, sir. Limerick's  
5 emergency communications system is a dedicated phone switch  
6 unto itself, and there's approximately 100 phone lines on that  
7 already that are installed, aside from other commercial  
8 phone lines of about 50 that are available for communications.

9 MR. BOYER: We do have about 100 dedicated phones.

10 MR. KERR: I was speaking particularly of those  
11 used to transmit information to and from the NRC.

12 MR. BOYER: Do you know how many --

13 MS. KANKUS: The control room phones have been  
14 installed. The ENS and HPN go from various facilities within  
15 the plant to Bethesda and the Region. Some of those phones  
16 have been installed.

17 MR. KERR: ENS means emergency notification --

18 MS. KANKUS: Notification system.

19 MR. KERR: And there's more than one of these?

20 MS. KANKUS: There's more than one extension, if  
21 you would use that phrase, on the line -- control, TSC and --

22 MR. KERR: Is that a dedicated line from Limerick  
23 to Washington?

24 MS. KANKUS: Yes.

25 MR. KERR: So that's three dedicated lines at least.

1 MS. KANKUS: They are extensions of the same  
2 dedicated line. There are two systems with several sets  
3 of extensions, line you are wiring your house with a phone  
4 in the bedroom and the kitchen. They are all on the same  
5 phone number but they are different extensions on that, and  
6 there are two phone numbers, if you will, the ENS and the HPN.

7 MR. KERR: Thank you. Do these go through normal  
8 AT&T facilities?

9 MS. KANKUS: Yes.

10 MR. KERR: They are hard wired in all the time?  
11 What does dedicated mean?

12 MR. KISTER: The ENS phone system that was designed  
13 by the NRC puts you in contact with every licensee's control  
14 room in the United States, with the headquarters emergency  
15 response center.

16 It's hard wired phones. All you do in the control  
17 room, in the EOF or in the TSC, is pick the phone up and you  
18 have contact with the NRC Operations Center and if the Opera-  
19 tions Center wants the Region on, they can patch the Region  
20 in. It's one solid dedicated line.

21 DR. MICHELSON: Do all the extensions go on as a  
22 result of the response center patching in then?

23 MR. KISTER: Only if you pick up the extension.

24 DR. MICHELSON: If you pick up the phone in the  
25 control room, it goes only to the response center here? That's

40 1 it? Nothing else happens?

2 MR. KISTER: That's correct.

3 DR. MICHELSON: Now, if the response center wants  
4 somebody else on the phone, then they patch from the response  
5 center?

6 MR. KISTER: That's correct.

7 DR. MICHELSON: How about at your end? Can you  
8 patch others onto your phone at your end?

9 MR. KISTER: The NRC Operations Center has to do  
10 the patching.

11 DR. MICHELSON: They're the only ones that can  
12 patch.

13 MR. KISTER: They are the control function.

14 DR. MICHELSON: Because otherwise you can get an  
15 awful lot of people on extensions in a hurry.

16 MR. KISTER: That was recognized early on.

17 DR. MICHELSON: Thank you.

18 MR. HARKSTER: The only other item I'm aware of  
19 off the top of my head, there are some problems with the  
20 ventilation system which are presently being corrected, and  
21 those also are pre-fuel load items.

22 MR. KERR: Which ventilation system?

23 MR. HARKSTER: Their ventilation system for the  
24 technical support center, and I believe -- they can correct  
25 me -- but it has to do with the charcoal filters, and perhaps

41 1 one problem with these things which they might address, the  
2 rest are all training and procedural problems after that.

3 MR. KERR: Are there other questions about emer-  
4 gency planning?

5 The agenda calls for a discussion of the security  
6 plan, and this is a closed session. I think before we go into  
7 closed session, I would ask if there are any further questions  
8 or comments by either members of the subcommittee and consul-  
9 tants or Philadelphia Electric or NRC?

10 MR. BOYER: I wasn't here when Ms. Kankus came up  
11 to the podium. I might just note that she was a licensing  
12 senior reactor operator licensed at Peach Bottom prior to  
13 assuming her present position in charge of our emergency  
14 training area.

15 MR. KERR: Thank you. Are there any further  
16 questions on this issue or -- Mr. Ebersole, a couple of  
17 questions you raised were answered, and the answers will be  
18 in the transcript. Are there any further comments?

19 MR. SCHWENHER: There was one concern raised by  
20 Dr. Michelson on the emergency procedures earlier. I might  
21 just provide a little bit more information on that.

22 You had asked whether or not specific procedures  
23 were looked at. The answer is that the staff has not looked  
24 at specific procedures, but it has been a reviewing of the  
25 process. There is some additional information, however.

42 1           The staff has a program to audit approximately  
2 12 plants in the next couple of years. I understand that the  
3 Palo Verde plant has been audited, in which case they will  
4 examine the actual emergency operating procedures.

5           With regard to the General Electric emergency guide-  
6 lines, we have recently approved those. I guess that's been  
7 within about a year. So there probably are not too many  
8 plants, if any, earlier than Limerick that have been reviewed  
9 against that directly, although many of the licensees probably  
10 would be backfitting to that.

11           The current practice is to allow the applicant  
12 to apply the generic BWR group emergency planning guides,  
13 however, if there are any deviations that are planned from  
14 those guides, then the NRC staff has asked and does look at  
15 these deviations for the specific plants, and assesses the  
16 acceptability of these deviations.

17           Further, there are -- the Limerick was reviewed  
18 against Revision 2. Revision 3 has been approved by the  
19 staff generically, and Revision 4 shortly will be approved.  
20 Our position is that the use of these emergency planning  
21 guidelines would be pretty much automatic under the same  
22 basis that Limerick was reviewed, namely, that if they plan  
23 deviations, those deviations must come to the staff and we  
24 would pass judgment on those.

25           MR. KERR: Does that answer your question, Mr.



1 Michelson?

2 DR. MICHELSON: I guess what you are saying then  
3 is that you really -- let me ask another question first.  
4 When you say the staff, do you include the regional offices?

5 MR. SCHWENHER: I understand that to be primarily  
6 the NRC headquarters staff, although I'm not sure who would  
7 be involved in these 12 or so audits.

8 DR. MICHELSON: No, I'm thinking about your reply  
9 that you really don't review the operating procedures. You  
10 said the staff doesn't review the operating procedures, and  
11 I'm wondering, does that include -- is that correct to state,  
12 that the regional office does not review the operating pro-  
13 cedures?

14 MR. SCHWENHER: I think I would defer to the region.

15 MR. WIGGINS: My name is Jim Wiggins. I'm the  
16 Senior Resident Inspector. The actual inspection program  
17 as set out by I&E does not require that inspector to go and  
18 review each and every procedure. What is required and what  
19 has been done at Limerick is that we reviewed -- the utility  
20 has a procedure to write the procedures, and it would take  
21 a sampling review to ensure that they implemented that.  
22 The technical basis may be looked at in the course of that  
23 review, but it is not anywhere near 100 percent or anything  
24 near that as far as applicability.

25 We've had one inspection that did look at that area.

1 It probably looked at maybe at the most ten of the procedures  
2 in the area you are addressing. Although I don't have the  
3 specifics with me, we can certainly get an inspection report  
4 quotation and get the report number and provide it to the  
5 NRR people for you.

6 DR. MICHELSON: Let me be sure I understand your  
7 answer now. You are saying really that you inspect -- you  
8 review the administrative procedures by which the detailed  
9 procedures are prepared. You only in certain circumstances  
10 will review the detailed procedures, but in the case of  
11 Limerick you did it for about 12, did you say, or 10?

12 MR. WIGGINS: The first part of your question is  
13 absolutely true. I can attest to that being absolutely  
14 accurate. We do review their mechanism for developing and  
15 pooling and implementing and establishing procedures. We  
16 track it on down to make sure people get proper training and  
17 various other inspections, to ensure the people are trained  
18 in those procedures.

19 The region is not, by their inspection program --  
20 and we have not been doing as a matter of course -- a technical  
21 detailed review of each and every procedure. We will get a  
22 surrection of maybe ten in an area as what the absolute pro-  
23 gram really calls, to look at an area called emergency operat-  
24 ing procedures. We will select ten and audit them against  
25 the procedure development guidelines. Of course, the inspector

1 looks at them, and if there are any technical concerns he  
2 develops based on him looking at the procedure, he is cer-  
3 tainly expected to flag those to the utility and work towards  
4 resolution of the concern.

5 DR. MICHELSON: Then as I understand it, you really  
6 never review the procedures from the technical viewpoint.  
7 You pick a certain group to see that they are being prepared  
8 against the administrative procedure that you'd agreed to.

9 MR. WIGGINS: That's essentially correct. If you  
10 would ask me how much would I credit the program doing,  
11 I could attest that we did at least that much. The procedures  
12 were looked at, not in the detail that I believe your ques-  
13 tion is leading us to answer it.

14 DR. MICHELSON: I will just be perfectly frank.  
15 I've heard from time to time -- and maybe I didn't hear  
16 correctly -- but I thought I hear the staff did pick a small  
17 sample of procedures and check the technical content of them,  
18 but apparently they don't.

19 MR. WIGGINS: We do review what is in the procedure.  
20 We are looking for more than how many signatures there are  
21 on them. As far as sitting and doing a deliberate walk-down  
22 of the system, trying to apply the procedure to that, that  
23 is at the option of how the inspector does his particular  
24 job in that module, the inspection module.

25 DR. MICHELSON: Well, I think my statement was about

1 correct. You really don't review the technical content  
2 because, to do that, you must understand the technical basis  
3 for this particular procedure and then see that that basis  
4 is carried out by the steps.

5 MR. WIGGINS: In general, your statement is probably  
6 correct.

7 DR. MICHELSON: So the staff never reviews procedures  
8 except from this overall viewpoint. Is that your understand-  
9 ing, David?

10 VOICE: Yes.

11 DR. MICHELSON: Thank you.

12 MR. KERR: Are there further questions or comments?

13 MR. SIESS: They have reviewed the technical guide-  
14 lines, the emergency procedure guidelines.

15 DR. MICHELSON: My real concern is have those  
16 guidelines been converted into viable technically sound  
17 procedures, at least on a sampling basis, and apparently  
18 that sample has never pulled and checked.

19 MR. KERR: It may be that the procedures are better  
20 thereby.

21 DR. MICHELSON: Without having done it at least on  
22 one, there is no basis to believe they are better or worse.

23 MR. LEITCH: I'm not sure if this helps, but NUREG  
24 0737 requires that the NSSS vendor review those emergency  
25 operating procedures. That has been done in the case of

1 General Electric, and they have sent a letter to me saying  
2 that they have reviewed those procedures, and that they have  
3 found them satisfactory.

4 MR. KERR: Mr. Michelson, was your question aimed  
5 just at emergency procedures?

6 DR. MICHELSON: Just emergency operating procedures.

7 MR. KERR: Okay. Are there further questions or  
8 comments before we go into closed session? I shall not  
9 attempt to run a further open session after the closed session.

10 Any comments that we make about further review will  
11 be made at the end of tomorrow's session. Before we go into  
12 closed session, I want to acknowledge a letter that Mr. Savio  
13 received from a Marvin Lewis, and he has some comments about  
14 what he perceives to be the review of the Limerick license,  
15 and he encloses some of the NRC inspection report.

16 I did not see from his letter and from the report  
17 that there is anything of which the NRC is not aware, but I  
18 am going to give the letter to the NRC staff and ask them  
19 to make certain -- that they look at the letter to make cer-  
20 tain that there isn't something here which should be looked  
21 at. It does not appear to me that there is any new information  
22 contained in his letter, but I do want to acknowledge the  
23 letter, and copies will be made available to members of the  
24 ACRS.

25 Let's take a five-minute break then before we go

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into closed session to discuss security.

(Whereupon, at 4:20 p.m., the meeting of the  
ACRS subcommittee adjourned, to go into closed session.)

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CERTIFICATE OF PROCEEDINGS

This is to certify that the attached  
proceedings,

IN THE MATTER OF:

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

DATE: OCTOBER 9, 1984

PLACE: WASHINGTON, D.C.

were had as herein appears and that this is the original  
transcript for the files of the Commission.

REPORTER: Phyllis Young

SIGNED: *Phyllis Young*

TRANSCRIBER: Neal R. Gross

SIGNED: *Neal R. Gross*

NRC  
PRESENTATION TO ACRS  
FOR  
LIMERICK GENERATING STATION, UNITS 1 AND 2  
OCTOBER 9, 1984

R. E. Martin  
(X24937)



INTERIM ACRS REPORT COMMENTS

°EMERGENCY PLANNING

- ONSITE COMPLETE
- OFFSITE REVIEW BY PEMA, FEMA AND NRC CONTINUING

°PLANT SECURITY

- ESSENTIALLY COMPLETE

°SEISMIC EVENTS

- ADDRESSED IN PRA/SARA DISCUSSIONS

°COOLING TOWER FAILURE EFFECTS

- SAFETY RELATED EQUIPMENT PROTECTED  
(RHR SW PIPING, POWER SUPPLIES, FLOODING EFFECTS)

°PRA/SARA

- OCTOBER 10 DISCUSSIONS

MILESTONES

°OL APPLICATION	MARCH 1981
°SER	AUGUST 1983
°ACRS SSER-1	OCTOBER 1983 DECEMBER 1983
°FES	APRIL 1984
°PRA REPORT SSER-2,3	AUGUST 1984 OCTOBER 1984
°HEARINGS - SCWS (PID 3/8/83)* - OTHER (PID 8/29/84) - OFFSITE EP	FALL 1982 SPRING 1984 FUTURE
°PLANT CONSTRUCTION ESSENTIALLY COMPLETE	OCTOBER 1984

\*TWO ISSUES STILL IN CONSIDERATION

SER ISSUES

<u>ISSUES (PREVIOUSLY OPEN)</u>	<u>SECTION(S)</u>	<u>SSER</u>
1. EMERGENCY PREPAREDNESS	2.3.3, 13.3	3
2. TORNADO-MISSILE EFFECTS ON ULTIMATE HEAT SINK	3.5.2	3
3. PIPE BREAKS OUTSIDE CONTAINMENT	3.6.1	2
4. FEEDWATER ISOLATION CHECK VALVES	3.6.2	2
5. INSTRUMENT LINE VIBRATION MONITORING PROGRAM	3.9.2.1	1
6. °SEISMIC/DYNAMIC QUALIFICATION °ENVIRONMENTAL QUALIFICATIONS	3.10 3.11	2,3 2
7. INADEQUATE CORE COOLING	4.4.7 7.5.2.1	2
8. AIRBORNE PARTICULATE RADIOACTIVITY MONITORING SYSTEM	5.2.5	1
9. SECOND ISOLATION VALVE FOR HYDROGEN RECOMBINER	6.2.4.2	1
10. PRESSURE DROP MEASUREMENT ACROSS ESF HEPA FILTERS	6.5	1
11. MANUAL INITIATION OF SAFETY SYSTEMS	7.3.2.5	2
12. POST-ACCIDENT MONITORING INSTRUMENTATION	7.5.2.3	3
13. MULTIPLE CONTROL SYSTEMS FAILURES AND HIGH-ENERGY LINE BREAKS AND CONSEQUENTIAL CONTROL SYSTEM FAILURES	7.7.2.1	2
14. 3-HOUR-FIRE-RATED BARRIERS FOR STRUCTURAL STEEL	9.5.1.4	2
15. ELECTRICAL CABLE AND CABLE TRAY PROTECTION	9.5.1.4.5	2

<u>ISSUES (PREVIOUSLY OPEN)</u>	<u>SECTION(S)</u>	<u>SSER</u>
16. EFFECTS OF HYDROGEN EXPLOSION ON OFFGAS SYSTEM	11.3.1	1
17. ADMINISTRATIVE PROCEDURES (APPLICABLE TMI ITEMS)	13.1.2.1	1
18. SIZE OF ISEG	13.4	1
19. RECLASSIFICATION OF EVENTS	15.2.2	1
20. ODYN CODE CALCULATION	15.2.2	1
21. ATWS EVENTS (GENERIC LETTER 83-28)	15.8	2
22. Q LIST	17	2
23. CONTROL ROOM DESIGN REVIEW	18	3
24. CONTAINMENT EMERGENCY SUMP RELIABILITY	APPENDIX C	2
25. MODES AND CONSEQUENCE OF MAIN COOLING TOWER FAILURES	19	3
26. MATERIALS FURNISHED BY RAY MILLER, INC., AND TUBE-LINE CORPORATION	APPENDIX K	2
27. CONTROL ROOM CEILING	3.7.3.1	2
28. TWO-STAGE TARGET ROCK VALVES	3.9.3.4	3
29. PIPE CLAMPS	3.9.7	3
30. HAYWARD TYLER PUMPS	APPENDIX L	2
31. STRESS CORROSION CRACKING MONITORING PROGRAM	19	2

<u>ISSUES (PREVIOUSLY CONFIRMATORY)</u>	<u>SECTION(S)</u>	<u>SSER</u>
1. FSAR TABLES 3.2-1 AND 3.2-2 REVISIONS	3.2.2	2
2. PIPING ISOMETRICS AND PIPE WHIP EFFECTS	3.6.2	2
3. STARTUP TEST SPECIFICATION FOR BOP PIPING	3.9.2.1	2
4. REACTOR INTERNALS ANALYSIS DOCUMENTATION	3.9.2.4	2
5. LOADING COMBINATIONS, DESIGN TRANSIENTS, AND STRESS LIMITS	3.9.3.1	3
6. INSERVICE TESTING OF PUMPS AND VALVES	3.9.6, 5.4.6, 5.4.7	3 1 1
7. FUEL ROD MECHANICAL FACTURING	4.2.1.2	1
8. FUEL ASSEMBLY STRUCTURAL DAMAGE FROM EXTERNAL FORCES	4.2.1.3 4.2.3.3	1
9. OVERHEATING OF GADOLINIA FUEL PELLETS	4.2.3.2	3
10. HIGH BURNUP FISSION GAS RELEASE	4.2.3.3(1)	2
11. LOOSE-PARTS MONITORING SYSTEMS	4.4.6	2
12. PRESERVICE INSPECTION PROGRAM	5.2.4.3, 6.6.3	3 3
13. ALTERNATE SHUTDOWN COOLING FLOW PATH	5.4.7	2
14. ENVIRONMENTAL QUALIFICATION ENVELOPE FOR DRYWELL	6.2.1.3	2
15. BULK-TO-LOCAL POOL TEMPERATURE DIFFERENCES	6.2.1.7.3	2
16. CAPPING VACUM BREAKER DOWNCOMER	6.2.1.7.3	2
17. ANDERSON-GREENWOOD VACUUM BREAKER TESTS PROGRAM	6.2.1.7.3	2
18. APPLICABILITY OF MARK III CONCERNS	6.2.1.8	2

<u>ISSUES (PREVIOUSLY CONFIRMATORY)</u>	<u>SECTION(S)</u>	<u>SSER</u>
19. PROCEDURES FOR ISOLATING FEEDWATER BYPASS LINES	6.2.4.1	2
20. PROCEDURES FOR HYDROGEN RECOMBINER OPERATION	6.2.5	2
21. PROCEDURES FOR TYPE A LEAKAGE TESTING FOR HYDROGEN RECOMBINERS AND COMBUSTIBLE GAS ANALYZER	6.2.5	2
22. FRACTURE TOUGHNESS OF CONTAIN- MENT PRESSURE BOUNDARY	6.2.7	3
23. PROCEDURES FOR RESPONSE TO LOCA	6.3.5	2
24. PLANT-SPECIFIC LOCA ANALYSIS	6.3.5, 15.9.4	2
25. TEST RESULTS FOR STEAM EFFECTS ON CORE SPRAY DISTRIBUTION	6.3.5	2
26. INSTRUMENT SETPOINTS	7.2.2.1	3
27. FAILURES IN REACTOR VESSEL LEVEL SENSING LINES	7.2.2.2	2
28. ISOLATION OF CIRCUITS	7.2.2.9	2
29. APRM UPSCALE TRIPS	7.2.2.10	2
30. RESTART OF HPCI AND RCIC ON LOW WATER LEVEL	7.3.2.4	3
31. AUTOMATIC SWITCHOVER OF RCIC	7.4.2.2	3
32. ROD SEQUENCE CONTROL SYSTEM, ROD WORTH MINIMIZER, AND THE ROD BLOCK MONITOR	7.4.2.3	2
33. CAPABILITY FOR SAFE SHUTDOWN FOLLOWING LOSS OF ELECTRICAL POWER	7.4.2.1	2
34. REMOTE SHUTDOWN SYSTEM	7.4.2.3	3
35-59. FIRE PROTECTION ISSUES	9.5.1	2
60. SOLIDIFICATION/DEWATERING OF SOLID WASTE (PROCEDURES)	11.4	3
61. OPERATING AND MAINTENANCE PROCEDURES	13.5.2.1	2

<u>ISSUES (PREVIOUSLY CONFIRMATORY)</u>	<u>SECTION(S)</u>	<u>SSER</u>
62. EMERGENCY OPERATING PROCEDURES	13.5.2.3	2
63. ASSURANCE OF PROPER ESF FUNCTIONING (II.K.1.5)	15.9.3	3
64. PROCEDURES TO ENSURE OPERABILITY STATUS (II.K.1.10)	15.9.3	2
65. AUTOMATIC RESTART OF RCIC (II.K.3.13)	15.9.4	2
66. PRECLUDE SPURIOUS ISOLATION OF RCIC AND HPCI (II.K.3.15)	15.9.4	2

ADDITIONAL SAFETY EVALUATIONS

SSER-2

SFP CAPACITY	9.1.3
LIGHT LOAD HANDLING	9.1.4
RHR SW POWER SUPPLIES	9.2.2
COMPRESSED AIR FILTERS	9.3.1
NITROGEN VENT HEADER	9.4.5

SSER-3

LIFTING OF LEADS	7.2.2
ATWS	7.2.2
ELECTRICAL SEPARATION	8.4.1
PERSONNEL QUALIFICATIONS	13.1.2
LOCA ANALYSIS	15.6
FUEL HANDLING ACCIDENT	15.7
IDVP	17.5



COOLING TOWER

EFFECTS ON BURIED PIPING AND POWER SUPPLIES

FAILURE MODES

OVERTURNING

BUCKLING

DEBRIS WITHIN BASE AREA

DEBRIS VELOCITY AND SIZE

PENETRATION DEPTH LESS THAN PROTECTION PROVIDED

FLOODING EFFECTS

TURBINE BUILDING

DUCT BANK MANHOLES

REGION I PRESENTATION  
LIMERICK GENERATING STATION

INTRODUCTION

FACILITY CONSTRUCTION

STATUS

SPECIAL INSPECTIONS

CONSTRUCTION DEFICIENCY REPORTS

FACILITY PREOPERATIONAL TESTING

TEST PROGRAM STATUS

-- FUEL LOAD TESTS

-- DEFERRED TESTS

FACILITY READINESS FOR LOW POWER OPERATION

FACILITY STAFFING

EMERGENCY PREPAREDNESS

RADIATION PROTECTION AND RADWASTE

SECURITY

OVERVIEW OF READINESS FOR POWER OPERATION

ORGANIZATION

SALP

START-UP TEST PROGRAM

OPERATIONAL ASSESSMENT TEAM

TECHNICAL SPECIFICATIONS

CONTRACTOR USAGE

PRA

AS-BUILT

PRA APPLICATIONS PROGRAM - REGION I

OBJECTIVES

LIMERICK APPLICATION

SUMMARY

QA/QC

MANAGEMENT

REGION I PRESENTATION  
ON  
LIMERICK GENERATING STATION, UNIT ONE

INTRODUCTION

LICENSEE:	PHILADELPHIA ELECTRIC CO. (PECO)
AE/CONSTRUCTOR:	BECHTEL, SAN FRANCISCO
TYPE:	BWR-4/MARK II CONTAINMENT
CONSTRUCTION START:	JULY 1970
CONSTRUCTION PERMIT:	JUNE 1974
RESIDENT INSPECTOR ASSIGNED:	OCTOBER 1979
SECOND RESIDENT INSPECTOR ASSIGNED:	SEPTEMBER 1983
REGION I INSPECTION HOURS (TOTAL TO 10/1/84):	15,000
FY 84 INSPECTION HOURS:	7,000

CONSTRUCTION

- o 99+% COMPLETED
- o COMMON AREAS BETWEEN UNITS 1 AND 2 COMPLETED -  
UNIT 1 ADEQUATELY SEGREGATED
- o SPECIAL INSPECTIONS - ALL FINDINGS AFFECTING FUEL LOAD  
RESOLVED
  - MID-CONSTRUCTION HVAC INSPECTION - 1980
  - CONSTRUCTION TEAM INSPECTION - 1982
  - AS-BUILT INSPECTION - 1984
  - NDE INSPECTIONS - 1982 & 1984
- o CONSTRUCTION DEFICIENCIES - REPORTABLE UNDER 50.55(E) -  
29 CDR'S SINCE 9/83 - ONE REMAINS OPEN (84-10) -
- o ALLEGATIONS - THREE (3) OPEN - INVESTIGATION COMPLETED -  
DOCUMENTATION REQUIRED - NO IMPACT ON SAFETY

PREOPERATIONAL TEST PROGRAM (AS OF 10/1/84)

- o PREOPERATIONAL TESTS: 90 FOR FUEL LOAD 20 DEFERRED\*
- o COMPLETED BY PECO: 90 6
- o REVIEWED BY REGION I: 83 4
- o MEETINGS IN APRIL AND JUNE 1984 - REGION I EMPHASIZES TO  
PECO GREATER NEED FOR CONTROL OF PREOP PROGRAM

\* TESTS PROPOSED TO BE COMPLETED AFTER FUEL LOAD -  
ATTACHMENT 1 TO PROPOSED LICENSE

- o STEPS TAKEN BY PECO (IN JUNE 1984) TO IMPROVE PREOP PROGRAM
- o ALLEGATIONS - TWO (2) - ONE RESOLVED, REQUIRES DOCUMENTATION, NO IMPACT ON SAFETY - SECOND UNDER INVESTIGATION

FACILITY READINESS FOR LOW POWER OPERATION

- o FACILITY STAFFING - FIVE SHIFT ROTATION
  - 4 OF 5 SHIFTS HAVE SHIFT SUPERINTENDENT EACH WITH FIVE (5) YEARS OF LICENSED EXPERIENCE - ADEQUATE OPERATING EXPERIENCE
  - REMAINING SHIFT HAS SHIFT ADVISOR (PREVIOUSLY SRO-LICENSED AT PEACH BOTTOM) TO THE SHIFT SUPERINTENDENT
- o EMERGENCY PREPAREDNESS - ONSITE
  - REGION I APPRAISAL OF IMPLEMENTING PROCEDURES IN JUNE 1984
  - EMERGENCY PREPAREDNESS EXERCISE IN JULY 1984 - ADEQUATE ACTIONS TAKEN BY PECO
  - 49 APPRAISAL FINDINGS, 22 AFFECTING FUEL LOAD - 18 RESOLVED, 4 REQUIRE RESOLUTION

- o RADIATION PROTECTION AND RADWASTE
  - 2/84 - EMPHASIS TO PECO BY REGION I MANAGEMENT TO DIRECT ADDITIONAL ATTENTION TO RADIOLOGICAL CONTROL PROCEDURES - PECO RESPONSIVE TO REGION I'S FINDINGS
  - HEALTH PHYSICS APPRAISAL IN 8/84 - 7 ISSUES REQUIRE RESOLUTION PRIOR TO FUEL LOAD
- o SECURITY
  - 19 ISSUES REQUIRE RESOLUTION PRIOR TO FUEL LOAD
  - 3 ALLEGATIONS OPEN CONCERNING SECURITY PROGRAM - ALL UNDER INVESTIGATION
  - 9/24/84 - REGION I STRESSES INCREASED OVERSIGHT OF SECURITY CONTRACTOR REQUIRED BY PECO



OVERVIEW OF READINESS FOR POWER OPERATION

o ORGANIZATION

- 45 OPERATOR LICENSES ISSUED: 13 SRO STAFF ENGINEERS,  
13 SRO OPERATORS, 19 RO OPERATORS
- 8 STA'S CERTIFIED BY PECO
- ROUTINE SHIFT OPERATIONS COMMENCED 9/24/84
- PLANT OPERATIONS STAFF - TOTAL OF 139 YEARS NUCLEAR,  
58 YEARS OPERATING BWR EXPERIENCE
- ELECTRIC PRODUCTION STAFF - MANAGEMENT: 142 YEARS  
NUCLEAR, 31 YEARS OPERATING BWR EXPERIENCE

o SALP

- 1980, 1981, 1983 - IMPROVED PERFORMANCE
- 1984 SALP (12/82 THRU 11/83) - RESULTS
  - CATEGORY 1 IN 5 AREAS
    - PIPING SYSTEMS AND SUPPORTS
    - SAFETY-RELATED COMPONENTS
    - SUPPORT SYSTEMS
    - ELECTRICAL POWER SUPPLY AND DISTRIBUTION
    - LICENSING ACTIVITIES
  - CATEGORY 2 IN 3 AREAS
    - ENGINEERING AND DESIGN CONTROL
    - PREOPERATIONAL TESTING AND READINESS FOR OPERATION
    - INSTRUMENTATION AND CONTROL SYSTEMS
  - NO CATEGORY 3 AREAS
- NEED FOR INCREASED ATTENTION IN PREOPERATIONAL TESTING AND CONTROL OF WORK ON SYSTEMS ACCEPTED BY STARTUP
- OVERALL - MANAGEMENT - ATTENTIVE, INVOLVED, DETERMINED TO ACHIEVE HIGH PERFORMANCE LEVEL
- TECHNICALLY STRONG CONSTRUCTION QA ORGANIZATION
- PEACH BOTTOM MOST RECENT SALP - NO CATEGORY 3 AREAS - IMPROVED IN-PLANT IMPLEMENTATION OF FIRE PROTECTION, HOUSEKEEPING, AND RADIOLOGICAL CONTROLS FROM PAST PERFORMANCE

o START-UP TEST PROGRAM

- REGION I REVIEW BEGAN 8/84
- 37 TEST PROCEDURES FOR STARTUP
- 10 OF 37 REQUIRED FOR FUEL LOAD AND INITIAL CRITICALITY - ALL ARE COMPLETED AND APPROVED
- PROCEDURE ACCEPTANCE IS PROGRESSING

o OPERATIONAL ASSESSMENT TEAM

- INSPECTION BY REGION I AFTER FUEL LOAD
  - STARTUP TEST PROCEDURES IMPLEMENTATION
  - CONTROL ROOM ACTIVITIES
  - MAINTENANCE AND I&C GROUP WORK ACTIVITIES
  - SURVEILLANCE TEST IMPLEMENTATION
  - TECHNICAL SPECIFICATION COMPLIANCE
  - RESPONSE TO ALARMS AND TRANSIENTS
  - OTHER AREAS TO BE DETERMINED BY INSPECTION TEAM
- USED AS INDICATOR FOR RECOMMENDING FULL POWER LICENSE

## TECHNICAL SPECIFICATIONS

- o REGION J REVIEW - USED PRA TO DETERMINE SYSTEMS TO BE INSPECTED
- o NO DISCREPANCIES IDENTIFIED BETWEEN TECHNICAL SPECIFICATIONS AND AS-BUILT PLANT
- o TEAM INSPECTION CONDUCTED TO COMPARE FSAR, TECHNICAL SPECIFICATIONS AND AS-BUILT PLANT
  - SYSTEMS REVIEWED
    - RHR
    - EMERGENCY ONSITE POWER
    - SERVICE WATER
    - CONTAINMENT SYSTEMS

## PROBABILISTIC RISK ASSESSMENT - REGION J APPLICATIONS PROGRAM

- o OBJECTIVES
  - PRIORITIZE NRC INSPECTIONS
  - IMPROVE INSPECTION PROCEDURES
  - IMPROVE REGIONAL INSPECTION CAPABILITIES
- o LIMERICK
  - PREOPERATIONAL INSPECTION PROGRAM
  - START-UP INSPECTION PROGRAM

SUMMARY

o PECO

-- QA/QC

- CONSTRUCTION - QA ORGANIZATION WITH STRONG TECHNICAL EXPERTISE
- PREOPERATIONAL - ONCE LICENSEE TOOK STEPS TO RESOLVE INITIAL REGION I FINDINGS, OVERALL QA PERFORMANCE WAS ACCEPTABLE

-- MANAGEMENT

- MANY YEARS OF NUCLEAR/BWR EXPERIENCE
- ATTENTIVE AND INVOLVED
- LICENSEE ACTIONS TO RESOLVE FUEL LOAD INSPECTION OPEN ITEMS ARE ONGOING

o REGION I

- PROFESSIONAL SURVEY CONDUCTED REQUESTING COMMENTS BY REGION STAFF ON LIMERICK - NO COMMENTS RECEIVED
- REVIEW OF LICENSEE ACTIONS IN RESOLVING FUEL LOAD INSPECTION OPEN ITEMS AND RESOLUTION OF OPEN ALLEGATIONS ARE ONGOING

**STATUS OF  
LIMERICK GENERATING STATION**

**G. M. LEITCH**

## **INTRODUCTION**

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- STARTUP TEST PROGRAM
- IMPLEMENTING PROCEDURES
- TEST SEQUENCES
- PROGRAM SCHEDULE
- CONCLUSION

## **STARTUP TEST PROGRAM**

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- DESCRIBED IN FSAR CHAPTER 14
- BASED ON:
  - REG. GUIDE 1.68
  - REG. GUIDE 1.70
  - VENDOR SPECIFICATIONS
- INCLUDED:
  - STARTUP TEST PROCEDURES
  - HOT FUNCTIONALS (IN FSAR AND SPECIFICATIONS)



# **IMPLEMENTING PROCEDURES**

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- PREPARATION AND REVIEW
  - WRITERS
  - SUPERVISORY REVIEW
  - PECO ENGINEERING DEPARTMENT REVIEW
  - PECO ELECTRIC PRODUCTION QA/QC REVIEW
  - PECO ELECTRIC PRODUCTION TECHNICAL REVIEW
  
- PROCEDURES REVISED AND SENT TO PORC
  - PORC REVIEWS
  - REVISED AS REQUIRED
  - PORC APPROVES
  - PORC VS. TRB
  - PORC APPROVAL OF RESULTS
  - NUCLEAR REVIEW BOARD
  - NUCLEAR REGULATORY COMMISSION
  - ADMINISTRATIVE PROCEDURES

## **NORMAL TEST SEQUENCE WITHIN A TEST CONDITION:**

---

- CORE PERFORMANCE ANALYSIS
- STEADY STATE TESTING
- CONTROL SYSTEM TUNING
- MAJOR TRIPS

# **RESEARCH OF PLANT PROBLEMS DURING THE STARTUP TEST PROGRAM**

---

## PLANTS COVERED:

- LA SALLE 1, 2 (TO DATE)
- SUSQUEHANNA 1, 2 (TO DATE)
- HANFORD 2 (TO DATE)
- HATCH 2 (TO DATE)

## DATA SOURCES:

- DAILY STARTUP REPORTS
- STARTUP TEST REPORTS
- STP RESULTS

## RESEARCH FORMAT:

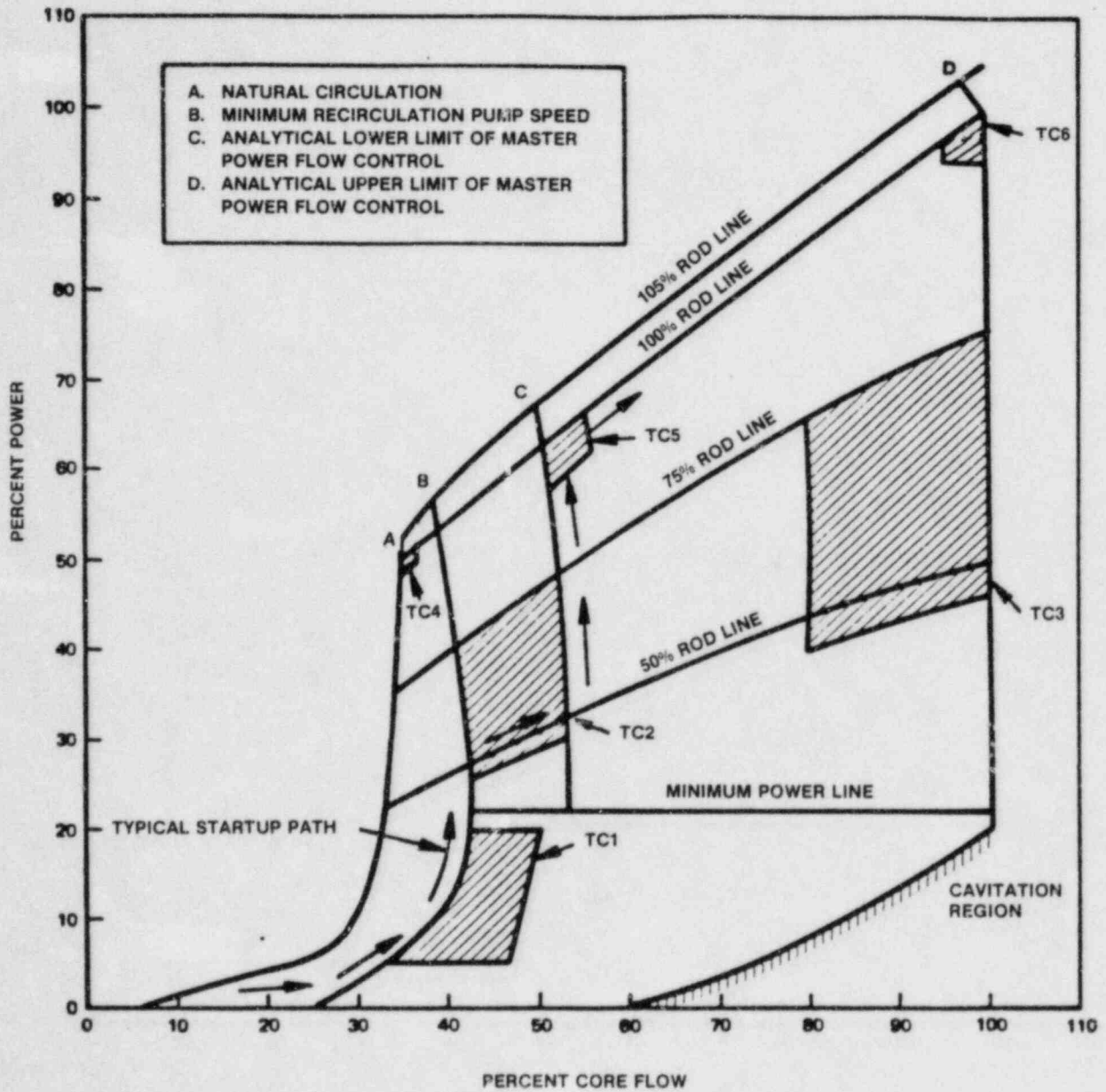
- PROBLEMS BY SYSTEM
  - PLANT IDENTIFIES
  - CAUSE, REMEDY, ETC. (IF KNOWN)
  - DESIGN PROBLEMS
  - EQUIPMENT PROBLEMS
  - GENERAL PROBLEMS
  - SPARE PARTS PROBLEMS
  - OTHER
- SPECIAL AREAS
  - ERIS (TRA)
  - TURBINE/GENERATOR (EHC)
  - FEEDWATER/CONDENSATE
- GOOD PRACTICES TO CONSIDER

# STARTUP TEST SEQUENCE

## TEST CONDITION

PROCEDURE DESCRIPTION	OPEN VESSEL	HEAT UP	1	2	3	4	5	6	WAR-RANT
CHEMICAL AND RADIOCHEMICAL	X	X	X	X	X		X	X	
RADIATION MEASUREMENTS	X	X		X	X			X	
FUEL LOADING	X								
FULL CORE SHUTDOWN MARGIN		X							
CONTROL ROD DRIVE SYSTEM	X	X		X	X			X	
SRM PERFORMANCE AND CONTROL ROD SEQUENCE		X							
WATER LEVEL REFERENCE LEG TEMPERATURE		X	X	X	X	X	X	X	
IRM PERFORMANCE		X	X						
LPRM CALIBRATION		X	X		X			X	
APRM CALIBRATION		X	X	X	X		X	X	X
PROCESS COMPUTER PERFORMANCE VERIFICATION	X	X	X	X	X			X	
RCIC SYSTEM PERFORMANCE VERIFICATION		X	X	X					
RCIC SYSTEM START UP AFTER LOSS OF AC POWER TO THE SYSTEM			X						
RCIC SYSTEM OPERATION WITH A SUSTAINED LOSS OF AC POWER TO THE SYSTEM			X						
HPCI SYSTEM PERFORMANCE VERIFICATION		X			X				
SELECTED PROCESS TEMPERATURES VERIFICATION		X			X	X		X	
SYSTEM EXPANSION	X	X		X				X	
TIP UNCERTAINTY					X			X	
CORE PERFORMANCE			X	X	X	X	X	X	X
STEAM PRODUCTION									X
CORE POWER — VOID MODE RESPONSE						X	X		
PRESSURE REGULATOR RESPONSE			X	M	M	X	M	M	
FEEDWATER CONTROL SYSTEM DEMONSTRATION			X	X	X	X	X	X	
MAIN TURBINE VALVES SURVEILLANCE TEST					X			X	
MAIN STEAM ISOLATION VALVES PERFORMANCE VERIFICATION		X	X		X		X	X,SD	
MAIN STEAM RELIEF VALVES PERFORMANCE		X		X					
TURBINE TRIP AND GENERATOR LOAD REJECTION DEMONSTRATION				X	M,SD			M,SD	
SHUTDOWN FROM OUTSIDE THE MAIN CONTROL ROOM DEMONSTRATION				X,SD					
RECIRCULATION FLOW CONTROL DEMONSTRATION					M			M	
RECIRCULATION SYSTEM				X	M	X		M	
LOSS OF TURBINE — GENERATOR AND OFFSITE POWER				X,SD					
ESSENTIAL HVAC SYSTEM OPERATION AND CONTAINMENT HOT PENETRATION TEMPERATURE VERIFICATION		X			X			X	
PIPING STEADY STATE VIBRATION		X		X	X		X	X	
OFFGAS SYSTEM PERFORMANCE VERIFICATION		X	X		X			X	
RECIRCULATION FLOW CALIBRATION					X			X	
PIPING DYNAMIC TRANSIENT		X		X	X			X	
REACTOR WATER CLEANUP SYSTEM PERFORMANCE VERIFICATION		X							
RESIDUAL HEAT REMOVAL SYSTEM PERFORMANCE VERIFICATION				X				X	

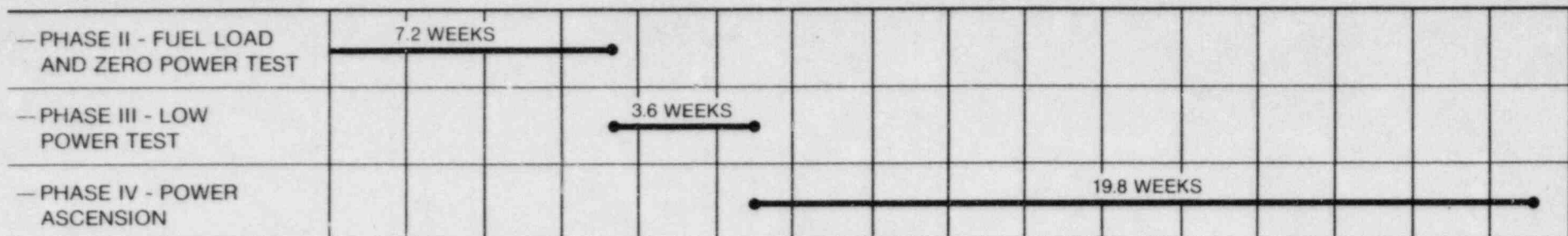
LEGEND: X = TEST INDEPENDENT OF FLOW CONTROLLER MODE    M = MASTER MANUAL FLOW CONTROLLER MODE    SD = SCRAM DEFINITE



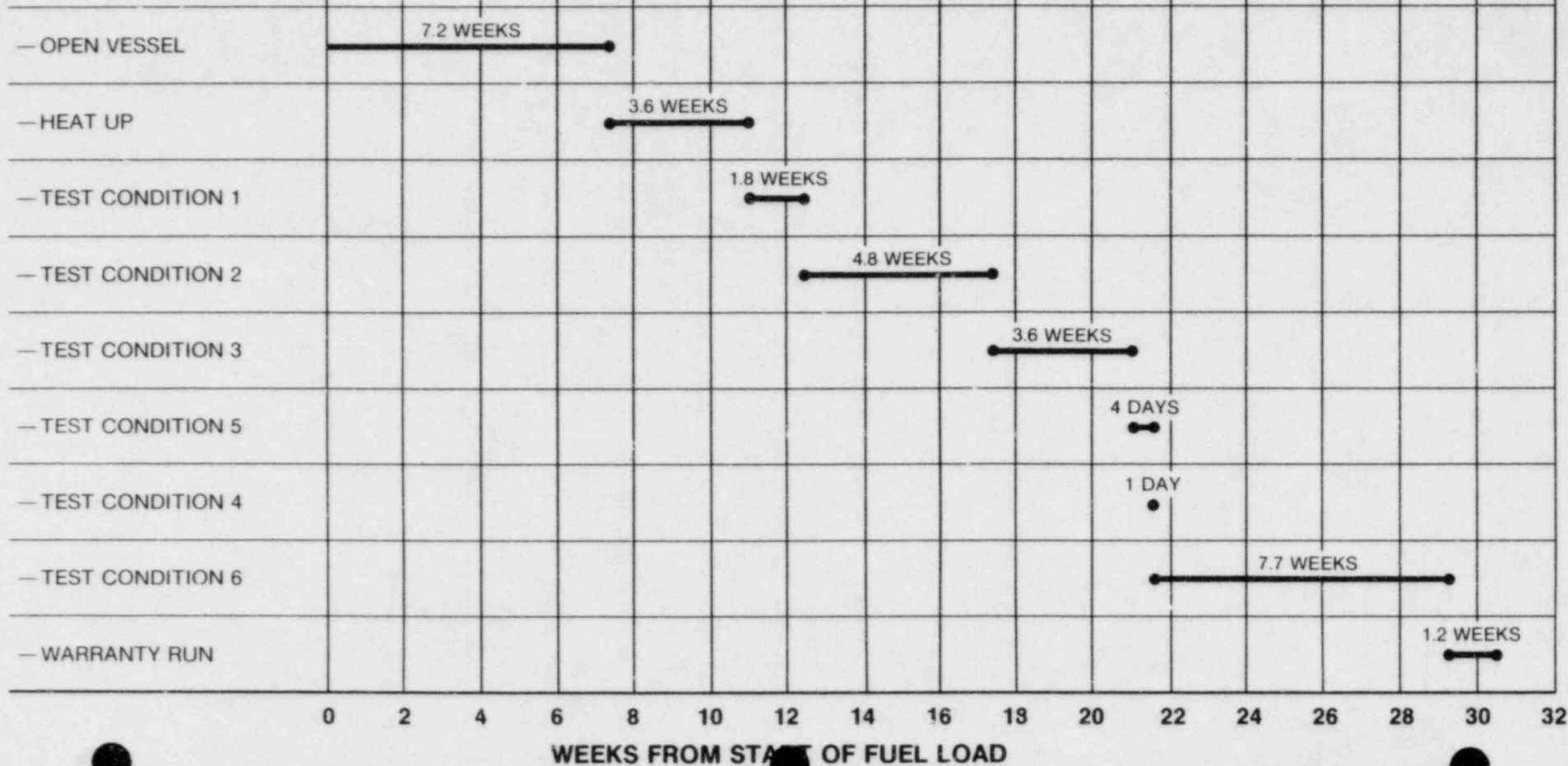
OPERATIONAL POWER/FLOW MAP

## SUMMARY STARTUP TEST SCHEDULE

### MAJOR TEST PHASES:



### TEST CONDITIONS:



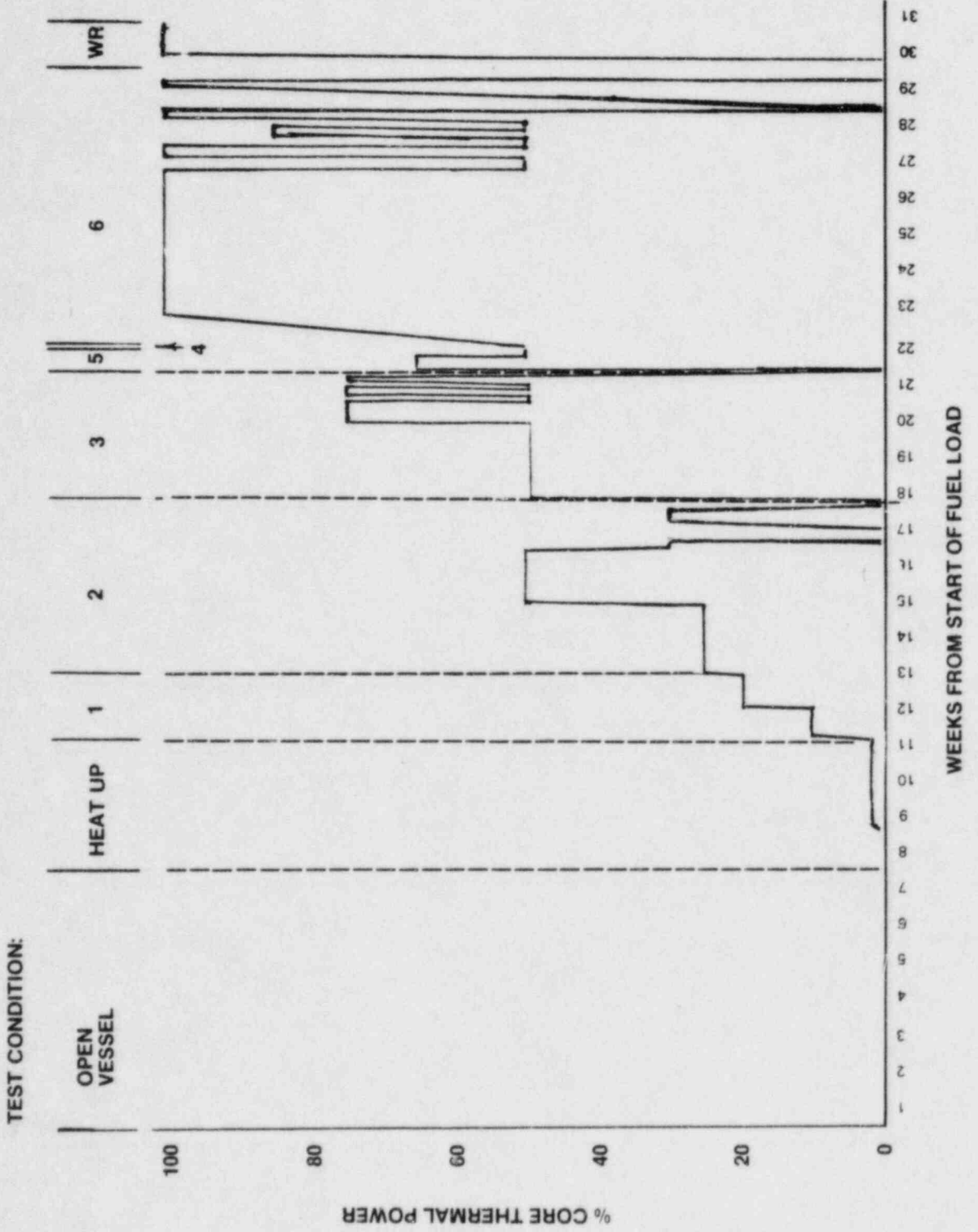
## MILESTONES

---

<u>EVENT</u>	<u>TIME FROM START OF FUEL LOAD</u>
FUEL LOAD COMPLETE	4 WEEKS
RPV HEAD ON	5 WEEKS
INITIAL CRITICALITY	7 WEEKS
5% POWER EXCEEDED	11 WEEKS
INITIAL TURBINE ROLL/ SYNCHRONIZE GENERATOR	13 WEEKS
INITIAL 100% POWER	23 WEEKS
COMPLETE WARRANTY RUN	31 WEEKS

# LIMERICK UNIT 1

## % POWER VERSUS TIME PROJECTION





## **CONCLUSIONS**

---

- PROCEDURES COMPLETE
- PLANT COMPLETE
- PERSONNEL TRAINED
- NUCLEAR REVIEW BOARD READINESS CONCLUSION
- NRR AND REGION I ASSESSMENT
- PLANT READY TO BEGIN TESTING

**EMERGENCY PLANNING**  
**R.A. KANKUS**

## **EMERGENCY PLANNING**

---

- ON-SITE APPRAISAL AND RESULTS
- RADIOLOGICAL EMERGENCY RESPONSE PLANS (RERP)
- PUBLIC ALERT/NOTIFICATION SYSTEM
- PUBLIC INFORMATION
- EVACUATION TIME ESTIMATE
- CONCLUSION

## ON-SITE APPRAISAL RESULTS

- 49 ITEMS IDENTIFIED FOR CORRECTIVE ACTION
  
- PECO 9/7/84 RESPONSE COMMITS TO:
  - CLARIFY ORGANIZATION DESCRIPTION
  - CENTRALIZE TRAINING RESPONSIBILITIES
  - COMPLETE EQUIPMENT INSTALLATION
  - CLARIFY PROCEDURE STEPS
  - COMPLETE TRAINING OF EMERGENCY RESPONSE PERSONNEL
  - COMPLETE STORAGE OF SUPPLIES

## **JULY 1984 ON-SITE EXERCISE RESULTS**

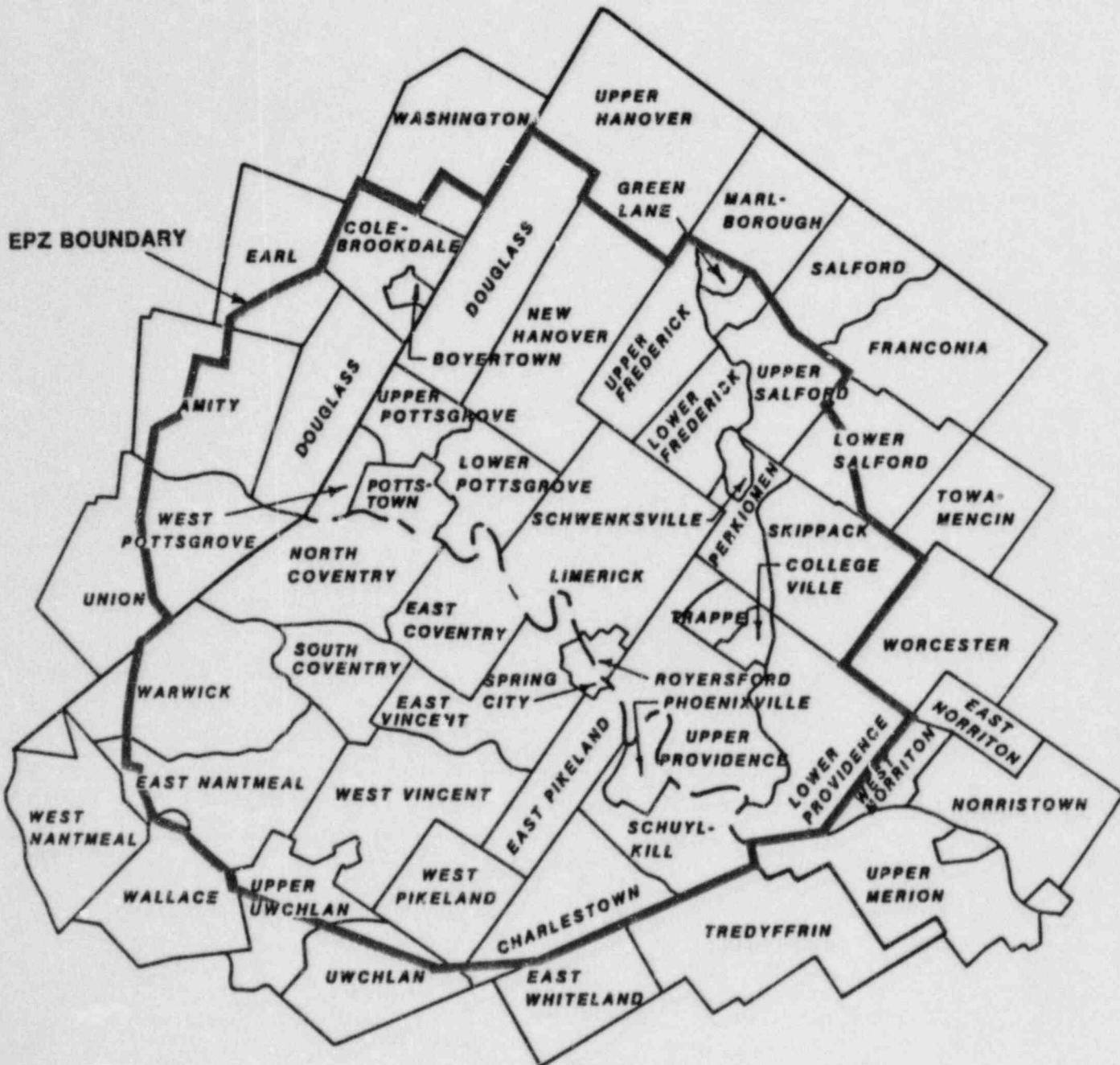
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- INSPECTION TEAM FOUND NO VIOLATIONS
- RESPONSE ADEQUATE

## **SCOPE OF OFF-SITE RADIOLOGICAL EMERGENCY RESPONSE PLANS**

---

3	RISK COUNTY PLANS
2	SUPPORT COUNTY PLANS
43	MUNICIPAL PLANS
10	HEALTH CARE FACILITIES
13	SCHOOL DISTRICTS
<u>35</u>	PRIVATE SCHOOLS
106	TOTAL PLANS



## RADIOLOGICAL EMERGENCY RESPONSE PLAN PROCESS (RERP)

SEQUENCE OF EVENTS	TIME FRAME
EPZ DESIGNATED Counties and Municipalities Work to Develop Boundaries	March 1982
RERP PROTOTYPE DEVELOPMENT (Basic Plans for Counties, Municipalities, Schools, Health Facilities drafted)	4/82 to 9/82
STATE EMERGENCY MANAGEMENT AGENCY REVIEW/COMMENT (Informal)	8/31/83 to 12/9/83
REGIONAL ASSISTANCE (RAC) REVIEW/COMMENT (Informal)	12/9/83 to 5/8/84
RERP REVISION (Based Upon RAC comments)	5/8/84 to 10/1/84
INITIAL ORIENTATION/TRAINING of Counties, Municipalities, etc.	11/1/83 to 7/25/84
PRACTICE DRILLS/CRITIQUES	May to July 84
FULL-SCALE OBSERVED EXERCISE	7/25/84
RERP REVISION (Based on PEMA, FEMA, NRC, Comments and Exercise Results)	8/1/84 to 11/1/84
PUBLIC MEETING	12/1/84 (projected)
FEMA HEADQUARTERS FINDINGS AND DETERMINATIONS (formal)	Spring 1985
PREPAREDNESS ESTABLISHED	Spring 1985
ANNUAL RERP REVIEW AND REVISION	Ongoing
ANNUAL RER TRAINING	Ongoing
BIANNUAL EXERCISE	1986



## **PECO RERP SUPPORT TO GOVERNMENT AGENCIES**

---

- ENERGY CONSULTANTS HIRED TO ASSIST COUNTIES, MUNICIPALITIES, HEALTH CARE FACILITIES, SCHOOL DISTRICTS, PRIVATE SCHOOLS IN PLAN DEVELOPMENT
- PUBLIC NEEDS SURVEY DISTRIBUTED AND ANALYZED BY PECO FOR COUNTIES
- PUBLIC ALERT/NOTIFICATION SYSTEM INSTALLED BASED UPON COUNTY INPUT
- PUBLIC INFORMATION BROCHURE DISTRIBUTED BY PECO AFTER PEMA/COUNTY DEVELOPMENT
- HMM ASSOCIATES HIRED TO DEVELOP EVACUATION TIME ESTIMATE
- EQUIPMENT AND FISCAL RESOURCES
- TRAINING OF STAFF/VOLUNTEERS

## **RERP EQUIPMENT**

---

- TELEPHONES
- STATUS BOARDS
- TABLES
- CHAIRS
- MAPS
- GENERATORS
- RADIO EQUIPMENT
- OFFICE SUPPLIES

## **RERP TRAINING**

---

- COUNTY STAFF/VOLUNTEERS
- MUNICIPAL STAFF/VOLUNTEERS
- POLICE — LOCAL AND STATE
- FIRE COMPANIES
- AMBULANCE COMPANIES
- FARMERS
- SCHOOL STAFF/TEACHERS
- BUS DRIVERS
- HOSPITAL AND NURSING HOME STAFF

## **PUBLIC ALERT/ NOTIFICATION SYSTEM**

---

- 165 ROTATING MECHANICAL SIRENS CONTROLLED BY EACH COUNTY (BACKUP CONTROLLER AT LGS)
- TWO-WAY RADIO SYSTEM PROVIDING INDICATION OF OPERATION TO APPROPRIATE COUNTY EOC
- SITES SELECTED BY COORDINATION WITH COUNTIES AND MUNICIPALITIES
- SITE COVERAGE DEVELOPED BY COMPUTER ANALYSIS CONSIDERING SIREN CHARACTERISTICS, TOPOGRAPHY, METEOROLOGY, VEGETATION, ETC.
- PECO TO MAINTAIN SYSTEM
- PECO/COUNTIES DEVELOPING TESTING PROGRAM
- SYSTEM USED DURING 7/25/84 EMERGENCY RESPONSE EXERCISE
- FEMA-43 SUBMITTED
- BACKUP TRANSMITTER TO BE PROVIDED

# DOCUMENT/ PAGE PULLED

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## **PECO PUBLIC INFORMATION PROGRAM**

- MONTHLY LOCAL NEWSPAPER ADVERTISING
- LIMERICK LIGHT NEWSPAPER
- PUBLIC INFORMATION BROCHURE DISTRIBUTION
- RADIO ADVERTISING
- MEDIA ANNUAL BRIEFING
- MEDIA PRESS KITS

# LIMERICK GENERATING STATION

## EMERGENCY INFORMATION FOR BERKS, CHESTER AND MONTGOMERY COUNTIES

Berks County  
Emergency Management Agency  
Agricultural Building, R.D. #1  
Leesport, Pennsylvania 19533

Chester County  
Department of Emergency Services  
Hazlett Building 14 East Biddle Street  
West Chester, Pennsylvania 19380

Montgomery County  
Office of Emergency Preparedness  
100 Wilson Building  
Eagleville, Pennsylvania 19403

# Important Emergency Information

For All or Part of the Following Communities

## Berks County

Amity Township\*  
Colebrookdale Township  
Douglass Township

Earl Township\*  
Union Township\*  
Washington Township\*

## Chester County

Charlestown Township\*  
East Coventry Township  
East Nantmeal Township\*  
East Pikeland Township  
East Vincent Township  
North Coventry Township  
Phoenixville Borough

Schuylkill Township\*  
South Coventry Township  
Spring City Borough  
Upper Uwchlan Township\*  
Warwick Township\*  
West Pikeland Township\*  
West Vincent Township

## Montgomery County

Collegeville Borough  
Douglass Township  
Green Lane Borough  
Limerick Township  
Lower Frederick Township  
Lower Pottsgrove Township  
Lower Providence Township  
Lower Salford Township  
Marlborough Township  
New Hanover Township  
Perkiomen Township

Pottstown Borough  
Royersford Borough  
Schwenksville Borough  
Skippen Township  
Trappe Borough  
Upper Frederick Township  
Upper Pottsgrove Township  
Upper Providence Township  
Upper Salford Township  
West Pottsgrove Township

\*Partially located in potential evacuation area.

*This information is important. Do not discard. Keep in a handy place, such as your phone book.*

Dear Resident:

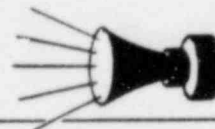
The following important information and specific instructions explain what you may be asked to do should a serious accident occur at the Limerick Generating Station.

The protective actions described represent specific procedures developed by, and coordinated through, your state, county and municipal governments. Each level of government has prepared detailed plans to ensure a safe and coordinated public response to an emergency. It is important that you respond quickly but calmly when notified that protective actions are to be taken.

**THIS INFORMATION IS IMPORTANT.** Please read the entire section. We recommend that you underline or circle the directions for your municipality under "Where to Go" and refer to the map for the routes that will be used. This information should also be reviewed with the members of your family.

County Board of Commissioners

## How Will You Learn Of A Nuclear Incident?



If there is significant information that could affect your safety, or if protective actions are required to protect your health and safety, the standard "Alert Signal" will be sounded over the siren system that has been installed within an approximate ten-mile radius of the Limerick Generating Station. **This signal is a steady three to five minute signal — not a wailing or warbling signal.** If the Alert Signal is sounded in your community, tune your radio or TV to one of the County Emergency Broadcast Stations. A message will be broadcast advising you what action should be taken. The sounding of the sirens will be monitored by municipal officials. Should a siren fail to activate, residents will be alerted by municipal police and firefighters using mobile public address systems or door-to-door notification.

**Don't use the telephone to try to get emergency information.** That seldom will bring results and could tie up lines urgently needed for emergency operations aimed at your protection.

## EMERGENCY PLANS

State, county and municipal emergency plans have been developed and exercised for response to an accident at the Limerick Generating Station. The plans were designed to coordinate and support emergency actions that may be necessary should an accident occur.

## BERKS COUNTY ALERT & WARNING/E.B.S. STATIONS

AM	FM	TV
WHUM	1240	
And participating county radio stations.		

This emergency information was developed by each county emergency management agency with the support of the Pennsylvania Emergency Management Agency in accordance with state law and federal regulations. This important information was placed in the telephone directory by the Philadelphia Electric Company, in cooperation with your county government.



## CHESTER COUNTY ALERT & WARNING/E.B.S. STATIONS

	AM	FM	TV
WCAU	1210		
WCOJ	1420		

And participating county radio stations.

## MONTGOMERY COUNTY ALERT & WARNING/E.B.S. STATIONS

	AM	FM
KYW	1060 AM	

And participating county radio stations.

If you have a neighbor who is hard of hearing or visually handicapped, please check to ensure that this neighbor has received the alert and understands what to do.

### If You Are Told To Take Shelter



Should you be directed to take shelter (remain indoors), there will be several things you need to do:

- Close all outside doors and windows. This will help to keep out any radioactive materials which may be outdoors.
- Turn off or close all outside air intakes.
- Keep pets inside, and to the extent possible shelter farm animals.
- Keep your radio or TV turned on and listen for further emergency instructions.
- Don't use the telephone - Leave lines open for emergency communications.
- Persons traveling within the area in motor vehicles should roll up windows and close air vents.
- Those not at home should take the best available shelter.
- Any other precautions deemed necessary while taking shelter will be broadcast by county officials at the time. Stay tuned to your local Emergency Broadcast Station.

Stay indoors until you receive official notice that it is safe to go out. Special arrangements will be made by state, county and municipal officials to take care of school children and hospital patients.

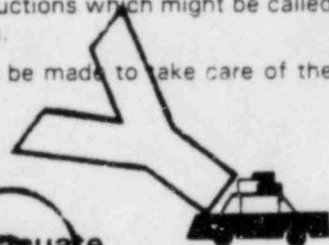
#### Farm Animals

Farmers affected by a Take Shelter or Evacuation advisory should shelter their animals and contact their county USDA agricultural agent for further instructions regarding protection of livestock and foodstuffs.

## EVACUATION INFORMATION

If it is necessary to evacuate an area, you will be informed by an announcement on your EBS Station. The message will include any special instructions which might be called for by the particular situation.

Special arrangements will be made to take care of the sick and the disabled.



### If You Are Told To Evacuate

If you are advised to evacuate, follow instructions promptly and carefully. The map identifies main evacuation routes. Also see the "Where To Go" section in this brochure which describes, by municipality, where you should go for temporary accommodations and the highways to use.

School students will be relocated to identified host schools. See the "School Section" in this brochure for specific information.

When instructed to leave, secure your home as you would for a three day trip.

### What to Take With You



You should plan to spend a minimum of three days away from home. Bring only essential items and avoid excess baggage. Take only what you need and then in small quantities.

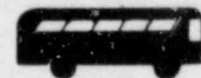
#### Suggested items to take:

- Clothing appropriate for the season
- Sleeping bags or blankets
- Prescription drugs
- Personal care items
- Baby supplies
- Pet supplies

#### Pets and Pet Supplies

For sanitary reasons, pets will not be allowed inside mass care centers. You are responsible for their care.

### If You Need Transportation



If you are instructed to evacuate and you do not have transportation, attempt to obtain a ride with neighbors, a friend or a relative who lives nearby.

If this is not possible, transportation can be arranged by calling your municipal Emergency Management Agency. For telephone numbers see the "Where To Go" section in this brochure.

## SCHOOL INFORMATION



Parents of children attending schools within the emergency planning zone are urged NOT to call or go to the schools when protective action recommendations, such as sheltering or evacuation, have been issued. This would only add confusion and could hinder school authorities from the special provisions that have been made to protect your children.

If school is in session at the time evacuation is recommended, children attending schools located within the emergency planning zone will be transported by bus to

designated host schools outside the area. They will remain there under school supervision until picked up by parents or guardians. These Student Pick-Up Points have been planned to coincide with main evacuation routes.

Students whose homes are inside but who attend school outside the emergency planning zone will not be sent home if an evacuation is advised. They will remain at the school they attend under school supervision until picked up by parents or guardians.

**Specific information concerning Student Pick-Up Points will be provided to parents by school officials.** If your child's school is subject to evacuation and you are not aware of the designated pick-up point, contact the school principal or school district superintendent and request this important information now. Don't wait!

## BERKS COUNTY — Where To Go

### Example

#### Municipality

**Routes** (Evacuation routes controlled by police for efficient movement out of your area. Once outside the 10-mile Emergency Planning Zone, use appropriate routes to your destination. If you need a temporary place to stay, continue on the designated Evacuation Route to the identified Reception Center.)

**Reception Center** (Report to the identified Reception Center if you need a temporary place to stay. At the Reception Center you will be given directions to a Mass Care Center nearby.)

**Transportation Assistance** (Emergency telephone numbers for those in need of transportation assistance only.)

#### Amity Township\* — Amity Gardens

Take Route 422 West to:  
Reading Mall, Reading  
(215) 689-9415

#### Amity Township\* — East

Take Route 662 North to:  
Oley Valley High School, Oley  
(215) 689-9415

#### Boyerstown Borough

Take Route 73 West to:  
Oley Valley High School, Oley  
(215) 367-2688

#### Colebrookdale Township — West of Route 100

Take Route 73 West to:  
Oley Valley High School, Oley  
(215) 369-1362

#### Colebrookdale Township — East of Route 100

Take Route 100 North to:  
Emmaus High School, Emmaus  
(215) 369-1362

#### Douglass Township — South

Take Route 662 North to:  
Oley Valley High School, Oley  
(215) 367-8500

#### Douglass Township — North

Take Route 562 West to Route 662 North to:  
Oley Valley High School, Oley  
(215) 367-8500

#### Earl Township\*

Take Route 562 West to 662 North to:  
Oley Valley High School, Oley  
(215) 367-9673

#### Union Township\*

Take Route 724 West to:  
Cumru Elementary School, Shillington  
(215) 835-3769  
(215) 582-3769

#### Washington Township\*

Take Route 100 North to:  
Emmaus High School, Emmaus  
(215) 845-2877

\*Municipalities with an asterisk are partially located in the potential evacuation area. See map for area included.

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## CHESTER COUNTY — Where To Go

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### Charlestown Township\*

Take Route 29 South to Route 202 South to:

West Goshen Shopping Center, West Goshen

(215)

### East Coventry Township

Take Route 23 West to:

Morgan Corporation, Morgantown

(215) 495-6063

### East Nantmeal Township\* - West

Take Route 401 North to Route 23 West to:

Morgan Corporation, Morgantown

(215) 458-5780

### East Nantmeal Township\* - East

Take Route 100 South to Route 113 South to Route 30 Bypass West to 322 West to:

Downingtown High School, Downingtown

(215) 458-5780

### East Pikeland Township

Take Route 113 South to Gordon Drive to Route 100 South to:

Exton Mall, Exton

(215) 933-9961

### East Vincent Township

Take Route 113 South to Gordon Drive to Route 100 South to:

Exton Mall, Exton

(215) 933-4424

### North Coventry Township - South

Take Route 23 West to:

Morgan Corporation, Morgantown

(215) 323-1694

### North Coventry Township - North

Take Route 724 West to:

Cumru Elementary School, Shillington

(215) 323-1694

### Phoenixville Borough

Take Route 23 East to Route 202 South to:

West Goshen Shopping Center, West Goshen

(215) 933-8801

### Schuylkill Township\* -- East

Take Route 23 East to Route 202 South to:

West Goshen Shopping Center, West Goshen

(215) 933-5843

### Schuylkill Township\* - West

Take Route 29 South to Route 202 South to:

West Goshen Shopping Center, West Goshen

(215) 933-5843

### South Coventry Township - North

Take Route 23 West to:

Morgan Corporation, Morgantown

(215)

### South Coventry Township - South

Take Route 100 South to Route 113 South to Route 30 Bypass West to Route 322 West to:

Downingtown High School, Downingtown

(215)

### Spring City Borough

Take Route 724 East to Route 113 South to Gordon Drive to Route 100 South to:

Exton Mall, Exton

(215) 948-3660

### Upper Merion Township

Take Route 100 South to Route 113 South to Route 30 Bypass West to Route 322 West to:

Downingtown High School, Downingtown

(215) 363-8450

### Wauwatosa Township\*

Take Route 23 West to:

Morgan Corporation, Morgantown

(215) 286-5557

### West Pikeland Township\*

Take Route 113 South to Gordon Drive to Route 100 South to:

Exton Mall, Exton

(215) 827-9218

### West Vincent Township

Take Route 100 South to Route 113 South to Route 30 Bypass West to Route 322 West to:

Downingtown High School, Downingtown

(215) 827-7932

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\*Municipalities with an asterisk are partially located in the potential evacuation area. See map for area included.

## MONTGOMERY COUNTY — Where To Go

### Collegeville Borough

Take Route 422 East to Pennsylvania Turnpike East to Exit 27 to:

Willow Grove Industrial Park, Willow Grove

(215) 489-4464

### Douglass Township

Take Route 100 North to Route 29 North to:

Emmaus High School, Emmaus

(215) 367-0277

(215) 367-9191

### Green Lane Borough

Take Route 63 East to Route 113 North to:

County Line Plaza, Telford

(215) 234-9000

### Limerick Township

Take Route 422 East to Pennsylvania Turnpike East to Exit 27 to:

Willow Grove Industrial Park, Willow Grove

(215) 495-6432

### Lower Frederick Township

Take Route 29 North to Perkiomenville Road to Route 63 East on Route 113 North to:

County Line Plaza, Telford

(215) 287-8857

### Lower Pottsgrove Township

Take Route 663 North to Route 309 North to:

Southern Lehigh School, Center Valley

(215) 323-1380

(215) 323-0436

### Lower Providence Township

Take Route 363 South to Pennsylvania Turnpike East to Exit 28 to Route 1 North to:

Neshaminy Mall, Cornwells Heights

(215) 533-8000

### Lower Salford Township

Take Route 113 North to:

County Line Plaza, Telford

(215) 256-8087

### Marlborough Township\*

Take Route 63 East to Route 113 North to:

County Line Plaza, Telford

(215) 234-9300

### New Hanover Township

Take Route 663 North to Route 309 North to:

Southern Lehigh School, Center Valley

(215) 323-1008

### Perkiomen Township

Take Route 29 South to Route 113 North to Route 73 East to Route 202 North to:

Montgomery Mall, North Wales

(215) 489-4034

### Pottstown Borough — Northwest

Take Route 100 North to Route 29 North to:

Emmaus High School, Emmaus

(215) 326-3100

### Pottstown Borough — Northeast

Take Route 663 North to Route 309 North to:

Southern Lehigh School, Center Valley

(215) 326-3100

### Pottstown Borough — Southwest

Take Route 422 West to:

Reading Mall, Reading

(215) 326-3700

### Pottstown Borough — Southeast

Take Route 724 West to:

Cumru Elementary School, Shillington

(215) 326-3100

### Royersford Borough

Take Township Line Road to Route 422 East to Pennsylvania Turnpike East to Exit 27 to:

Willow Grove Industrial Park, Willow Grove

(215) 948-3737

### Schwenksville Borough

Take Route 73 East to Route 202 North to:

Montgomery Mall, North Wales

(215) 287-8997

### Skippack Township

Take Route 113 North to Route 73 East to Route 202 North to:

Montgomery Mall, North Wales

(215) 584-5453

### Trappe Borough — North

Take Route 113 North to Route 73 East to Route 202 North to:

Montgomery Mall, North Wales

(215) 489-2700

### Trappe Borough — South

Take Route 422 East to Pennsylvania Turnpike East to Exit 27 to:

Willow Grove Industrial Park, Willow Grove

(215) 489-2700

### Upper Frederick Township

Take Route 63 East to Route 113 North to:

County Line Plaza, Telford

(215) 754-6436

### Upper Pottsgrove Township

Take Route 100 North to Route 29 North to:

Emmaus High School, Emmaus

(215) 323-8675

### Upper Providence Township

Take Pottstown bypass to I-276 East to Exit 28 to Route 1 North to:

Neshaminy Mall, Cornwells Heights

(215) 933-9197

(215) 933-8608

### Upper Providence Township — Alternate

Take Route 363 South to I-276 East to Exit 28 to Route 1 North to:

Neshaminy Mall, Cornwells Heights

(215) 933-9197

(215) 933-8608

### Upper Salford Township

Take Route 63 East to Route 113 North to:

County Line Plaza, Telford

(215) 287-6150

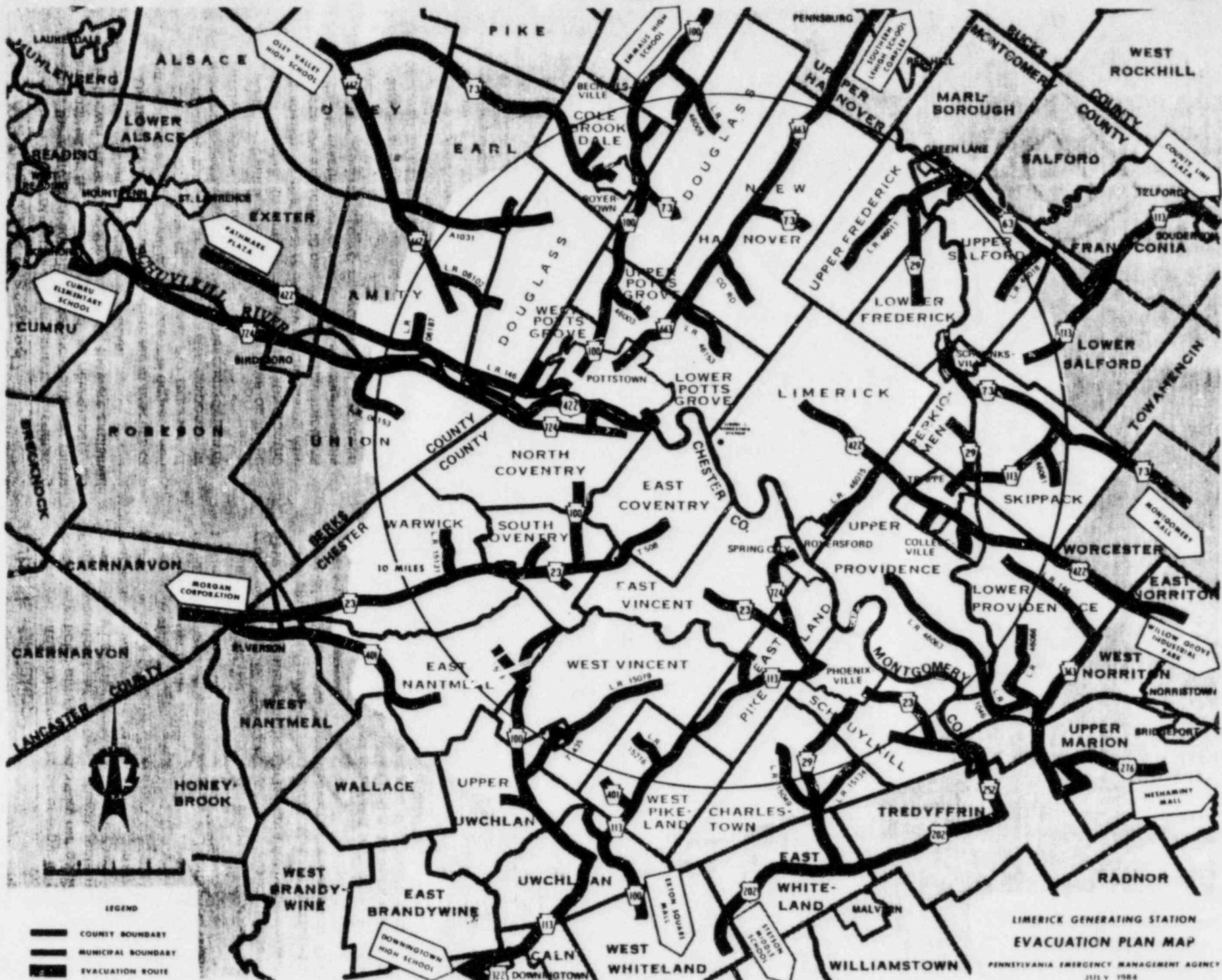
### West Pottsgrove Township

Take Route 422 West to:




Reading Mall, Reading

(215) 323-7717

\*Municipalities with an asterisk are partially located in the potential evacuation area. See map for area included.



LEGEND

-  COUNTY BOUNDARY
-  MUNICIPAL BOUNDARY
-  EVACUATION ROUTE

LIMERICK GENERATING STATION  
EVACUATION PLAN MAP

PENNSYLVANIA EMERGENCY MANAGEMENT AGENCY  
JULY 1984

## How Are Accidents Classified?

Should an accident occur at the Limerick Generating Station, there are four accident classifications you might hear reported on radio, TV or read in the newspapers. So that you will understand their meaning, they are explained in the order of their potential seriousness:

**Unusual Event** — Unusual events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

**Alert** — Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the Protective Action Guideline exposure levels established by the Federal Environmental Protection Agency (EPA).

**Site Emergency** — Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except near the plant boundary.

**General Emergency** — Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate plant area.

### RUMOR CONTROL TELEPHONE NUMBERS

BERKS COUNTY — (215) 374-4809

CHESTER COUNTY — (215) 431-6480

MONTGOMERY COUNTY — (215) 631-9700, 9709

## What is Radiation?

Nuclear radiation consists of energy in the form of invisible particles or rays given off by radioactive material. Small amounts of radioactive material occur naturally and always have been part of man's environment. Radioactive materials in varying amounts are present in the earth's crust, the sun's rays, the air we breathe, the food we eat and the water we drink. As a result, every person has radioactive materials within his body. Larger amounts of radioactive materials are produced by and contained within a nuclear power plant.

Man's use of radioactive materials also results in radiation exposure. For example, doctors and scientists have utilized X-rays in medical treatment for many years.

The amount of radiation a person receives is measured in terms of radiation dose. The unit used to measure this dose is called a *millirem*.

The following table shows examples of typical radiation doses due to natural radioactive materials or man's use of radioactive materials compared to the worst estimated exposure received by an individual during the TMI-2 accident in 1979.

Source	Millirem Per Year
• Color television	1
• Airline travel (typical airline passenger who makes 10 flights per year)	3
• Natural radioactive materials within the body	20
• Medical X-rays (average patient)	20
• Cosmic rays	27
• Natural radioactive materials in the earth	46
• Maximum offsite exposure during TMI accident	70

\* "The Effects on Populations of Exposure to Low Levels of Ionizing Radiation," National Academy of Science, 1980.

\*\* Report of the President's Commission on the accident at Three Mile Island, October 1979, Page 32.

## **EVACUATION TIME ESTIMATE DEVELOPMENT**

---

- HMM ASSOCIATES COORDINATES WITH PEMA TO DEVELOP BASIC ASSUMPTIONS
- PEMA AND HMM MEET WITH COUNTIES TO OBTAIN DETAILED INFORMATION
- HMM USES AGENCY INPUT FOR NETVAC.
- HMM COLLECTS FIELD DATA ON ROADS AND TRAFFIC FOR NETVAC
- DRAFT EVACUATION TIME ESTIMATE (ETE) PROVIDED TO PEMA AND COUNTIES
- DRAFT ETE REVISED BY HMM
- FINAL DRAFT ISSUED 5/84

## EPZ POPULATION BY MUNICIPALITY

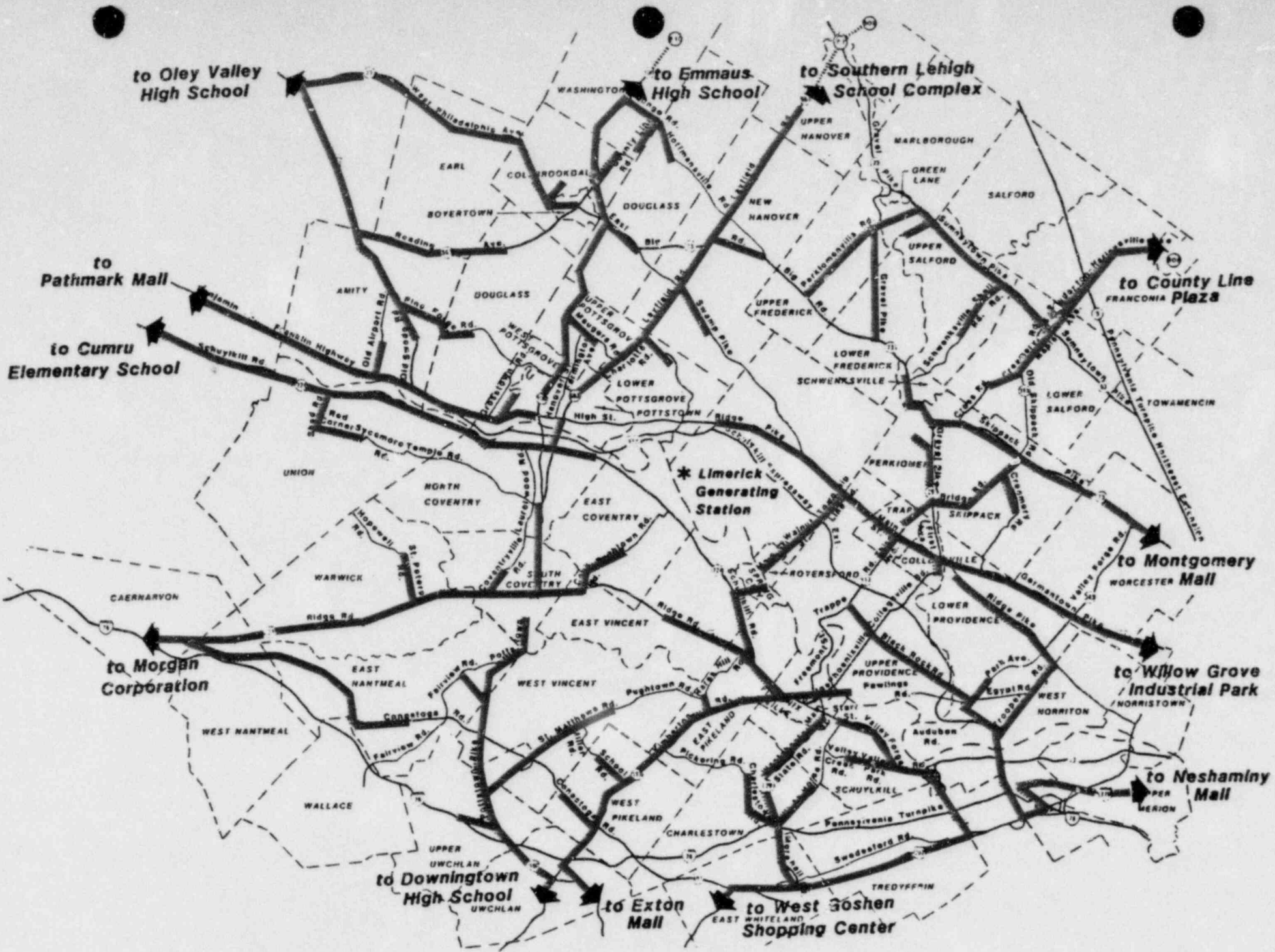
<u>1980 PERMANENT RESIDENT POPULATION WITHIN EPZ</u>	<u>1980 PERMANENT RESIDENT POPULATION WITHIN EPZ</u>	<u>1980 PERMANENT RESIDENT POPULATION WITHIN EPZ</u>
<b>MONTGOMERY COUNTY:</b>	<b>CHESTER COUNTY:</b>	<b>BERKS COUNTY:</b>
Douglass Township 5,833	Charlestown Township 2,770	Amity Township (75%*) 4,384
Limerick Township 5,298	East Coventry Township 4,085	Colebrookdale Township 4,748
Royersford Borough 4,243	East Nantmeal Township 1,222	Boyertown Borough 3,979
Lower Frederick Township 2,379	East Pikeland Township 4,410	Douglass Township 3,128
Lower Pottsgrove Township 7,250	East Vincent Township 4,739	Earl Township (22%*) 562
Pottstown Borough 22,729	Spring City Borough 3,389	Union Township (40%*) 1,126
Lower Providence Township 18,945	North Coventry Township 7,164	Washington Township (20%*) 514
Lower Salford Township (33%*) 2,052	Schuylkill Township 5,993	<b>Total Berks County 18,441</b>
Marlborough Township (10%*) 285	Phoenixville Borough 14,165	
Green Lane Borough 542	South Coventry Township 1,556	
New Hanover Township 4,623	Upper Uwchlan Township (61%*) 1,103	
Perkiomen Township 3,265	Uwchlan Township (3%*) 250	
Schwenksville Borough 1,041	Warwick Township (90%*) 2,115	
Skippack Township 5,784	West Pikeland Township 1,536	
Upper Frederick Township 1,759	West Vincent Township 1,992	
Upper Pottsgrove Township 2,873	<b>Total Chester County 56,489</b>	
Upper Providence Township 9,551		
Collegetown Borough 3,406		
Trappe Borough 1,800		
Upper Salford Township 2,375		
West Pottsgrove Township 4,208		
<b>Total Montgomery County 110,290</b>		

**TOTAL 1980 PERMANENT RESIDENT POPULATION WITHIN EPZ: 185,220**

\*% of total population of municipality within the Plume Exposure EPZ

Source: County RERPs and data from the 1980 U.S. Census of Population and Housing.





PRIMARY EVACUATION ROUTES

## EVACUATION TIME ESTIMATE SUMMARY

### GENERAL EVACUATION TIME<sup>1</sup>

Analysis Area	Winter Week Day Fair Weather	Winter Week Night Fair Weather	Summer Weekend Fair Weather	Winter <sup>2</sup> Week Day Adverse Weather	Summer <sup>3</sup> Weekend Adverse Weather
EPZ	4 Hrs. 50 Min.	4 Hrs. 15 Min.	4 Hrs. 45 Min.	6 Hrs. 45 Min.	5 Hrs. 50 Min.

<sup>1</sup>All residents, transients and special facilities within the analysis area would be evacuated.  
Time estimates are rounded to the nearest 5-minute period.

<sup>2</sup>Snowstorm adverse weather.

<sup>3</sup>Rainstorm adverse weather.

# **SUPPLEMENTAL EXERCISE**

---

NOVEMBER 16, 1984

- NINE MUNICIPALITIES:
  - AMITY TOWNSHIP
  - UNION TOWNSHIP
  - WEST POTTSBORO TOWNSHIP
  - SCHWENKSVILLE BOROUGH
  - GREEN LANE BOROUGH
  - MARLBOROUGH TOWNSHIP
  - LOWER PROVIDENCE TOWNSHIP
  - DOUGLAS TOWNSHIP
  - LOWER SALFORD TOWNSHIP
- ADDITIONAL MUNICIPALITIES AS TRAINING
- SCHOOL DISTRICTS
- LIMITED PARTICIPATION BY COUNTIES AND STATES

## **SUMMARY**

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- WITH CORRECTION OF DEFICIENCIES IDENTIFIED BY FEMA DURING 7/25/84 EXERCISE, EMERGENCY PREPAREDNESS WILL BE ESTABLISHED

6504 BR. FORD TERR.  
PHILA, PA 19149

CR09D059

RECEIVED  
ADVISORY COMMITTEE ON  
REACTOR SAFEGUARDS, U.S.N.R.C.

OCT 13 1984

2, 3, 9, 10, 11, 12, 1, 2, 3, 4, 5, 6 PM

DISTRIBUTED TO ACRS MEMBERS

Dr Richard Savio  
ACRS  
NRC

Dear Sir;

Please supply copies of this letter to the subcommittee meeting on October 9 and 10th in Washington, D .C. , in reference to the Limerick nuclear power plant licenses. Also this letter is aimed at the full Committee meeting on October 13th at 1 PM on the Limerick license application.

Specifically I object to any ACRS review of the Limerick license that does not look at the continuing and dangerous series of violations, unresolved items and deficiencies that are being allowed by the Staff at the Limerick project. Also the Applicant, PECO made statements thru its lawyer that certain welding had been inspected. Subsequently PECO did reverse itself and admit that the welds in question could not be accessed for inspection. Due to the disingenuity of the applicant , a contention on welding was allowed into the proceedings.

Limerick is becoming another Zimmer. The Inspection Reports list violation after violation. The latest two violations were on Aug 2, 1984 in Combined Inspection Report 50-352/50-353/84-09. Since that report , the staff seems to have taken a softer line and instead of noting deficiencies of safety related work as violation, they now refer to these occurrences as unresolved items or deficiencies.

PECO is attempting to get an operating license. Instead of coming before the ACRS with clean hands, it comes with a slew of violations, open items, other deficiencies, and disingenuities coloring its application.

I respectfully request that the ACRS at least look at the inspection reports from Limerick before going on record allowing another fiasco like Zimmer to actually get a license to operate.

Respectfully submitted, X- Limerick  
William Lewis (215) 2895964

CR-2.4

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
631 PARK AVENUE  
KING OF PRUSSIA, PENNSYLVANIA 19406

P6

APR 10 1984



Docket Nos. 50-352

Philadelphia Electric Company  
ATTN: Mr. John S. Kemper  
Vice President  
Engineering and Research  
2201 Market Street  
Philadelphia, PA 19101

*red 4/21/84*

Re:

Subject: Inspection No. 50-352/84-12

This refers to the routine safety inspection conducted by Dr. P. K. Eapen of this office on March 12-23, 1984, at the Limerick Generating Station of activities authorized by NRC License No. CPPR-106, and to the discussions of our findings held by Mr. A. T. Gody with Mr. G. L. Leitch of your staff at the conclusion of the inspection, and to a subsequent telephone discussion between Mr. Gody and Mr. Leitch on April 2, 1984.

Areas examined during this inspection are described in the NRC Region I Inspection Report which is enclosed with this letter. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector.

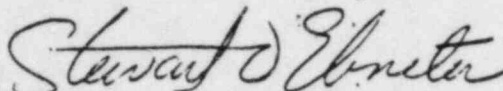
Based on the results of this inspection, it appears that one of your activities was not conducted in full compliance with NRC requirements. This apparent violation involves the lack of checklists and acceptance criteria for pre-turnover system walkdowns and inspections. The details of this violation are included in the attached report. We are considering this item for appropriate enforcement action and will be addressing it later in separate correspondence. An enforcement conference is scheduled for April 12, 1984, to discuss your actions regarding this matter and to discuss further your understanding of the circumstances which led to this problem. At this meeting you should be prepared to discuss your corrective actions to prevent recurrence of such problems.

In accordance with 10 CFR 2.790(a), a copy of this letter and the enclosure will be placed in the NRC Public Document Room unless you notify this office, by telephone, within ten days of the date of this letter and submit written application to withhold information contained therein within thirty days of the date of this letter. Such application must be consistent with the requirements of 10 CFR 2.790(b)(1). The telephone notification of your intent to request withholding, or any request for an extension of the 10-day period which you believe necessary, should be made to the Supervisor, Files, Mail and Records, USNRC Region I, at (215) 337-5223.

The responses directed by this letter and the accompanying Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Your cooperation with us in this matter is appreciated.

Sincerely,



*for* Thomas T. Martin, Director  
Division of Engineering and  
Technical Programs

Enclosure: NRC Region I Inspection Report Number 50-352/84-12

cc w/encl:

V. S. Boyer, Senior Vice President, Nuclear Power  
Troy B. Conner, Jr., Esquire  
Eugene J. Bradley, Esquire  
Limerick Hearing Service List  
Public Document Room (PDR)  
Local Public Document Room (LPDR)  
Nuclear Safety Information Center (NSIC)  
NRC Resident Inspector  
Commonwealth of Pennsylvania

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-352/84-12

Docket No. 50-352

License No. CPPR-106

Licensee: Philadelphia Electric Company

2301 Market Street

Philadelphia, Pennsylvania 19101

Facility Name: Limerick Generating Station Unit 1

Inspection At: Limerick, Pennsylvania

Inspection Conducted: March 12 - 23, 1984

Inspectors: P. K. Eapen

P. K. Eapen, Ph.D.  
Lead Reactor Engineer

4/6/84  
date

P. Bissett  
P. Bissett, Reactor Engineer

4/6/84  
date

Approved by: A. T. Gocy

A. T. Gocy, Chief Management  
Program Section, EPB, DETP

4/6/84  
date

Inspection Summary:

Inspection on March 12 - 23, 1984 (Report No. 50-352/84-12)

Areas Inspected: Preoperational Test activities; Preoperational Test QA Program; QA/QC coverage of Preoperational Test activities; and followup on an allegation by a Start-up Engineer.

The inspection involved 135 inspection hours by 2 Region based inspectors and one supervisor.

Results: One violation (Failure to establish checklists and acceptance criteria for Preturndown walkdowns and inspections - paragraph 2) was identified.



1. Persons Contacted

A. Arcilla, Start-up Engineer  
A. Averano, Quality Control (QC) Engineer  
J. Barbour, Start-up Engineer  
D. Basile, QC Engineer  
K. Brown, Administrative Coordinator Assistant  
\*D. Clohecy, Quality Assurance (QA) Engineer  
D. Condliff, Start-up Group Supervisor  
D. Corey, Group Supervisor - Electrical  
J. Coyle, Start-up Engineer  
\*J. Corcoran, Lead QA Engineer  
W. Dana, Start-up Engineer  
D. Darnall, Start-up Engineer  
\*C. Endriss, Regulatory Engineer  
C. Enos, Start-up Engineer  
\*J. Filson, QA Auditor  
\*K. Folta, QA Engineer  
\*J. Franz, Assistant Station Superintendent  
T. Hagstrom, Start-up Engineer  
J. Hodges, Start-up Engineer  
G. Kelly, QA Engineer  
W. Kershner, Assistant Project Start-up Engineer  
\*G. Leitch, Station Superintendent  
D. Mackey, Administrative Coordinator  
\*K. Meck, QA Engineer  
S. MacAinsh, QA Site Supervisor  
E. Neashma, Start-up Group/Supervisor  
W. Noll, Start-up Engineer  
J. Rubert, Lead QA Engineer  
A. Spector, Start-up Engineer  
\*J. Spencer, Start-up Director  
J. Stansbury, Start-up Group Supervisor  
A. Strait, Start-up Group Supervisor  
J. Uritis, Start-up Engineer

Nuclear Regulatory Commission

\*S. Chaudhary, Senior Resident Inspector  
\*J. Wiggins, Senior Resident Inspector  
\*A. Gody, Chief, Management Programs Section

\*Denotes those present at the exit meetings conducted on March 20 and 23, 1984.

## 2. Preoperational Testing Program Review

### 2.1 Scope

This inspection was conducted to establish that:

1. The applicant had established a QA program for preoperational testing activities.
2. The QA program was consistent with the Final Safety Analysis Report (FSAR) commitments and regulatory requirements.
3. The preoperational testing activities were implemented in accordance with the established program.

### 2.2 Areas Reviewed

The following areas were reviewed to ascertain the adequacy of the program and its implementation:

1. Preoperational Test Program,
2. QA Surveillance and Inspection,
3. Audits,
4. Training and Qualification of Personnel, and
5. Preoperational Test Activities

### 2.3 Details of Review

#### 1. Preoperational Test Program

Chapter 14 of the Limerick Generating Station's (LGS) Final Safety Analysis Report (FSAR) discusses the Preoperational Testing Program, including System Turnover from the Contractor (Bechtel Power Co) to the licensee. The preoperational test activities are managed by the licensee's Start-up Director who reports directly to the Station Superintendent. The Start-up Director is assisted by the Project Start-up Engineer (a Bechtel Power Corporation employee) and his staff.

The "Start-up" Section of the LGS QA Plan reflected the licensee's commitments in the FSAR and regulatory requirements. According to this plan, the Electric Production Department has the overall responsibility for preoperational test activities. The Start-up Director's organization, various other station groups, Corporate Engineering and Research groups, Bechtel Construction, the Test Review Board (TRB), and the licensee's QA Division participate in start-up activities. The Start-up

Administrative Manual provides the administrative controls for Start-up activities. The QA Plan and the Start-up Manual adequately defined the responsibilities of the participating organizations.

The Electric Production (EP) Department has delegated the Quality Assurance responsibilities for the preoperational test program to the Engineering and Research (E&R) QA organization. The EP Department maintained the program audit responsibility and coverage of special activities, such as radiation protection and fire protection. Review and audit responsibilities of EP-QA and E&R-QA were established and were denoted in a detailed listing.

The LGS QA Plan included requirements for periodic audits of preoperational test and start-up activities. E&R-QA has the responsibility to audit the preoperational phase activities with the exception that EP-QA performs audits in special areas, such as Blue Tag testing procedures, and Local and Integrated Leak Rate tests.

### 2.3.2 QA Surveillance and Inspection

Quality Control Engineers reported to the Lead Quality Engineer and performed procedure reviews, surveillances, and inspection activities. The System Start-up Engineers were certified to ANSI N45.2.6, Level II inspectors and performed and directed component inspections and tests.

Station Procedure QAPD-30 (Rev.0) "LGS S/U QC Surveillance" established QC surveillance requirements for start-up activities.

Procedure QAPD-26 (Rev. 2), "Quality Control Inspection of LGS S/U Preoperational Activities," governs QC inspections. Start-up Nonconformance Report (NCR) requirements are discussed in procedure AD 1.2-1 and the NCR trending activities are conducted using procedure QAPD 27.1 (Rev. 0).

The following documents were reviewed to determine the effectiveness of the licensee's QA/QC surveillances, and inspections:

- Start-up QC Surveillance Report No. 136 dated 3/11/1984
- NCR No. S-227-M
- NCR No. S-230-M
- NCR No. S-276-M
- NCR No. S-310-M
- NCR No. S- 13-M
- NCR No. S-318-M
- NCR No. S-331-M
- Start-up Trend Analysis dated 3/21/84

The inspector noted that the above surveillances, inspections, and trend analysis were performed effectively and conducted in accordance with the licensee's procedures.

### 2.3.3 Audits of Preoperational Test Activities

The Engineering and Research Department's QA organization has the primary responsibility for auditing preoperational test activities. The audits were conducted using checklists that were appropriate for the audited activities. The personnel conducting the audits were knowledgeable and independent of the audited area. The auditors met or exceeded the training and qualification requirements of ANSI N45.2.23. Audit findings were meaningful and were reported to the appropriate levels of management. Corrective actions were timely and effective.

The above observations were based on a review of four audits (S-017, S-024, S-028, and S-041) and discussions with the E&R QA staff and the staffs of the audited organizations.

### 2.3.4 Training and Qualification of Personnel

Individual records were randomly selected for the following job categories of the Preoperational Test staff and QA/QC staff:

- Supervisors
- QA/QC Inspectors and Engineers
- System Start-up Engineers (SSE)
- QA Auditors

Training and qualification of the selected individuals met the training and qualification requirements established in the FSAR and procedure AD 2.5 (Revision 3), "S/U Personnel Qualification and Training." The effectiveness of the personnel qualification and training was evident during discussions of preoperational test activities with the staffs.

### 2.3.5 Preoperational Test Activity Review

The following preoperational test activities were reviewed with System Start-up Engineers responsible for the activities:

- 1P-5 Safeguard 440 V Load Centers
- 1P-52 High Pressure Coolant Injection System
- 1P-17 Instrument AC Power System
- 1P-30A Safeguard Air Supply System
- 1P-30C Auxiliary Equipment Exhaust
- 1P-55 Control Rod Hydraulic System

For each of the above preoperational tests the following specific items were reviewed:

- System turnover
- Preliminary test procedure furnished by Bechtel
- Preoperational test procedure drafted by the SSE
- Review cycle (TRB, QA, etc.)
- Approval cycle

For completed preoperational tests, three additional items were reviewed:

- Test reports
- Test exceptions
- Test report review and approval

At the time of this inspection, the systems were in various stages of the preoperational test program. The SSEs were conducting the following activities for numerous systems simultaneously: (a) Inspection of systems and identification of exceptions that required correction prior to turnover, (b) development and resolution of preoperational test procedures, and (c) conduct of preoperational tests.

The Start-up personnel were working 12 hours per day consecutively, and had done so for the past several weeks. This workload may have generated a difference in opinion between an SSE and a group supervisor that contributed partially to the allegation discussed in paragraph 3.

During a review of Preoperational Test 1P - 55.1 for the Control Rod Drive Hydraulic System, the inspector noted that the pressure gages used during the test were not identified in Section 5, "Test Equipment," of the preoperational test procedure. This concern was identified to the responsible SSE and his supervisor, who agreed to include the information in the preoperational test procedure. This item will be followed in future NRC inspections.

The licensee had not established checklists and acceptance criteria for system walkdown and inspection during System Turnover. This was determined to be the major contributor to the allegation regarding inadequate walkdowns and inspections referenced in section 3.

The failure to establish checklists and acceptance criteria is contrary to the requirements of 10 CFR Part 50 Appendix B Criterion V. This is a violation (352/84-12-01).

The licensee's representatives stated that the required checklists and acceptance criteria will be established by March 30, 1984.

### 3. Follow-up on a System Start-up Engineer's Allegation

On March 5, 1984, a System Start-up Engineer (SSE) filed an allegation with the NRC regarding inadequate walkdown inspections and supervisory pressure. Immediately after filing the allegation with the NRC, the alleged discussed his concerns with licensee management. The following is a summary of the allegation:

1. The Auxiliary Equipment and Control Room Heating, Ventilation and Air Conditioning (HVAC) System (System 30C) was turned over and accepted by the PECC start-up group without adequate walkdown and inspection. ①
2. Due to inadequate inspection and walkdown there were numerous deficiencies in system 30C.
3. The alleged's supervisor was upset by his NCRs because it affected the scheduled system completion.
4. The nature of identified NCRs are minor discrepancies to important nonconformances (already identified) such as inoperable dampers, wrong location of flow switches, and motor and fan malfunctions.
5. The supervisor has been harassing him and putting pressure on him to overlook these problems and/or correct them outside the nonconformance reporting program.
6. He believes that such pressure on S/U engineers are a threat to safety in the system and should be curbed.

In order to determine the impact of the allegation on safety-related activities, the NRC inspector conducted the following:

- Independent reviews of preoperational test activities performed by four randomly selected start-up work groups.
- Reviews of specific preoperational test activities with six responsible start-up engineers.
- Discussions with four start-up group leaders to determine their supervisory duties regarding preoperational test activities.
- Independent system walkdown by the inspector of an accepted turn over system.
- Discussions with the alleged.
- Discussions with licensee management.

The NRC inspector's findings for each respective statement of the allegation follow:

1. System 30C was turned over and accepted by the PECO start-up group. The alleged did not walkdown certain portions of the system. In addition, the alleged failed to conduct walkdowns inside the duct work.
2. Subsequent to the above allegation, the licensee performed repeat detailed system walkdowns for System 30C and several other systems with the alleged and Quality Control (QC) personnel. The repeat walkdown for System 30C identified several inadequacies and nonconformances. QC Surveillance Report No. 136, dated March 11, 1984, documented these.
3. The alleged's supervisor stated that he was concerned and to a certain extent upset; because the alleged did not assess the impact of the NCRs on the scheduled system completion. The SSE did not initiate, as required, Start-up Work Requests (SWRs) to resolve the concerns of the NCRs. This oversight on the alleged's part caused his supervisor to commit to an unrealistic schedule completion for System 30C. There was no objective evidence of any start-up group supervisor deliberately discouraging the SSEs from writing NCRs. When an NCR was written, it was never invalidated without full concurrence from the SSE and QC personnel.
4. A review of the NCR attached to QC Surveillance Report No. 136 indicated that NCRs written on System 30C ranged from minor discrepancies to important nonconformances. The repeat walkdowns identified new concerns that were not known to the alleged at the time of the allegation. One of the new concerns identified was inadequate electrical grounding for a vane-axial ventilation fan for System 30A.
5. The inspector found no objective evidence to support the alleged's statement that his supervisor was harassing him and putting pressure on him to overlook problems and/or correct them outside the nonconformance reporting System. The alleged informed the inspector that he had not documented any instances of supervisory harassment or pressure to overlook problems. His allegation was based on his interpretation of the supervisor's oral instructions and the supervisor's reactions during their discussions of the NCRs.
6. Other SSEs, start-up group supervisors, and the start-up group management acknowledged the existence of schedule pressure. However, the NRC inspector noted the schedule pressures for the start-up group was "normal" for such activities. In addition, the alleged informed the NRC inspector that the licensee's repeat walkdowns identified his concerns and other discrepancies adequately.

The inspector met with Start-up management on March 14, 1984, to discuss his findings from the allegation review. The licensee acknowledged the inspector's findings and stated that the allegation stemmed from a lack of positive measures to control work pressures; handle differences of opinion; establish guidelines for walkdown and nonconformance writing; and, afford privacy during a supervisor's discussions with the employee on job performance. The licensee initiated the following measures to avoid recurrence of similar instances.

- Established formal channels for resolving differences of opinion between an employee and his supervisor.
- Issued training bulletins to provide additional guidance to the SSE for NCR writing.
- Instructed supervisors to hold discussions regarding job performance with an employee in private.
- Limited the average work week of an SSE to 60 hrs/week, and required the SSE's not to work more than 12 consecutive days without a break.

Licensee management was particularly concerned about the alleged's statement regarding inadequate walkdown and inspection. The licensee stated:

Procedure AD 6.1 (Revision 4) requires the start-up engineer to be responsible for "the identification of exceptions required to be complete prior to acceptance of turnover."

The Start-up Director felt that the alleged's statement reflected a lack of understanding of the requirements. On March 15, 1984, the licensee invalidated the alleged's Level II certification and established measures to retrain and qualify the alleged.

After formal notification of his decertification, the alleged filed a second allegation on March 20, 1984. The alleged complained that disciplinary action taken against him for not adhering to the Start-up Administrative Procedures for system turnover was not fair in that:

1. He felt licensee management had singled him out for this action although other start-up engineers conducted business in a manner similar to his. He felt that the disciplinary action may have been taken as a result of his contact with the NRC on March 5, 1984.
2. He indicated that some of the problems identified by licensee management in System 30A during the reinspection had been previously identified by him during his pret turnover walkdown, but the Bechtel construction engineer, who accompanied him on the walkdown, did not update the system punch list.



3. He indicated that construction punch lists were being continually updated/revised and those punch lists were being placed into turnover packages in an uncontrolled manner. He stated that System 30A had been accepted by start-up and a revised punch list was placed into the package by Bechtel personnel after turnover with no formal notification made to the licensee regarding the altering of the package.
4. Finally, he believed that most vane-axial ventilation fans in the plant may have inadequate electrical grounds.

The NRC inspector's findings for each respective statement of the allegation follow:

1. The basis for the alleged decertification was his lack of understanding of the procedure requirements. As described in paragraph 2.3.5, the NRC inspector also identified a lack of acceptance criteria and checklist for system walkdown and inspection. This resulted in his performance of an inadequate walkdown inspection. This lack of understanding was also found to exist among other start-up engineers. The licensee did not remove their certification. In addition one reason for the alleged decertification was his statement in the first allegation regarding his inadequate walkdown and inspection.
2. The Bechtel Construction punch list program was not controlled to assure that the exceptions identified by an SSE were entered on the punch list. The SSE was not required to submit the exceptions formally to the punch list coordinator, nor was he required to follow up punch list entries. This lack of formality and control created a potential for omissions. However, the alleged did not provide any objective evidence of his identification of System 30A problems during the preturnover walkdown.
3. Punch list items were deleted only after the punch list coordinator received formal documentation supporting the closure of the items. After receipt of the allegation, the NRC Senior Resident Inspector reviewed the punch lists for System 30A and several other randomly selected systems and did not identify any punch list revisions that were added after turnover.
4. The inspector noted that the licensee had installed several vane-axial ventilation fans at the facility. Some of these fans were electrically grounded in a manner similar to those in System 30A. During the licensee's reinspection (following the first allegation) the vane-axial ventilation fan in System 30A was found to be improperly grounded.

The inspector discussed the results of his allegation review with licensee management and requested immediate management attention to this matter. The inspector also identified his concerns about the impact of the SSE's lack of understanding of procedure requirements and the lack of acceptance

criteria and checklists for system walkdown and inspection on the systems that were already turned over. At the exit meeting on March 23, 1984, the licensee provided the following information:

- The licensee identified three other SSE's with a similar lack of understanding of their responsibilities. However, the impact of the lack of understanding for these individuals was not considered as significant as the alieger's. Consequently, these individuals were not decertified. Licensee management decided to retrain and requalify all SSE's, using the lesson plan and written examination prepared to retrain and requalify the alieger. SSE's who fail the written examination will then be decertified. This SSE retraining effort will be completed by April 6, 1984. During the training sessions, the station superintendent will meet with each group to stress PECO management's commitment to safety and quality assurance in preoperational test activities. Checklists and acceptance criteria will be developed to assist the SSE's in system walkdowns and final inspection by March 30, 1984.

The Bechtel construction punch list program will be revised to establish measures to assure that the exceptions identified by SSE's are entered accurately into the punch list by March 30, 1984.

A program will be developed by April 10, 1984 to assess the impact of the SSE's lack of understanding of procedures on previously turned over systems.

All installed vane-axial ventilation fans are being reinspected to detect and correct inadequate electrical grounding concerns identified for such fans during previous walkdowns. This effort will be completed by April 30, 1984.

The above actions including the retraining and requalification program for SSE's, will be reviewed in a future NRC inspection.

#### 4. Management Meeting

The inspector and his supervisor met with licensee personnel identified in paragraph 1 on March 20 and March 23, 1984, to discuss the findings of this inspection. The licensee provided a status of the actions that were being taken to address the concerns of the allegations described in paragraph 3. The inspector also informed the licensee that the findings of this inspection will be presented to NRC management and regulatory actions stemming from this inspection will be communicated to the licensee separately. At no time during this inspection was written material provided to the licensee.