UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
Philadelphia Electric Company	)	Docket Nos. 50-352
	)	50-353
(Limerick Generating Station, Units 1 and 2)	)	
	)	

APPLICANT'S TESTIMONY RELATING
TO ONSITE EMERGENCY PLAN CONTENTIONS

Panel - Vincent S. Boyer, Warner T. Ullrich, Graham M. Leitch, Roberta A. Kankus, Richard W. Dubiel, George F. Daebeler, Gary W. Murphy, Gary J. Reid, and Dr. Roger E. Linneman.

Contention VIII-1

1. Section 4.2 of the Limerick Emergency Plan[1/] provides representative examples of the kinds of accidents which are analyzed in Chapter 15 of the Limerick FSAR. In addition to the design basis accidents encompassed by the FSAR, Table 4-2 includes events which are greater in radiological consequences than design basis accidents. For

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1/ Unless otherwise specified by reference to the Limerick Final Safety Analysis Report ("FSAR"), the Environmental Report - Operating License Stage ("EROL"), or other licensing document, all references herein are to the Limerick Emergency Plan. Implementing procedures for the Limerick Emergency Plan are contained in EP-101 et seq.

example, the events described in Table 4-2, Items IIId and IVd exceed design basis. Additional examples have been added to Table 4-2 to reflect the other example initiating conditions for the "General Emergency" level designation in Appendix 1, "Emergency Action Level Guidelines for Nuclear Power Plants," NUREG-0654 (Rev. 1) (November 1980). These additional examples include the specific example boiling water reactor ("BWR") sequences listed therein. The specific changes in the Emergency Plan which will be made are set forth in the revised Table 4-2, which will be made a part of the Emergency Plan upon formal submission. Dose calculations in Table 4-1 pertain solely to design basis accidents. The procedures for calculating dose consequences for accidents exceeding design basis are set forth in Section 6.2 as discussed in response to Contention VIII-14, infra and are the same no matter what the severity of the accident. [V. Boyer, R. Kankus]

Contention VIII-2(a)

2. The entire spectrum of accidents described in Chapter 15 of the FSAR is contained in FSAR Table 15.0-3. Other accidents described in Chapter 15 are either sub-variations of the accidents listed in Table 15.0-3 or lack any significant radiological consequence. Section 4.2 of the Emergency Plan, in particular, Table 4-2, lists each of the accidents described in Table 15.0-3. The 11 accidents described in Section 4.2 therefore encompass all of

the accidents described in the FSAR with significant radiological consequences. [V. Boyer, R. Kankus]

Contention VIII-2(b)(1)

3. This portion of Contention VIII-2 deals with example initiating condition 12 of the "Unusual Event" emergency action level of Appendix 1, NUREG-0654. Table 4-2 of the Emergency Plan, as revised, provides for example initiating condition 12 to reflect a security threat, attempted entry or attempted sabotage. See Table 4-2, Item XVa. Such threats will be handled in accordance with the Limerick Security Plan. [V. Boyer, R. Kankus]

Contention VIII-2(b)(2)

4. This portion of Contention VIII-2 relates to example initiating conditions for the "Alert" emergency action level of Appendix 1, NUREG-0654. Example initiating condition 10 (loss of functions needed for plant cold shutdown) is reflected in EP-101 at page 18. Specifically, this postulated condition assumes:

> 1. Complete loss of any function needed for plant Cold Shutdown and main condenser unavailable
>
> a) Loss of RHRSW or
>
> b) Loss of shutdown cooling.

This postulated condition is also reflected in Table 4.2, Item XIVa of the Emergency Plan. [V. Boyer, R. Kankus]

5. Example initiating condition 16 (ongoing security compromise) is reflected in Table 4-2, Item XVb. [V. Boyer, R. Kankus]

6. Example initiating condition 17b (flood, low water, tsunami, hurricane surge, seiche near design levels) is inapplicable to Limerick. See FSAR Sections 2.4.2, 2.4.3, 2.4.4, 2.4.5, 2.4.6, 2.4.7, 2.4.8. [V. Boyer, R. Kankus]

7. Example initiating condition 18a (aircraft crash), 18b (missile impacts), 18c (known explosion damage) is reflected in Table 4-2, Item Xb, which states the following event general description:

> When both units are in cold shutdown: Aircraft or other missile impact on plant. Explosion affecting plant operation. Toxic, flammable gases or chlorine detected in control room.

[V. Boyer, R. Kankus]

8. Example initiating condition 18e (turbine failure) is addressed under example initiating condition 18b for missile impacts as reflected in Table 4-2, Item Xb. Further, an exhaustive analysis of turbine failure is reflected in FSAR Section 3.5.1.3, which indicates that the probability of unacceptable damage to safety-related components due to turbine missiles has been calculated as 4.11×10^{-10} per unit per year for the two turbine trains. The reference to missiles in Table 4-2, Item Xb, includes consideration of all impacts resulting from the spectrum of missiles analyzed in Section 3.5 of the FSAR. [V. Boyer, R. Kankus]

9. Example initiating condition 17c (tornado striking facility) is reflected in EP-101 at page 7, which states:

> Tornado strikes the Reactor Enclosure, Turbine Enclosure, Spray Pond Pump

> House, Control Enclosure or Diesel Generator Enclosure.

[V. Boyer, R. Kankus]

10. Example initiating condition 17d (hurricane winds near design basis level) is reflected in EP-101 at page 7, which states:

> Sustained high winds greater than 70 mph as indicated on OBC699 [control panel indicator for wind speed].

This postulated condition is also reflected in Table 4-2, Item XIIe. As indicated by comparing this entry with that discussed below on example initiating condition 15c under the "Site Emergency" level, it is clear that the Emergency Plan distinguishes between different wind speeds for the "Alert" and "Site Emergency" levels. [V. Boyer, R. Kankus]

Contention VIII-2(b)(3)

11. This portion of Contention VIII-2 relates to example initiating conditions under the "Site Emergency" emergency action level. Example initiating condition 8 (loss of functions for hot shutdown) is reflected in EP-101 at page 18, which states:

> 1. Complete loss of any function needed to maintain the plant in Hot Shutdown if Hot Shutdown condition is required
>
> a) HPCI and RCIC not available or
>
> b) All Reactor vessel relief valves inoperable or
>
> c) loss of Suppression Pool cooling.

This postulated condition is also reflected in Table 4-2, Item XIVb. [V. Boyer, R. Kankus]

12. Example initiating condition 9 (ATWS event) is reflected in EP-101 at page 15 as follows:

> 1. Transient requiring standby liquid control system to initiate with failure to scram.

This postulated condition is also reflected in Table 4-2, Item IIb. [V. Boyer, R. Kankus]

13. Example initiating condition 14 (imminent loss of physical control of the plant) is reflected in Table 4-2, Item XVc. [V. Boyer, R. Kankus]

14. Example initiating condition 15b (severe natural phenomena and plant not in cold shutdown) is inapplicable to Limerick for the reasons discussed above in response to example initiating condition 17b of the "Alert" emergency action level. [V. Boyer, R. Kankus]

15. Example initiating condition 15c (sustained winds or tornadoes in excess of design limits) is reflected in EP-101 at page 7, which states:

> 1. Sustained high winds greater than 90 mph is indicated on OBC-699 if either unit is not in Cold Shutdown.

These two entries therefore distinguish between wind speeds for the "Alert" and "Site Emergency" classifications inasmuch as 90 mph is the design basis wind speed for the Limerick facility and 70 mph is approximately the translational wind speed for a tornado. This postulated

condition is also reflected in Table 4-2, Item VIIf. [V. Boyer, R. Kankus]

Contention VIII-2(b)(4)

16. This portion of Contention VIII-2 relates to example initiating conditions for the "General Emergency" emergency action level. Example initiating condition 2 (loss of two of three fission product barriers) is reflected in Table 4-2, Item IVd, which states for a situation involving substantial fuel degradation:

> Containment Post LOCA Radiation Monitors greater than 1×10^5 R/hr.

Such condition could result only from clad failure accompanied by failure of the reactor coolant pressure boundary within primary containment. Therefore, this condition reflects the loss of two of three fission product barriers. [V. Boyer, R. Kankus, R. Dubiel, G. Murphy]

17. Example initiating condition 3 (loss of physical control of facility) is reflected in Table 4-2, Item XVd. [V. Boyer, R. Kankus]

18. Example initiating conditions 4a and 4b (possible release of large amounts of radioactivity in short period of time), example initiating condition 6 (BWR sequences) and example initiating condition 7 (major internal or external events causing massive common damage to plant systems) are reflected in Table 4-2, Items IIc, Vh and Vi, and XIVc. [V. Boyer, R. Kankus, R. Dubiel, G. Murphy]

Contention VIII-3

19. The Emergency Plan identifies the established onsite monitoring systems used to initiate emergency measures in accordance with the emergency action levels designated by NUREG-0654, Appendix 1. Geophysical phenomena monitors are addressed in Section 7.3.1 of the Emergency Plan, which specifically states that seismic instrumentation includes time-history accelerographs, peak recording accelerographs and seismic switches as discussed in FSAR Section 3.7.4. Specific instrumentation used in emergency action level declaration is provided in Appendix EP-101-2. Section 7.3 of the Emergency Plan provides information as to the acquisition of meteorological data. This is further described in response to Contention VIII-14(g). Hydrological instrumentation is not required as discussed in response to Contention VIII-2(b)(2). [V. Boyer, R. Kankus, G. Daebeler]

20. Radiological monitors are discussed in response to Contentions VIII-14(d), VIII-14(i), and VIII-15(a) and are addressed in the various Appendices to EP-101. For example, Appendix EP-101-6 refers to radioactive releases of the North Stack and South Stack, which would be indicated by the Radiological and Meteorological Monitoring System. Appendix EP-101-8 reflects monitors which would indicate fuel damage. [V. Boyer, R. Kankus, R. Dubiel, G. Daebeler]

21. Process monitors (radiological) are discussed in FSAR Section 11.5. Process and effluent radiological

monitoring systems are summarized in Table 7-3 of the Emergency Plan. Area and airborne radiologically monitoring are discussed in FSAR Section 12.3.4. Area and airborne radiological monitoring systems are also described in Table 7-4. [[V. Boyer, R. Kankus, R. Dubiel, G. Daebeler, G. Murphy]

22. Process monitors (non-radiological) are described in FSAR Sections 1.13 (describing the Emergency Response Facility Data System) and 7.5.2.5.1.1.2 (describing Applicant's compliance with Regulatory Guide 1.97). Process monitors are addressed in the various Appendices to EP-101. For example, Appendix EP-101-11 refers to reactor level less than -129 inches. [V. Boyer, R. Kankus, G. Leitch]

23. As stated in Section 7.3 of the Emergency Plan, fire protection systems are described in FSAR Section 9.5.1. Fire protection systems are also described in Chapter 2 of the Fire Protection Emergency Evaluation Report. Declarations as a result of fire are addressed in Appendix EP-101-5.

Contention VIII-5

24. As stated in Section 6.4.1.2.C. of the Emergency Plan, the Interim Emergency Director, Emergency Director or Site Emergency Coordinator will make protective action recommendations to the Bureau of Radiation Protection ("BRP") utilizing guidelines provided by BRP. Protective action recommendations will be based upon those measures which provide the greatest dose savings to the general public at the time as possible. The procedures contained in

Appendix EP-317-2 are the BRP guidelines for protective action options. In conjunction with evacuation time estimates (Appendix EP-317-3) and whole body shielding factors (Appendix EP-317-4), these guidelines are utilized in decision-making flow chart procedures for protective action recommendations for good and adverse weather conditions (Appendices EP-317-6 and EP-317-7). [V. Boyer, R. Kankus, W. Ullrich, G. Leitch]

Contention VIII-6(a)

25. The only organizations with responsibility for onsite augmentation of the function performed by Applicant under its Emergency Plan are the Linfield Fire Company and Limerick Fire Company, as discussed in response to Contention VIII-11. Letters of agreement with each of these organizations have been obtained, which state that each fire company will provide all requested support for the Limerick Generating Station and that each company agrees to respond whenever called. [V. Boyer, R. Kankus]

26. Inasmuch as the agreements with the Linfield and Limerick Fire Departments provide that they will respond to a request for assistance at Limerick based upon Applicant's determination that such support is necessary, mutually agreeable bases exist for notification of these response organizations. [V. Boyer, R. Kankus]

Contention VIII-6(b)

27. The initial notification format for each emergency level classification provided in NUREG-0654, Appendix 1, is

contained in the Emergency Plan, Appendix F and in procedures EP-102 to EP-105 inclusive. The basic approach for notifying offsite support organizations, including the emergency management agencies for the Risk Counties, is contained in Section 3.3.3 of the Emergency Plan. As provided therein and in EP-102 through EP-104, initial notification of an unusual event, alert or site emergency is given to the NRC Operations Center in Bethesda, Maryland, the Pennsylvania Emergency Management Agency ("PEMA"), the Pennsylvania Bureau of Radiation Protection ("BRP"), and the Montgomery County Emergency Management Agency. For a general emergency, initial notification is also given to the Berks County Emergency Management and the Chester County Department of Emergency Services, as reflected in EP-105 at page 12. When an emergency classification is changed, previously notified agencies are informed of the change by Applicant or PEMA. [V. Boyer, R. Kankus, G. Leitch]

28. Applicant's responsibilities for follow-up messages of offsite organizations is governed by the Commonwealth of Pennsylvania Disaster Operations Plan, Annex E, Fixed Nuclear Facility Incidents. Annex E, Appendix 7 provides at page E-7-F-1 that follow-up messages to State and local organizations will be made exclusively by BRP. Under Annex E, subsequent communications from Applicant are made directly to BRP and federal support agencies only. [V. Boyer, R. Kankus]

29. Section 6.2 of the Emergency Plan describes the information which will be provided to BRP in follow-up messages. As revised, this information includes:

1. Location of incident and date/time of occurrence.

2. Identification of personnel at communication points.

3. Emergency class.

4. Actual or potential radioactive release type (airborne, waterborne, surface spill) and duration.

5. Estimate of quantity of radioactive material released or being released and the points and heights of releases.

6. Chemical and physical form of released material, including estimates of the relative quantities and concentration of noble gases, iodines and particulates;

7. Meteorological conditions at appropriate levels (wind speed, direction, indication of stability, precipitation, if any);

8. Actual or projected dose rates and integrated dose rates at the Site Area Boundary and at other distances from the plant.

9. Projections of integrated doses for affected sectors and distances (2, 5 and 10 miles).

10. Estimates of surface radioactive contamination.

11. Status of emergency response actions.

12. Recommended emergency actions, including evaluation of protective action options.

13. Requests for assistance.

14. Prognosis for worsening or termination of the event based upon plant information.

[V. Boyer, R. Kankus, G. Leitch]

30. Because Annex E and the Limerick Emergency Plan provide that follow-up communications with State and local response organizations will be made by BRP, there is no need for the Emergency Plan to have specific message formats for such follow-up communications in the event of an emergency. Moreover, because of the direct linkage in communications between the Limerick Technical Support Center and Emergency Operations Facility and BRP, there is no need for any specific message format for follow-up communications between Limerick and BRP. [V. Boyer, R. Kankus]

31. As indicated in Section 7.2.6 of the Emergency Plan, the dedicated telephone switch provides rapid and reliable communications between Limerick and BRP as well as other emergency response organizations in the event of an emergency. Specifically, as shown on Figure 7-2 of the Emergency Plan, two circuits run directly to BRP. Thus, since an open line exists to BRP, there is no need for specific follow-up message formats. [V. Boyer, R. Kankus]

Contention VIII-6(c)

32. The actions applicable to each emergency action level and the response organizations involved are discussed in Section 3.3 of the Emergency Plan. Section 6.1 governs emergency organization activation. It states that the

response organizations designated in Section 3.3 would be notified as appropriate upon declaration of each particular emergency action level. Specifically, Section 6.1.1 states that emergency organization activation for unusual events is initiated as follows:

> "Notification shall be within about 15 minutes from the time at which the operators recognize events have occurred which make declaration of an emergency class appropriate."

Sections 6.1.2, 6.1.3 and 6.1.4 address emergency organization activation for an alert, site emergency and general emergency, respectively, and state the 15 minute notification requirement of Section 6.1.2 as applicable to those situations. [V. Boyer, R. Kankus]

Contention VIII-7(a)

33. Details regarding the line of succession for the Site Emergency Coordinator are provided in Section 5.2.1.3 of the Emergency Plan. Under these provisions, the Site Emergency Coordinator is the Superintendent - Nuclear Generation Division. The primary alternate is the Superintendent - Nuclear Services, and the secondary alternate is the Station Superintendent - Peach Bottom Atomic Power Station. Accordingly, there are two alternates for the position of Site Emergency Coordinator. [V. Boyer, R. Kankus, W. Ullrich]

34. When activated upon declaration of a site or general emergency, the Site Emergency Coordinator normally goes to the Emergency Operations Facility ("EOF"). At that

time, as Section 5.2.1.3 states, the Site Emergency Coordinator assumes overall control of the emergency organization from the Emergency Director or Interim Emergency Director. Specifically, upon determining the readiness of the staff to assume responsibilities assigned to the EOF and obtaining information on the status of emergency conditions from the Technical Support Center ("TSC"), the Site Emergency Coordinator informs the TSC that the EOF is assuming responsibility for control of the integrated emergency response. Thus, Section 5.2.1.3 identifies the specific conditions for higher level utility officials assuming control of the integrated emergency response. [V. Boyer, R. Kankus, W. Ullrich]

35. The Site Emergency Coordinator is a high level official within Applicant's organization. Under normal conditions, he reports directly to the Manager - Nuclear Production. A schematic explanation of the relationship of other emergency response personnel to the Site Emergency Coordinator is given in Figure 5.4 of the Emergency Plan. [V. Boyer, R. Kankus, W. Ullrich]

36. The responsibilities of the Interim Emergency Director and Emergency Director are described in Sections 5.2.1.1. and 5.2.1.2, respectively, of the Emergency Plan. As stated therein, the Emergency Director is the Station Superintendent. The alternate is the Assistant Station Superintendent. The Interim Emergency Director is the Shift Superintendent. The Alternate Interim Emergency Director is

the Shift Supervisor. Section 5.2.1.1. further states that the Interim and Alternate Interim Emergency Director positions are filled 24 hours per day on rotating shifts. Thus, either the Emergency Director, Interim Emergency Director, or their respective alternates, will be available at all times. Accordingly, there is no need to establish any further line of succession for these positions. [V. Boyer, R. Kankus, G. Leitch]

37. As further indicated in Section 5.2.1.2, certain responsibilities of the Emergency Director are not delegated to other segments of the emergency organizations. The remaining items, however, may be carried out by other emergency personnel under the direction of the Emergency Director. Even if the Emergency Director were not immediately available, Section 5.2.1.1 authorizes the Interim Emergency Director to perform the major functions necessary for incident assessment, notification, providing recommendations for protective actions to offsite officials, initiating protective measures on site and, in general, implementing the provisions of the Limerick Emergency Plan and applicable plant procedures. Accordingly, full provision has been made in the Emergency Plan for carrying out these functions until overall responsibility has been assumed by the Site Emergency Coordinator under Section 5.2.1.3. [V. Boyer, R. Kankus, G. Leitch]

Contention VIII-7(c)(3)

38. Applicant's compliance with the minimum staffing requirements stated in NUREG-0654, Table B-1, is reflected in Table I-1 of the Emergency Plan. Table I-1 states the major functional area and major task of necessary personnel with a description of position, title or expertise, and compares this information with the requirements under NUREG-0654 for minimum shift personnel and augmenting personnel to be added within 30 and 60 minutes, respectively. As indicated by Table I-1, the Applicant's plans for augmenting onsite personnel fully meet the requirements of NUREG-0654. Personnel augmentation is also covered in the various "phone list" and team activation procedures. [V. Boyer, R. Kankus, G. Leitch]

Contention VIII-8(b)

39. Emergency Plan descriptions of the Emergency Operations Facility ("EOF"), Technical Support Center ("TSC"), and Operations Support Center ("OSC"), including emergency equipment and supplies, are contained in Sections 7.1.2, 7.1.3 and 7.1.4 of the Emergency Plan. These sections describe the physical layout, equipment, documents and supplies necessary for the efficient and reliable operation of these facilities. Further information has been provided in response to NRC Question 810.30. When fully functional, these facilities will meet the requirements of of NUREG-0737, Supp. 1. The only additional information contemplated for submittal is a floor plan which will

indicate positioning of particular personnel in these facilities. [V. Boyer, R. Kankus]

Contention VIII-10(a)

40. As reflected in Appendix A of the Emergency Plan, letters of agreement have been executed by the Linfield Fire Company and Limerick Fire Company, by which they have agreed to provide any equipment or manpower that will be needed now or in the future at Limerick in the event of a fire. Under the procedures applicable to Montgomery County, fire department equipment and personnel are dispatched by the County at the request of the Limerick Generating Station. [V. Boyer, R. Kankus, R. Linneman]

41. In the event that either fire department were summoned to the Limerick site, the fire truck would be met at the gate by security personnel, who would provide dosimetry and escort the truck to the appropriate location on site. Once onsite, the fire department would be under the direction and control of Applicant's fire fighting team leader. The Shift Supervisor will assume the role of Firefighting Group Leader, and direct firefighting efforts to control fire and other related incidents. Accordingly, Applicant's onsite personnel will retain responsibility for the direction and control of responding fire companies in the event of a fire at Limerick. An escort will accompany fire department personnel at all times while onsite. [V. Boyer, R. Kankus, R. Linneman]

42. Responsibilities of the Hospital of the University of Pennsylvania ("HUP") and the Pottstown Memorial Medical Center ("Pottstown Memorial") with regard to the treatment of contaminated, injured patients transported from the Limerick site are discussed in the letters of agreement contained in Appendix A of the Emergency Plan. [V. Boyer, R. Kankus, R. Linneman]

43. Under the agreement between Applicant and Pottstown Memorial, Pottstown Memorial will provide the primary medical care in the event that treatment of contaminated, injured victim(s) is necessary. It is anticipated that Pottstown Memorial will be able to handle a number of such cases utilizing its routinely available facilities and resources. In the event that larger numbers of contaminated, injured victims must be treated, Pottstown Memorial will initiate its disaster plan for expanding such capabilities as it would in the event of any non-radiological emergency. In initiating these procedures, Pottstown Memorial will utilize a radiation plan developed by Radiation Management Corporation ("RMC") for hospitals generally, which will be adapted to the specific facilities and staffing for Pottstown Memorial. Essentially, Emergency Room staff will institute triage principles based upon injury. Less seriously injured/contaminated patients will be held in ambulances. Seriously injured/contaminated patients will be processed through the Radiation Emergency Area ("REA") sequentially according to necessity for life-saving

measures. The REA can be expanded accordingly. [V. Boyer, R. Kankus, R. Linneman]

44. If, for any reason, treatment of a contaminated, injured victim requires a medical specialty not immediately available at Pottstown Memorial, the patient would be stabilized and transported to HUP, which has greater capabilities for particular medical specialties as well as clinical capability and experience to evaluate and treat severe exposure cases. Arrangements for transportation to the HUP will be coordinated through Pottstown Memorial. Such transportation to be in the best interests of the patient (ambulance, private vehicle or helicopter). [V. Boyer, R. Kankus, R. Linneman]

45. HUP has entered a general agreement with Radiation Management Corporation ("RMC") for the treatment of such patients on behalf of particular facilities with which RMC has separate agreements, e.g., Susquehanna Steam Electric Station, Salem Nuclear Generating Station and Calvert Cliffs Nuclear Power Plant. By agreement between RMC and Applicant, Limerick is included among the facilities so designated. Under this agreement, HUP will provide treatment in addition to Pottstown Memorial as necessary for contaminated, injured victims from the Limerick site. In this regard, HUP will also be utilized in the event that Pottstown Memorial were unavailable because of a general evacuation of the plume exposure pathway EPZ. [V. Boyer, R. Kankus, R. Linneman]

46. Ambulances which provide transportation services to offsite medical facilities are governed by the same access control procedures described above with respect to fire companies. As regards helicopter transporting services, the helicopter would be directed to land outside the restricted area of the plant, to which location the patient would be transported. When possible, given the immediacy of the need for medical treatment, patients released for transportation to offsite medical facilities will undergo decontamination in accordance with standard health physics procedures. A letter of agreement between Applicant and Goodwill Ambulance Unit is contained in Appendix A, which provides for arrangements for Goodwill to respond to a call for assistance to Limerick and provide necessary transportation services to hospitals as needed. Each of the five ambulances available from Goodwill has a capacity for transporting two patients. A letter of agreement is also being obtained to provide a back-up capability. [V. Boyer, R. Kankus, R. Linneman]

47. In the event that additional resources were necessary, more than two patients could be transported by an ambulance. If sufficient ambulance service were nonetheless unavailable for any reason, transportation to Pottstown Memorial or HUP will be made by the Keystone Helicopter Service. Such transportation would be coordinated through RMC under the terms of the letter of agreement. [V. Boyer, R. Kankus]

48. Private vehicles onsite would provide a separate, alternative capability for transporting contaminated, injured victims even if there were a shortage of other transportation. For less severe injuries (e.g., broken arm), such patients need not be transported by ambulance and could be easily conveyed by automobile. In addition to the personal decontamination for the victim discussed above, the transporting vehicle would be protected against contamination by some appropriate means of covering, such as plastic liners or anti-contamination clothing. [V. Boyer, R. Kankus, R. Linneman]

49. Agreements with local physicians have been reached as reflected in Appendix A to supply onsite medical assistance. Under these agreements, each physician assumes the responsibility for medical supervision of the patient(s) until arrival at a medical facility such as Pottstown Memorial or until such time that the physician's services are no longer required. The physicians under these agreements would be bound by the same access control provisions discussed above. [V. Boyer, R. Kankus, R. Linneman]

50. The Limerick Emergency Plan states the responsibilities of the Pennsylvania State Police with respect to access control during any potential radiological emergency at the site. See Section 5.3.3.3 of the Emergency Plan and FSAR §2.1.2.3. [V. Boyer, R. Kankus, G. Leitch]

Contention VIII-10(b)

51. Section 2.2.4 of the Emergency Plan lists the Radiation Medicine Center of HUP as a local agency which has agreed to provide support services in response to requests for assistance at the Limerick Generating Station. The delineation of these services in providing treatment of contaminated, injured victims is discussed more fully in Section 5.3.2.1 of the Emergency Plan. In the context of discussing possible protective actions, which may include medical treatment, Section 6.5.4 also refers to available medical facilities. Specifically, reference is made to RMC, which, as noted in the discussion above, has an agreement with the HUP for medical treatment of a number of nuclear facilities, including Limerick, in the event of a radiological emergency. [V. Boyer, R. Kankus, R. Linneman]

Contention VIII-11

52. Pursuant to NRC Staff Branch Technical Position CMEB-9.5.1, Applicant has fully analyzed both active and passive measures necessary for fire protection. This analysis considered fire detection capability, automatic and manual suppression capability, physical separation of potentially affected components, effects of structural barriers on limitation of fire damage, and the necessary administrative controls and personnel requirements, including training, for fire prevention and manual fire suppression activities. The results of this analysis are contained in Applicant's Fire Protection Evaluation Report,

which demonstrates that Applicant's onsite fire detection and suppression capabilities, in concert with safety system and structural configuration, are adequate to handle any credible fire at Limerick and will limit fire damage to structures, systems, or components important to safety so that the capability to safely shut down the plant is ensured. [V. Boyer, G. Reid]

53. As indicated in Sections 2.2.4 and 5.3.2.3, the Linfield Fire Company will provide firefighting assistance to Limerick upon request. Additionally, an agreement has been obtained from the Limerick Fire Company, by which it agrees to provide firefighting services upon request. The commitment to provide such assistance is reflected in letters of agreement. [V. Boyer, R. Kankus]

54. Last year, the Linfield Fire Company responded to 86 calls. Only once was it already dispatched when another call was received. Based on this operational experience, it was determined that the back-up provided by the Limerick Fire Company is sufficient. Although Applicant has determined that its onsite fire protection equipment and systems are adequate, it is noted that Linfield and Limerick Fire Company equipment has been certified as adequate by the National Fire Protection Association. [V. Boyer, G. Leitch, G. Reid]

Contention VIII-12(a)

55. Planning for Limerick with regard to the provision of medical services and facilities to provide treatment for

contaminated, injured persons has been undertaken in light of the guidance provided in Southern California Edison Company (San Onofre Nuclear Generating Station, Units 2 and 3), CLI-83-10, 17 NRC 528 (1983). Further, Applicant has the benefit of the experience secured by its consultant/contractor RMC, which has obtained such service for a number of other facilities identified in response to Contention 10(a). As noted in response to Contention VIII-10(b), RMC has obtained a general agreement from the Hospital of the University of Pennsylvania ("HUP") to provide treatment for contaminated, injured persons for those facilities, including Limerick. [V. Boyer, R. Kankus, R. Linneman]

56. The Radiation Plan developed by RMC for HUP will be modified to relate to the physical character and staffing of the Pottstown Memorial Medical Center so as to enable Pottstown Memorial to handle in the range of up to 25 contaminated, injured individuals. This will involve normal triage decisionmaking and the expansion of hospital facilities to accommodate contaminated injured victims as need be. Plans provide for the possibility that Pottstown Memorial may be evacuated as part of a general evacuation of the plume exposure pathway EPZ, as discussed with respect to Contention VIII-10(a). [V. Boyer, R. Kankus, R. Linneman]

Contention VIII-12(b)

57. The availability of sufficient ambulance service has been discussed previously in response to Contention

VIII-10(a). When possible, the patient will be decontaminated to the extent possible prior to transportation offsite to a medical facility, consistent with the need for prompt medical attention. As discussed in Section 6.5.3 of the Emergency Plan, shielding for ambulance attendants and/or the helicopter pilot during transportation of contaminated patients will be supplied. Essentially, plastic liners and anti-contamination clothing will be utilized. Decontamination of ambulance attendants would be accomplished at the accepting medical facility by normal washing and removal of clothing. If necessary, such personnel could be transported back to the Limerick site for decontamination in accordance with the generally applicable health physics procedures as discussed in response to Contention 15(d). A health physics technician will accompany the patient in the ambulance to monitor contamination levels and to assist medical personnel at the hospital as further described in EP-252. [V. Boyer, R. Kankus, R. Linneman, R. Dubiel]

58. Adequate radiological protection is provided by anti-contamination clothing worn by ambulance attendants as well as plastic wrapping which is used to cover the patient and surfaces of the ambulance. [V. Boyer, R. Kankus, R. Linneman, R. Dubiel]

Contention VIII-13(a)

59. The provisions for participating governmental agencies providing onsite support in an emergency response at Limerick are contained in Section 5.3.3 of the Emergency

Plan. Specifically, Section 5.3.3.4 indicates that the Office of Inspection and Enforcement, Region I, Nuclear Regulatory Commission, will dispatch personnel to the EOF and TSC in the event of an emergency and will lend support in areas of observation and accident evaluation. The necessary resources to support this response are contained in the specific provisions describing the EOF and TSC, which are discussed in response to Contention VIII-8(b) above. Additionally, as indicated in Figure 7-2 of the Emergency Plan, the NRC will install a direct telephone line between the TSC and EOF and Region I. [V. Boyer, R. Kankus]

60. Upon notification at an appropriate emergency action level, the Department of Energy ("DOE"), under its Radiological Assistance Program ("RAP"), will dispatch a RAP Team to augment offsite radiation teams and to advise and assist as necessary to minimize the public radiation exposure. Technical advice and environmental monitoring provided by the RAP Team will support the efforts of the Pennsylvania BRP, which has the primary responsibility in these areas as discussed in Annex E, pages E-18 to E-19. The specific responsibilities of BRP, as outlined in Annex E, are also referenced in Section 5.3.3.2 of the Emergency Plan. When the BRP field survey team becomes activated, the Applicant assumes a support function. Support provided by PEMA for federal emergency response personnel is described in Annex E, Appendix 24. No further federal support response is anticipated. [V. Boyer, R. Kankus, W. Ullrich]

Contention VIII-14(a)

61. Plant system and effluent parameter values characteristic of a spectrum of off-normal conditions have been provided in the specific onsite procedures under EP-101 for declaration of emergency action levels. As such, EP-101 relates the four emergency action levels to particular categories of events with plant system or effluent parameter values, i.e., environmental (page 7), radioactive release (page 11), fuel damage (page 13), boundary degradation/LOCA (page 16), unusual shutdown (page 17). These various categories therefore provide specific plant system and effluent parameter values characteristic of a spectrum of off-normal conditions. Additionally, once adopted, the Technical Specifications for the Limerick facility will provide the basis for other values. [V. Boyer, R. Kankus]

Contention VIII-14(c)

62. The methodology for calculation of offsite doses is explained in the discussion of assessment actions in Section 6.2 and summarized in response to NRC Question 810.41. Essentially, this calculation is accomplished by means of a computerized dose model or, alternatively, a manual dose calculation method. Section 6.2.1 describes the computerized Radiation and Meteorological Monitoring System ("RMMS"), which assesses offsite radiological impacts. The RMMS is a computer based, data acquisition and analysis system which provides the capabilities for making near real-time, site specific estimates of atmospheric transport and diffusion as well as offsite doses during and following

an accidental airborne radioactive release. [V. Boyer, R. Kankus, G. Daebeler, G. Murphy]

63. Although RMMS uses as inputs both actual meteorological data and plant effluent data, the inputs may be entered manually in the event that the data is unavailable. The system is designed such that, even in these circumstances, the operators respond to a selection of user-friendly and uncomplicated prompts in order to generate the required information. It is anticipated that the computerized release and dose calculational methodology of RMMS will be available by the time of the first annual exercise. In the unlikely event of a total failure of RMMS, a manual procedure has been provided which is also capable of determining off-site doses in the event of an emergency. The procedure for using the manual backup methodology is provided in EP-316. As discussed in the responses to NRC Questions 810.5(b) and 810.37, offsite monitoring data are shared between the Bureau of Radiation Protection and the Emergency Operations Facility. [V. Boyer, R. Kankus, G. Daebeler, G. Murphy]

64. The procedure for placement and recovery of offsite thermoluminescent dosimeters ("TLD's") is being prepared on the basis of Emergency Procedure Corporate, EP-C-315, which will be implemented by the Environmental Sampling Coordinator. [V. Boyer, R. Kankus, Daebeler]

65. Offsite dosimetry analysis will be accomplished through data provided by approximately 48 predesignated

sites for TLD's as listed in part in Table 7-5. The operation of this program is described more fully in EROL Section 6.1.5. When an offsite release has occurred, the Health Physics and Chemistry Coordinator or alternate(s) directs sample collectors to appropriate TLD stations where each emergency TLD badge is picked up and replaced with another badge. Each TLD badge is returned to a laboratory for processing. This information is transmitted to the EOF or appropriate licensee personnel at other locations. The process of picking up and replacing TLD badges is repeated as necessary depending upon the nature and duration of the release. In addition to dosimetry analysis, other environmental samples can be analyzed. The Emergency Plan requires sampling airborne particulates, airborne radioiodine, surface water, drinking water, and milk, as indicated in Table 7-5, which will be implemented by EP-C-315. This sampling program is also described in EROL Section 6.1.5. [V. Boyer, R. Kankus, G. Daebeler]

Contention VIII-14(d)

66. The Limerick facility has the capability of monitoring airborne and effluent radiological releases with potential for offsite consequences. Onsite and offsite monitoring equipment and systems are discussed in Section 7.3 of the Emergency Plan. All such systems and equipment meet the requirements of NUREG-0737 and Regulatory Guide 1.97. Specifically, three fixed onsite capabilities exist which provide indications displayed in the Control Room and

provide input to the RMMS. First, the North Stack Ventilation Exhaust Radiation Monitoring System, as discussed more fully in FSAR Section 11.5.2.2.1, will measure noble gas activity and provide samples of iodine and particulate effluents. Second, the Meteorological Measurement System, as discussed more fully in FSAR Section 2.3.3.2., consists of two main towers (Tower No. 1 primary, Tower No. 2 secondary) containing instrumentation providing wind speed and direction, temperature and atmosphere stability measurements. This system is used to predict overall meteorological conditions around the site. Third, the Containment High-Range Monitors, as described more fully in FSAR Sections 7.5.1.4.2.1.5, 7.6.1.1.6, and 11.5.2.3.1, measure gross radiation levels in the drywell, which are used as an indication of fuel failure. [V. Boyer, R. Kankus, G. Daebeler, G. Murphy]

67. In addition to these fixed onsite capabilities, portable area survey instrumentation is also available for onsite use. Instrumentation specifically dedicated for emergency use is described in ST-7-EPP-351-0, Rev. 0. This instrumentation includes air samplers, count rate meters, ion chambers, GM survey instruments, and radioiodine monitors. [V. Boyer, R. Kankus, R. Dubiel, G. Murphy]

68. Offsite monitoring capability also exists. As described in response to subpart (c) above, TLD's are used as fixed offsite monitoring instruments. Additionally, the same types of portable instrumentation used onsite is also

used offsite for plume tracking and measuring to confirm calculated dose rates. The real-time data provided by such instrumentation verify dose rates calculated by the RMMS. [V. Boyer, R. Kankus, G. Dubiel]

Contention VIII-14(e)

69. The onsite radiological monitoring systems, equipment and instruments which would be utilized to provide initial values and continuing assessment throughout the course of an accident, including their specific uses and capabilities, are described in response to subpart (d) above. In addition, a more detailed description of the Radiation and Meteorological Monitoring System is given in Section 6.2.1 of the Emergency Plan, as discussed in response to subpart (c) above. [V. Boyer, R. Kankus, G. Daebeler, G. Murphy]

70. The specific plant personnel who would be available to utilize these data for a continuing assessment throughout the course of an accident are described in Section 5 of the Emergency Plan. Groups of personnel with specific responsibility for evaluating radiological data include a number of teams. The Radiation Protection Team, as described in Section 5.2.2.2.1, includes the Field Survey Group, which conducts offsite field surveys, and the Plant Survey Group, which performs onsite and inplant surveys. The Chemistry Sampling and Analysis Team, as described in Section 5.2.2.2.4, is responsible for obtaining and analyzing normal and post-accident samples and for assessing the results.

Finally, the Dose Assessment Team, as described in Section 5.2.2.2.8, calculates off-site exposure data from available radiological monitoring, meteorological, and radiation survey data. [V. Boyer, R. Kankus, R. Dubiel]

71. Based upon the information provided him by these various groups, the Emergency Director or Interim Emergency Director performs assessment actions and monitors the effects of the emergency as directed by Section 5.2.1.1.f. The Site Emergency Coordinator obtains this information from the TSC, maintains an awareness of plant status and offsite consequences of emergency, and serves as the primary contact for federal and Commonwealth radiological emergency response agencies in maintaining a continuing assessment throughout the course of an accident as directed by Sections 5.2.1.3.b, c and f. [V. Boyer, R. Kankus, G. Leitch, W. Ullrich]

Contention VIII-14(f)

72. State of the art methods and techniques exist for determining the source term of releases of radioactive material within plant systems and the magnitude of releases based on plant system parameters and effluent monitors. "Source term" in this context means the radioactive material available for release from primary containment. As stated in response to NRC Question 810.40, Appendix B of the Emergency Plan and EP-325 provide a simple mechanism for correlating the Containment High-Radiation Monitor readings (R/hr) to the percent of fuel inventory released to the containment atmosphere as a function of time after plant

shutdown. Emergency Procedure Corporate EP-C-326 provides a refinement of this correlation based on analyses of containment atmosphere and reactor water samples. These samples can be obtained either by way of process sampling points or the Post-Accident Sampling System as described in response to Question 810.40, and Sections 6.2.3.1 and 6.2.3.2 of the Emergency Plan. A further description of these systems is given in FSAR Sections 11.5.4 and 11.5.5. [V. Boyer, R. Kankus, G. Murphy]

Contention VIII-14(g)

73. The capability of acquiring and evaluating meteorological information sufficient to meet the criteria of NUREG-0654, Appendix 2, is provided by assessing meteorological data from two meteorological towers on the site. The Limerick meteorological system has been designed in depth to provide information even if a key input parameter is unavailable. RMMS will automatically switch to a secondary or even a tertiary sensor if a primary sensor fails. Meteorological data are available from two independently powered towers. Data are available through RMMS through a data logger in the Control Room and also through strip charts in the Control Room. In the unlikely event that all these sources of information fail, data are also retrievable from instrument shacks at the base of each tower. [V. Boyer, R. Kankus, G. Daebeler, G. Murphy]

74. The meteorological data include 15 minute averages of wind speed and direction, sigma theta, and vertical

temperature difference measurements for atmospheric stability determination, as described more fully in Section 6.2.1 of the Emergency Plan. As this section also states, RMMS data files and calculational capabilities are available to personnel in the Control Room, TSC, and EOF through interactive consoles located in these facilities. Communication ports are also provided to allow for remote interrogation of meteorological parameters and effluent transport and diffusion results by the NRC and the appropriate Commonwealth emergency response agency. [V. Boyer, R. Kankus, G. Daebeler, G. Murphy]

Contention VIII-14(h)

75. The methodology for determining the release rate and projected doses if instrumentation used for assessment is offscale or inoperable is described in Section 6.2.3 of the Emergency Plan, as explained in response to subpart (f) above. Essentially, samples will be obtained from the effluent monitor sampling lines located at the point of release from the North Stack. Actual data obtained from these points will be fed into the RMMS system. Even if the RMMS system were inoperable, a complete manual backup procedure is available to calculate releases and offsite doses. Following analysis of these samples, the information will be used in conjunction with the X/Q tables provided in EP-316 and the Regulatory Guide 1.109 dose conversion factors provided in EP-316 to calculate releases and offsite doses. [V. Boyer, R. Kankus, G. Daebeler, G. Murphy]

Contention VIII-14(i)

76. The specific kinds of monitoring instruments to be used for field monitoring within the plume exposure pathway EPZ were previously described in response to subpart (d) above. The Limerick Health Physics Department is using state-of-the-art portable survey equipment. Ion chambers used will include the Eberline RO2 survey meter. This instrument will cover ranges from 0-5 R/hr. Geiger-Mueller instruments will include the Eberline E-520 survey meter. The range covered by this equipment is from 0-2 R/h. [V. Boyer, R. Kankus, R. Dubiel, G. Murphy]

77. The manner in which field surveys will be conducted is described in Section 6.2.4 of the Emergency Plan. Section 5.2.2.2.1.a describes the function of the Field Survey Group in performing offsite surveys and collecting environmental samples. As explained in Section 6.2.4, the Bureau of Radiation Protection, the United States Department of Energy, and other governmental agencies provide additional field survey capabilities. [V. Boyer, R. Kankus, R. Dubiel, G. Murphy]

Contention VIII-14(k)

78. Means exist for relating the various measured parameters to dose rates for key isotopes and gross radioactivity measurements. These methods are summarized in the response to NRC Question 810.48. As explained in the description of the RMMS in Section 6.2.1, calculation of dose rates and integrated doses is made by converting the

gross radioactivity release rate to an isotopic release rate by obtaining an isotopic breakdown of a release point sample and entering the data into the RMMS. The isotopic release rates are then used with the X/Q's and Regulatory Guide 1.109 dose conversion factors to calculate plume center line whole body, skin and thyroid dose rates. [V. Boyer, R. Kankus, G. Daebeler, G. Murphy]

79. Because samples are not immediately available during the first few minutes of an emergency to provide isotopic breakdowns, the RMMS allows the operator to choose from among (a) the most recent sample data from the chemical laboratory; (b) manually entered isotopic data from the Operator's Console on the basis of conservative assumptions; (c) a pre-programmed menu of isotopic spectra based on nine of the most radiologically significant accidents taken from Chapter 15 of the FSAR. [V. Boyer, R. Kankus, R. Dubiel, G. Murphy]

80. Projected dose rates obtained from RMMS calculations, as described in response to subpart (c) above, are multiplied by projected duration of exposure to obtain projected integrated doses. The projected integrated doses are compared with the protective action guides ("PAG's") in order to decide the appropriate recommended protective action. The procedures for comparing projected integrated doses to PAG's are contained in EP-317. This function is performed by the Dose Assessment Team as explained in Section 5.2.2.2.8. On this basis, the Dose Assessment Team

provides the Emergency Director and the Site Emergency Coordinator with the recommended protective action for transmittal to the Bureau of Radiation Protection. Protective action decision-making, as explained in the responses to NRC Questions 810.5 and 810.6, ultimately rests with offsite governmental authorities. [V. Boyer, R. Kankus, R. Dubiel, G. Murphy]

81. Additionally, as discussed in response to Contention VIII-14(c), fixed TLD's give a direct reading of integrated dose when processed. During an accident, these readings will provide a means for verifying the projected doses obtained from RMMS. [V. Boyer, R. Kankus, R. Dubiel, G. Murphy]

Contention VIII-15(a)

82. As described in Section 6.4.1.1.c of the Emergency Plan, evacuation of the protected area will commence upon notification by sounding of the Exclusion Area Evacuation Alarm, followed by an announcement over the plant public address system. Evacuees will use their personal vehicles in evacuating to designated assembly areas offsite. Experience with the current work force at the Peach Bottom facility has shown that there are more than enough personal vehicles for evacuation of onsite personnel should this be necessary. For example, if non-essential personnel have carpooled with essential personnel not leaving the site, there will be no problem in their obtaining transportation from other persons leaving the site. Also, dedicated plant

vehicles can be used to transport any stragglers. [V. Boyer, R. Kankus, G. Leitch]

83. Because plant access roads are maintained clear during the winter months, travel on these roads will be passable at all times, regardless of weather conditions. As indicated in EP-254, the designated reassembly areas are the Cromby Station and Limerick Airport. Numerous routes to these sites exist in the event that any particular route were impassable because of inclement weather. Given the short distances involved (2½ miles to Limerick Airport and 6 miles to Cromby Station), it is not anticipated that high traffic density will pose any problem to the reassembly of these personnel at these sites. [V. Boyer, R. Kankus, G. Leitch]

84. In the event of a general evacuation of the public, plant personnel at the reassembly areas would be evacuated as members of the general public from the plume exposure pathway EPZ. As discussed in response to NRC Question 810.5, information exchange will occur between utility and State representatives at the EOF. This exchange allows coordination of the onsite and offsite evacuation. As with its recommendations for protective actions for the offsite populace, specific radiological conditions which would warrant evacuation of onsite personnel as opposed to other protective actions are considered under EP-102 to 105. [V. Boyer, R. Kankus, G. Leitch]

85. As discussed above in response to Contentions VIII-14(d) and (i), certain portable area survey instrumentation, i.e., ion chambers, Geiger-Mueller detectors, and air samplers, are available for onsite monitoring to assist in such decision-making for onsite personnel. Thus, in addition to providing the capability to assess radiological hazards within the plant for controlling access to perform the necessary activities for damage mitigation, this instrumentation is used to conduct surveys on the plant site for determining the extent of radiological hazards outside the plant, but within the site boundary, to decide upon the appropriate protective action. It is also used for determining the procedures for reentry to those parts of the plant which have been evacuated. [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-15(b)

86. Adequate provisions exist for radiological monitoring of evacuees from the site. Under the provisions of EP-254, health physics personnel would pick up portable survey instruments suitable for detecting individual contamination and report to the various exit points. Portal monitors will also be used at the normal exits from the controlled area. If portal monitors are inoperable or a portal monitor alarm is activated by particular personnel, health physics personnel will use friskers or portable survey instruments to check such personnel for contamination. [V. Boyer, R. Kankus, R. Dubiel]

87. Whole body counts of personnel are unnecessary during emergencies unless suspected ingestion has occurred. If ingestion has occurred, whole body counting can be done later at an appropriate facility. Whole body counts are a normal part of plant health physics operations. [V. Boyer, R. Kankus, R. Dubiel]

88. Persons requiring access to the Radiologically Controlled Area are provided with dosimetry in accordance with 10 C.F.R. §20.202. Those personnel who are not required to wear dosimetry (e.g., administration workers) will have their work areas monitored by TLD's. In addition, TLD's will be placed at appropriate areas within the site to assist in monitoring evacuation routes. Adequate monitoring, therefore, is provided for all plant personnel. As stated in Section 6.4.1.1.e, dosimetric devices of evacuees will be recovered and processed as soon as practicable. There is no immediate need for processing dosimetry of evacuees because they are removed from the site prior to exposure and their dosimetry can be processed in a normal time frame. In areas in which neutron exposure is suspected, health physics personnel in the area will utilize a neutron monitor to determine neutron dose rate, as stated in Section 6.4.1.1.e. Basically, neutron exposure is determined by multipling neutron dose rate by stay time. If there are any visitors or construction workers in the area, they may be monitored by means of the different site TLD

stations referenced in Table 7-5 of the Emergency Plan, located around the plant. [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-15(c)

89. The Emergency Plan adequately distinguishes between "essential" and "non-essential personnel" in Section 6.4.1.1.c, which states:

> PECO personnel and contractors filling emergency response organization positions are considered essential personnel. As such, they will report to their emergency response locations. They will not evacuate unless specifically directed to by the (Interim) Emergency Director. All other personnel are considered are considered non-essential.

Thus, personnel will know by prior designation and training whether they are deemed essential personnel for emergency purposes. [V. Boyer, R. Kankus]

Contention VIII-15(d)

90. Monitoring points for site evacuees are contained in EP-254, as discussed in response to subpart (b) above. As stated therein, any contaminated personnel will be assembled for decontamination at the TSC or Radwaste Enclosure in accordance with standard health physics practices. The basic procedures and facilities for decontamination are described in Section 6.5.2. Basically, this simply involves the removal of any contaminated clothing and showering. Routine decontamination procedures will be utilized, including mild soap and water or mild chemicals (e.g., potassium permanganate). In the event that normal decontamination techniques cannot reduce the contamination below pre-defined

action levels, qualified medical assistance in the decontamination effort will be obtained through outside organizations (e.g., Radiation Management Corporation). If necessary, replacement clothing will be issued. [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-15(e)

91. Accountability for all individuals onsite at the time of an emergency is covered by Section 6.4.1.1.d, which states that the Personnel Safety Team and Security forces shall perform this function. As stated in EP-110 at page 3, the Security Team must inform the Emergency Director of the accountability status of onsite personnel within 30 minutes after the assembly announcement is made. [V. Boyer, R. Kankus, G. Leitch, R. Dubiel]

Contention VIII-15(f)

92. Adequate provision has been made for the use of onsite protective equipment and supplies for emergency personnel remaining onsite during an emergency. Specifically, Section 6.4.2.1 provides for individual respiratory protection. There is no need to have individual respiratory protection for radiological purposes for certain persons, e.g., those in habitable areas such as the Control Room and the TSC, although respiratory equipment is provided for personnel in the Control Room in the event of a fire or offsite accident involving release of toxic chemicals. [V. Boyer, R. Kankus, R. Dubiel]

93. Section 6.4.2.2 provides for the issuance of protective clothing. If necessary, anti-contamination clothing will be issued to all workers entering affected areas. This clothing is issued to emergency teams and other personnel required to enter known or suspected areas of radioactive contamination and to personnel required to work in or occupy contaminated areas. [V. Boyer, R. Kankus, R. Dubiel]

94. The distribution and use of potassium iodide (KI) for emergency workers is covered in Section 6.4.2.3 and further explained in response to NRC Question 810.53. As stated in EP-313, distribution of KI will be based upon expected or actual thyroid dose as calculated by the methodology provided in this procedure. Thus, distribution will be limited to specific emergency workers judged in need of treatment, which includes protection from an anticipated thyroid dose greater than pre-established levels. For example, there will be no need to provide KI to emergency workers in the Control Room or TSC inasmuch as these are habitable areas. [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-16(a)

95. As discussed in response to Contention VIII-15(f) above, the procedure for administration of KI is contained in EP-313. Under these provisions, the "treatment" of emergency workers includes the issuance of KI as a preventive action. Accordingly, KI will be distributed to specific emergency workers judged to be in need of treatment based

upon their location in areas of known or suspected radioiodine contamination. [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-16(b)

96. Sufficient procedures exist for permitting onsite volunteers to receive radiation exposures in the course of carrying out lifesaving and other emergency activities. Table 6-1 of the Emergency Plan contains emergency occupational exposure criteria applicable to all emergency personnel which may not be exceeded without express authorization from the Emergency Director. These limits, which incorporate the requirements of 10 C.F.R. §§20.101 and 20.102 and the "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents" (EPA 520/1-75-001) are also reproduced in the implementing procedures for the various emergency teams which will perform onsite emergency functions, i.e., EP-220 (Radiation Protection Team) and EP-250 (Personnel Safety Team). Such procedures contain an appendix which identifies each function for which authorization is required by the Emergency Director if a projected whole body dose or thyroid dose specified for that particular function is in excess of 10 C.F.R. Part 20 limits. [V. Boyer, R. Kankus, R. Dubiel]

97. It is up to each emergency worker to decide for himself, based upon his prior training, skills and knowledge as well as an explanation at the time of the risk involved, whether he will volunteer for the activity indicated. Additionally, projected doses provided at the time of an

emergency by health physics personnel will give the volunteer the specific data necessary for an informed decision. [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-16(c)

98. As stated in response to subpart (b) above, plant implementing procedures require specific authorization by the Emergency Director for a volunteer to receive projected whole body doses or thyroid doses in excess of designated limits. As further stated in Section 6.5.1, these guidelines and knowledge of radiation effects allow onsite emergency response personnel to make informed decisions as to volunteering for the wide range of emergency actions (such as accident assessment and first aid) which might be initiated. Emergency workers, like all site personnel, will have had basic training in the biological effects of ionizing radiation. In addition to their emergency training for specific tasks, this will provide them with sufficient knowledge concerning radiation risks in order to make an informed decision. [V. Boyer, R. Kankus, G. Leitch, R. Dubiel]

Contention VIII-16(d)

99. Personnel monitoring required by 10 C.F.R. §20.202 is provided by the issuance of personnel dosimetry such as thermoluminescent dosimeters ("TLD's"), direct reading pocket dosimeters, or calculations from area survey data and exposure times. Exact procedures and equipment for personnel monitoring is described more fully in FSAR Section

12.5.2.2.4. Accordingly, all personnel entering the Radiologically Controlled Area of the Limerick facility will be issued such dosimetry. [V. Boyer, R. Kankus, R. Dubiel]

100. Capability on a 24-hour basis to determine doses received by emergency workers will be available under the procedures for reading TLD's. This service will be provided by individuals trained and qualified to operate the processing equipment, who will be onsite or available within an hour. Individual personnel will be trained under the General Employee Training Program described in FSAR Section 12.5.3.5.1, and thus will be able to read the self-reading pocket dosimetry. [V. Boyer, R. Kankus, R. Dubiel]

101. In the event of an actual radiological emergency, health physics technicians would take the pocket dosimeters from the exiting personnel, read the dosimeter, and record the dose indicated. Personnel whose dosimetry readings exceed prescribed levels would report to the dosimetry office in the Technical Support Center for immediate processing of their TLD's. Individuals exiting radiologically affected areas would not be permitted to re-enter those areas until it has been determined that their doses are below limits permissible under 10 C.F.R. Part 20. Self-reading pocket dosimeters will be issued to personnel required to enter radiologically affected areas. In addition, ring or clip-on dosimeters for various extremities which might be particularly subject to exposure will be used. Personnel exposure records are maintained pursuant to

"Practice for Occupational Radiation Exposure Record Systems," ANSI N13.6, as stated in FSAR Section 12.5.2.2.4. [V. Boyer, R. Kankus, R. Dubiel]

102. Personnel exiting radiologically affected areas are also monitored for contamination by the use of friskers as described in FSAR Section 12.5.3.4.2. If contamination is detected, the individual is sent to the decontamination facility in the Radwaste Enclosure or the Technical Support Center. [V. Boyer, R. Kankus, R. Dubiel]

103. As part of the screening process, a health physics technician would determine whether the contamination is in the area of the nose or mouth, or whether there is reason to believe that respiratory protection equipment may have failed. At that point, the individual would be directed to the whole body counting room in the TSC where bioassay is conducted as described in FSAR Section 12.5.2.2.6. [V. Boyer, R. Kankus, R. Dubiel]

104. A health physics technician will be stationed at each entry point into an affected area. Any emergency worker entering such area will be given a specific stay-time or dose level which may not be exceeded. This procedure is consistent with existing health physics practices utilized during normal operating circumstances. [V. Boyer, R. Kankus, R. Dubiel]

105. As stated in Section 5.2.2.2.1.b, the Personnel Dosimetry Group, which is a subpart of the site health physics organizations, performs these same functions for

personnel from offsite response organizations whose support may be required onsite. [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-16(e)

106. As discussed in Applicant's Response to NRC Question 810.57, decontamination will be initiated for personnel surveys showing 100 cpm or greater above background. As described in the response to Contention VIII-16(d), such individuals would be directed to the decontamination facility at either the Radwaste Enclosure or TSC. [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-16(f)

107. Contamination control is the responsibility of the Plant Survey Group, whose function is described in Section 5.2.2.2.1.c of the Emergency Plan. The group will control contamination during emergencies by establishing access control to radiological areas affected during the emergency. Access control is implemented by identifying the area affected by the emergency condition and establishing access control points to the area. All other entry points to the affected area will be secured (locks or guards posted). The function of the access control point will be to ensure that individuals entering the area are properly protected and monitored (protective clothing, respirators, TLD's, etc.), and to evaluate personnel upon egress (need for decontamination, bioassay, etc.). Personnel contamination will thereby be contained within the bounds established by the Plant Survey Group. [V. Boyer, R. Kankus, R. Dubiel]

108. During any emergency in which the potential for contamination of the drinking water supply or food supplies exists, the Emergency Director will direct the securing of the water system and food supplies. Methods for securing water and food supplies include announcements over the plant paging system, shutting down domestic water system (pumps, valves, etc.), and placement of signs on vending machines, etc. [V. Boyer, R. Kankus, R. Dubiel]

109. Return of areas, items and systems (including onsite drinking water) will be made only after monitoring, sampling and analysis by the Plant Survey Group has determined the contamination to be below the allowable levels defined in normal health physics procedures (FSAR Section 12.5.3) or in 10 C.F.R. Part 20. Return of areas and systems would normally occur during the Recovery Phase of the Emergency Response. [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-16(g)

110. During an emergency, personnel will be monitored for contamination upon exiting the affected area (at the access control point) or upon exiting the Radiologically Controlled Area of the plant. Personnel requiring decontamination will be directed to the decontamination facility in the Radwaste Enclosure or the TSC. Personnel from the health physics staff will be assigned to the decontamination station. Decontamination procedures are discussed in response to Contention VIII-15(d). [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-17(a)

111. The Applicant's plans for re-entry and recovery are contained in Section 9 of the Emergency Plan. Responsibilities for planning re-entry are contained in Section 9.1. As used in the Plan, the term "re-entry" means entering evacuated or partially evacuated areas that have become adversely affected by emergency radiological or non-radiological conditions for repair and operations during an emergency. Re-entry is a deliberate process involving no unnecessary radiation exposure to personnel and shall not interfere or interrupt personnel accountability or attention to injured or contaminated evacuees. Procedures for entry for emergency repair and operations are contained in Section 6.4.1.1.g, as amplified by EP-401. The short term objectives of re-entry would include, i.e., (a) termination of the accident; (b) mitigation or elimination of potential hazards to the public and station personnel; (c) restoration of the plant to a safe and stable condition; (d) de-escalation of the existing emergency action level. [V. Boyer, R. Kankus, R. Dubiel]

112. In conducting re-entry, normal health physics practices are observed. Specifically, re-entry is controlled by health physics practices which address the conditions found in the area by considering dose rates, equipment required by personnel for radiation protection (respirators, anti-contamination clothing, boots etc.) and estimated stay times. Personnel must read and sign the

radiation work permit before entering the area to complete work. Radiation work permits are further discussed in FSAR Section 12.5.3.2. Under EP-401, continuous coverage by a health physics technician may substitute for a radiation work permit. [V. Boyer, R. Kankus, R. Dubiel]

113. The general health physics procedures and practices applicable to plant operation, including emergency procedures, are described in FSAR Section 12.5.3. During re-entry, planned radiation exposures will be limited to the Emergency Exposure Guidelines under Appendix EP-401-1. [V. Boyer, R. Kankus, R. Dubiel]

114. Plans for recovery are contained in Section 9.2 of the Emergency Plan. The basic objectives at the time of plant recovery are to identify the extent of plant damage, prepare specific plans and programs for Station repair and restoration, and return the plant to a normal operating status. The basic criteria for determining the appropriateness of recovery include, e.g., whether radiation levels are stable or steadily decreasing, whether release of radioactive materials to the environment has ceased or is controlled within permissible license limits, and whether fire or similar emergency conditions no longer constitute a hazard to the plant or station personnel. Appendix B to EP-410 is a Recovery Acceptance Checklist for various plant parameters and systems which should be considered. The specific procedures for formulating a recovery plan and

implementing the recovery phase are contained in EP-410. [V. Boyer, R. Kankus, W. Ullrich]

115. Based upon an analysis of these plant conditions, the Emergency Director, the Site Emergency Coordinator, Emergency Support Officer, and the Senior Vice President - Nuclear Power will determine whether entry into the recovery phase is justified. The 12 major tasks to be accomplished with the recovery phase are outlined in EP-401. [V. Boyer, R. Kankus, W. Ullrich]

Contention VIII-17(b)

116. Pursuant to EP-101 through EP-105, the Emergency Director periodically evaluates the event classification in accordance with the governing emergency procedure and de-escalates the classification if appropriate. Relaxation of the onsite protective measure of evacuation is covered under the procedures for reentry and recovery discussed in response to Contention VIII-17(a). An area will be returned to normal use only when area, surface and airborne surveys indicate that an acceptable radiation and contamination level exists. Until then, health physics supervision will determine what protective actions, if any, must be taken by persons entering contaminated areas for justifiable reasons. Basic health physics practices and procedures to be utilized are described in FSAR Section 12.5.3. Contamination control measures for the plant site are generally described in Section 6.4.3.1 of the Emergency Plan. [V. Boyer, R. Kankus, W. Ullrich, R. Dubiel]

Contention VIII-17(c)

117. The methodology for calculating projected cumulative population dose is described in Section 6.2.1 of the Emergency Plan. The methodology for calculation of offsite doses in general was previously discussed in response to Contention VIII-14(c). As stated in Section 6.2.1, computer routines are available to compute population doses. In the event the RMMS were unavailable, cumulative population dose could be calculated manually pursuant to EP-316. Based upon Control Room information (i.e., release rates from the North Stack indicated as microcuries per cc or microcuries per second) and the meteorological information obtained from the Operational Meteorological Measurement System described in FSAR Section 2.3.3.2 and discussed in response to Contention VIII-14(g), the appropriate atmospheric dispersion coefficients (X/Qs) are obtained from the tables in EP-316. Based upon an estimate of the duration of the release, a gamma dose calculation can be made for specific sites downwind using calculational methodologies contained in EP-316. Gamma dose multiplied by population within a given sector would yield the cumulative population dose within that sector. In this manner, population dose can be calculated for sectors at one mile intervals from the plant up to mile 5 and an additional projection at 10 miles. Thyroid population dose is calculated in a similar manner for radioiodine. [V. Boyer, R. Kankus, R. Dubiel, G. Murphy]

Contention VIII-18

118. Emergency response training for offsite response organizations and support personnel is described in Section 8.1.1 of the Emergency Plan. Essentially, such training would be provided for fire companies, ambulance services, and local physicians. The specific initial training and periodic retraining provided for such personnel is described in Table 8-1 of the Emergency Plan, Items 6 and 7. Training sessions will be conducted by seminar with lesson plans appropriate to their specific task. [V. Boyer, R. Kankus]

119. Because supporting offsite fire, ambulance and medical personnel will be required to render services at Limerick in the event of emergency only when escorted by trained site personnel, it is unnecessary to provide the offsite organizations with the further orientation and General Employee Training provided to site personnel as described in FSAR Section 12.5.3.5. [V. Boyer, R. Kankus]

120. Additionally, training will be provided for support personnel who will be arriving onsite to respond to an emergency on an ad hoc basis. This training, which is provided pursuant to EP-307, would apply to personnel of other reactor licensees, vendors, utility organizations, and the like. It would be conducted on an expedited basis to permit such personnel to provide immediate onsite assistance. This procedure would not govern the training for firefighting, ambulance or medical personnel, or organizations with which the Applicant has a letter of agreement, which is separately described above. [V. Boyer, R. Kankus]

Contention VIII-19(b)

121. Review and revision of the Limerick Emergency Plan and procedures is governed by Section 8.2. Under these review procedures, the Emergency Plan is reviewed annually by a member of the Electric Production Department Staff who is not immediately responsible for emergency preparedness and is appointed by the Superintendent, Nuclear Generation Division. As such, the review is conducted by a person who is, within the language of NUREG-0654, Criterion T.9, "not immediately responsible for the emergency preparedness program." [V. Boyer, R. Kankus, W. Ullrich]

122. Under 8.2.1, the results of the review are documented in a letter from the reviewer to the Station Superintendant. The approval process for either minor or major changes to the Emergency Plan is described in Section 8.2.1. Upon approval of any changes by the Vice-President of the Electric Production Department, approved changes are incorporated into the Emergency Plan or appropriate implementing procedures. Under EP-500, the results of this review, including recommended changes to the Emergency Plan and procedures, will be furnished to the Nuclear Regulatory Commission, the Pennsylvania Emergency Management Agency, and the Risk Counties. The initial review and the related review documents in the approval process are permanently retained in the Applicant's nuclear records management system or in the corporate filing system. [V. Boyer, R. Kankus, W. Ullrich]

Contention VIII-20(d)

123. As stated in Section 8.1.2.6 of the Emergency Plan, a drill involving the Plant Survey Group and the Field Survey Group will be performed semi-annually. As indicated in Section 8.1.2.6.b, one of the activities of the drills is collection and analysis of environmental samples. Specific drill functions are described in ST-7-EPP-554. Specifically, simulated elevated airborne and liquid samples are analyzed, and simulated data are recorded and reported as real data would be in an actual emergency. Additionally, direct radiation measurements in the environment are taken by the Field Survey Group, which similarly records and reports the data. [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-20(e)

124. Under Applicant's program for radiological monitoring and health physics drills, adequate review of capabilities can be obtained by use of simulated elevated airborne and liquid samples and direct radiation measurements in the environment. Inter alia, ST-7-EPP-554 provides that the Post Accident Sampling System shall be included in these drills at least annually. It is the Applicant's position that the use of actual elevated radiation levels creates an unnecessary risk of exposure to excessive radiation levels and violates the "as low as reasonably achievable" exposure criterion of 10 C.F.R. 20.1(c). [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-20(g)

125. The conduct of drills and exercises is covered under Section 8.1.2 of the Emergency Plan. An exercise will be conducted annually to test the adequacy of the effectiveness, timing and content of implementing procedures and methods; to test emergency equipment and communication networks, including the Public Notification System; and to ensure that the emergency organization personnel are familiar with their duties and responsibilities. Drills will be performed on different schedules on the basis of varying needs. Radiation/medical drills will be performed annually, plus or minus three months, as described in Section 8.1.2.3. Fire drills will be performed quarterly as described in Section 8.1.2.4. Communication drills will be performed monthly, quarterly or annually, as necessary, as described in Section 8.1.2.5. Radiological monitoring/health physics drills will be performed semi-annually as described in Section 8.1.2.6. Pursuant to the authorization in NUREG-0654, Criterion N.2, stating that a "drill is often a component of an exercise," Section 8.1.2 states that an annual emergency exercise scenario may include a simulated radiation/medical casualty, thereby fulfilling the drill requirement coincidentally with the conduct of the exercise. The drills will be performed as required, whether performed independently or as a part of the annual exercise. [V. Boyer, R. Kankus, R. Dubiel]

Contention VIII-20(h)

126. The conduct of a joint federal, State, and local exercise with the frequency required by federal regulations under 10 C.F.R. Part 50 and 44 C.F.R. Part 350, utilizing a scenario appropriate for a site or general emergency, is governed by Section 8.1.2.1 of the Emergency Plan. As stated in this provision, such an exercise will include notification and activation of PEMA, the NRC, applicable County agencies, and local civil agencies and off-site emergency response organizations. Activation includes performance of functions appropriate to the scenario as would be performed in the event of an actual site or general emergency. [V. Boyer, R. Kankus]

REFERENCE LIST

1. NUREG-0654, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (November 1980).
2. NUREG-0737 (Supp. 1), "Clarification of TMI Action Plan Requirements" (November 1980).
3. Regulatory Guide 1.97, Rev. 2, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following and Accident."
4. Fire Protection Evaluation Report, Limerick Generating Station, Units 1 and 2.
5. EPA-520/1-75-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents."

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
Philadelphia Electric Company	)	Docket Nos. 50-352
	)	50-353
(Limerick Generating Station, Units 1 and 2)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "Applicant's Testimony Relating to Onsite Emergency Plan Contentions," dated April 2, 1984 in the captioned matter have been served upon the following by deposit in the United States mail this 2nd day of April, 1984:

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