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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
PHILADELPHIA ELECTRIC COMPANY)
(Limerick Generating Station,)
Units 1 and 2))

Docket Nos. 50-352
50-353

NRC STAFF'S FINDINGS OF FACT AND CONCLUSIONS
OF LAW IN THE FORM OF A PARTIAL INITIAL DECISION

The NRC staff, in accordance with 10 C.F.R. § 2.754 and this
Licensing Board's "Memorandum and Order Establishing Format of Proposed
Findings of Fact and Conclusions of Law" (December 9, 1983), hereby
submits its attached Proposed Findings of Fact and Conclusions of Law in
the form of a partial initial decision on Onsite Emergency Planning.

Respectfully submitted,

Benjamin H. Vogler

Benjamin H. Vogler
Counsel for NRC Staff

Nathene A. Wright

Nathene A. Wright
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 2nd day of July, 1984

DESIGNATED ORIGINAL
Certified By DSO7 SAB

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PARTIAL INITIAL DECISION

(On Onsite Emergency Planning, LEA Contention VIII)

OPINION

I. SCOPE OF DECISION

This Partial Initial Decision addresses contentions proposed by Limerick Ecology Action (LEA) for consideration by this Licensing Board in connection with Philadelphia Electric Company's application to operate the Limerick Generating Station, Units 1 and 2, located on the Schuylkill River, near Pottstown in Limerick Township, Montgomery County, Pennsylvania. LEA alleged that Philadelphia Electric Company (PECo) has not provided an adequate onsite emergency plan for the Limerick Generating Station (LGS). Specifically, LEA alleges in these contentions that the Applicant's onsite emergency plans for the LGS do not include adequate agreements with offsite agencies which provide emergency response support at either the federal or local level, that the plans do not provide for adequate radiobiological emergency response training of personnel who may be called onsite to assist in an emergency, that the onsite emergency

response facilities, equipment and supplies are inadequate and that the Applicant's onsite emergency plans do not provide for prompt notification of emergency organizations. LEA alleges that the Applicant's staffing provisions do not comply with minimum staffing requirements, that the emergency plans fail to demonstrate that adequate methods, systems and equipment for assessing and monitoring actual or potential offsite consequences of a radiobiological emergency condition will be in use, and that the plans do not provide for adequate personnel dosimetry, monitoring or decontamination. Finally, LEA alleges that the Applicant's onsite emergency plans for the LGS consider only design basis accidents and do not take more severe accidents into account as required by regulations and planning bases. LEA based these claims on the relevant requirements in 10 C.F.R. § 50.47 and criteria presented in relevant NUREGs.

II. BACKGROUND

On March 17, 1981, Philadelphia Electric Company filed an application with the Nuclear Regulatory Commission (NRC) to operate the Limerick Generating Station, Units 1 and 2. The application was docketed on July 27, 1981.^{1/} On September 21, 1981, LEA filed its Petition To Intervene in the LGS operating license proceedings. During a prehearing conference held January 6-8, 1982, this Board found that LEA had standing to intervene and provided LEA the opportunity to file proposed contentions regarding the adequacy of the Applicant's emergency plans. However, the Board decided to defer ruling on the emergency planning

^{1/} 46 Fed. Reg. 42,557.

contentions until the Applicant's emergency plans in response to the new requirements of 10 C.F.R. § 50.47 and Appendix E to Part 50 were available.^{2/} The Applicant served the Emergency Plan on the Licensing Board and parties in September 1983, and the Board requested LEA to resubmit its onsite emergency planning contentions. LEA filed those contentions on November 14, 1983. The Licensing Board ruled on the admissibility of those contentions at a prehearing conference held on October 17-18, 1983. During subsequent negotiations between the parties various portions of the admitted onsite emergency planning contentions were either settled or dropped. The remaining contentions subject to litigation in this proceeding were: Contention VIII-1; 3; 6(a) and (c); 7(c)(3); 8(b); 10(a); 11; 12(a) and (b); 13(a); 14(c), (d), (e), (f) and (h); 15(b), (d), (e) and (f); 16(c), (d) and (g) and 18. These contentions were litigated by subject matter, not in numerical sequence at an evidentiary hearing held April 23-25, 1984, in Philadelphia, Pennsylvania.

III. SUMMARY

The NRC staff and the Applicant presented testimony which established, with respect to the issues in controversy, that the onsite emergency plans for the LGS are adequate and in compliance with relevant regulations and relevant criteria. While some portions of the plans are not yet complete, the Board believes that there is an adequate basis in this record to conclude that subsequent evaluation and review by the Staff will demonstrate that those portions of the plan will be implemented in a manner that will meet all relevant requirements and criteria.

^{2/} See, Philadelphia Electric Company (Limerick Generating Station, Units 1 and 2), LBP-82-43A, 15 NRC 1423, 1439, 1519-1520 (1982).

Specifically, the Board examined the Applicant's provisions for medical services for contaminated, injured personnel, including agreements with hospitals and found them to be adequate. The Board also examined the Applicant's agreements with offsite agencies that will respond to onsite emergencies and found they are mutually agreeable and in compliance with relevant requirements. Evidence submitted also indicates that the Applicant will provide adequate training for onsite and offsite emergency response personnel concerning radiological exposure risks. Review of the onsite emergency plans revealed that the Applicant is capable of prompt notification to offsite authorities and has the ability to meet 30/60 minute staffing requirements. The Board also examined the portions of the emergency plan concerning onsite monitoring, personnel monitoring, including personnel dosimetry and decontamination, and found that the Applicant's onsite planning in those areas is adequate and in compliance with relevant regulations and criteria. Finally, the Board examined LEA's allegation that the Applicant's Emergency Plan does not encompass the total spectrum of accidents required and found it to be without merit.

The Staff's proposed findings are presented in detail below by subject matter as they were litigated at the hearing, rather than by numerical sequence. Based on expert testimony by the Staff's and Applicant's witnesses, the Board has concluded with respect to the issues in controversy that the Applicant's plans for onsite emergency preparedness are adequate and in compliance with all relevant regulations and criteria.

IV. FINDINGS OF FACT

Introduction

1. The NRC staff presented testimony of John R. Sears, a Senior Reactor Safety Engineer with the Emergency Preparedness Branch, Division of Emergency Preparedness and Engineering Response, Office of Inspection and Enforcement of the NRC. From 1976 to 1979, Mr. Sears was the sole reviewer responsible for review of emergency planning for all the operating reactors in the United States. Since 1979, when the NRC emergency planning staff was increased, Mr. Sears also assisted in training new Staff members and in developing more stringent emergency preparedness criteria. See, Testimony and Professional Qualification of John R. Sears, ff. Tr. 9776.

2. The Applicant presented testimony by a panel of witnesses consisting of Vincent S. Boyer, a mechanical engineer and Senior Vice President-Nuclear Power, PECO; Roger E. Linnemann, M.D., the Vice Chairman of Radiation Management Corporation (RMC), President of RMC Medical Services, and an Associate Professor of Clinical Radiology; Gary Reid, an engineer in the Mechanical Engineering Division and Group Leader in the Buildings Facilities Branch of the Industrial Engineering Section, PECO, who is responsible for the design of the fire protection systems at Limerick; Gary W. Murphy, the Technical Support Health Physicist in the Health Physics Department, PECO, who supervises a group of physicists responsible for the Personnel Dosimetry and Bioassay, ALARA, Radwaste Shipping, Respiratory Protection and Special Projects programs at Limerick; George F. Daebeler, Supervising Engineer in charge of the Environmental Branch of the Nuclear and Environmental Section of the Mechanical

Engineering Division of the Engineering and Research Department, PECO, who supervises engineers and other professional personnel responsible for environmental monitoring and radioactive effluent monitoring systems at the LGS; Roberta A. Kankus, the Director of the Emergency Preparedness Section, Nuclear Services, PECO, who supervises a staff of analysts and physicists responsible for development and implementation of programs related to emergency preparedness for nuclear facilities; Richard W. Dubiel, Senior Health Physicist, PECO and Werner T. Ullrich, the Superintendent of the Nuclear Generation Division, who has the overall responsibility for the safe operation and support of the nuclear generating facilities for PECO. See, Testimony and Professional Qualifications of Vincent S. Boyer, et al., ff. Tr. 9772.

3. LEA did not present testimony by witnesses, but cross-examined the Staff's and Applicant's witnesses concerning the onsite emergency planning contentions. The Board will now examine the record and make our findings on the contention by subject grouping rather than addressing each contention in numerical sequence.

Medical Services for Contaminated, Injured Personnel Onsite

As litigated, Contention VIII-12 states:

The onsite plans fail to demonstrate that adequate arrangements have been made, for medical services for contaminated injured individuals onsite, as required by 10 C.F.R. § 50.47(b)(2) and (12):

(a) While medical services and facilities are described in sections 5.3.2.1 - 5.3.2.5 of the Plan, it has not been demonstrated that these services and facilities are adequate for the potential number of persons contaminated by the spectrum of credible accident scenarios for which planning is required, including some core melt

sequences (see NUREG-0396). The plans contain an agreement with Pottstown Memorial Hospital, a facility only two miles from the site, to provide emergency treatment to contaminated patients. In a general emergency, the hospital will be required to evacuate its own patients, which will preclude acceptance and treatment of radiation victims coming from the site. The status of medical support from the Hospital of University of Pennsylvania is unclear as well (see Contention VIII-9(b), above). These are the only two hospitals listed in the Plan as available for medical services to onsite contaminated victims. See NUREG-0654, Criteria B.9 and L.1.

(b) The Plan does not demonstrate that the Applicant has arranged adequate transportation of contaminated, injured persons to medical support facilities, as required by NUREG-0654, Criteria B.9 and L.4. The Applicant's provisions as described in § 6.5.3 of the Plan fail to demonstrate the availability of sufficient ambulance service, and shielding for such service, in view of the potential number of contaminated persons.

While the plans contain an agreement with Goodwill Ambulance Unit to transport onsite accident victims to offsite medical facilities, in a general emergency the Unit will be required to evacuate non-ambulatory patients requiring critical care from Pottstown Memorial Hospital. The Unit has, as of late 1982, only 4 well-equipped vehicles, and is the only ambulance unit in the plant vicinity. Therefore, additional provisions for ambulance service will be necessary.

4. The LGS Emergency Plan (EP) relies primarily on Pottstown Memorial Medical Center (Pottstown Hospital) for medical care of contaminated injured victims. The Applicant also has an agreement through Radiation Management Corporation (RMC) for the use of the Hospital of the University of Pennsylvania (HUP) as a backup hospital in the event that the patient needs more particularized treatment. (Boyer, et al., ff. Tr. 9772, at 14, paragraph 17-18). This agreement is for one-year periods renewable on an annual basis and is limited to referrals for evaluation or treatment of radiation injuries. Boyer, et al., ff. Tr. 9772, at 14; Tr. 9801-02 (Linnemann); see also, Applicant's Exhibits 40 and 42.

Radiation injury classification includes contaminated and injured (trauma) patients, even if a patient has not been injured by radiation itself. Tr. 9803-05 (Linnemann).

5. Although specialized treatment procedures for contaminated injury victims have not been finalized, Dr. Linnemann stated that RMC, PECO, and Pottstown Hospital are compiling these procedures which, along with training, will be completed by mid-July. While the proposed procedures have not been submitted to Pottstown Memorial for review, Dr. Linnemann does not expect any difficulty with the hospital's approval of these procedures since he has worked with many hospitals in the past and has never had a problem with approval. Tr. 9812-14 (Linnemann). The Pottstown Memorial Hospital will receive training on a semiannual basis. Tr. 9828 (Linnemann). The training documents to be used at Pottstown will be similar to those used at HUP and other hospitals across the country. Tr. 9829, 9932 (Linnemann). The training for Pottstown Hospital employee shall include instruction in the biological effects of ionizing radiation, classification of acute radiation injuries, and in the initial and emergency room treatment of radiation injuries. Tr. 9830 (Linnemann). Dr. Linnemann stated that training will consist of two or three training sessions and drills, which he will personally evaluate. He will provide his evaluation to Pottstown and the Applicant, and any deficiencies will be noted and corrected. These drills place prior to the FEMA/NRC exercise. Tr. 9955, (Linnemann).

6. When the disaster plan for Pottstown Hospital is completed, a designated area will be set aside as a radiation emergency area where contaminated and injured patients will be treated. The second aspect of the

plan will be to limit contamination to this part of the hospital; and the third aspect is to provide consultation and dose exposure evaluation for initial exposure after any trauma is stabilized. Tr. 9812-14 (Linnemann).

7. Since symptoms of radiation injury do not appear for days or weeks after exposure, radiation injuries could be readily handled without undue pressure on the hospital. Dr. Linnemann indicated that in his 15 years experience of establishing emergency medical programs at some 25 nuclear power plant sites around the country and providing emergency medical assistance programs for them, there has not been more than two contaminated injured patients taken to the local hospital at any one time. Although he did not know what would occur in the event of a serious accident in the way of trauma casualties, it was his opinion that radiation injuries from a serious accident at the LGS would not place an unmanageable load on the Pottstown Hospital. Tr. 9806-07 (Linnemann).

8. The radiation plan developed by RMC for HUP will be modified to relate to the physical character and staffing of Pottstown Hospital, permitting this facility to be able to handle up to 25 contaminated, injured individuals. Boyer, et al., ff. Tr. 9772, at 14. Equipment for detection and treatment of radiological exposure, including decontamination supplies and apparatus, have not been installed or supplied to Pottstown Hospital, but will be furnished by PECO upon identification of needed equipment. As an example, he explained that a whole body counter, a very expensive piece of equipment used for determining and evaluating internal doses where a patient has suffered an exposure to most of his body, is not routinely used and would be aboard a RMC mobile treatment

facility which could serve a geographical area of a thousand miles.

Tr. 9817-21 (Linnemann, Boyer).

9. The Federal Emergency Management Agency (FEMA) and NRC will evaluate drills on procedures involving treatment of radioactively contaminated patients. Results of the evaluation will be made available to PECO and Pottstown Hospital so any deficiencies can be noted and corrected. As soon as procedures and facilities are finalized, training and drills will be scheduled, which are targeted for late May, June and early July. Tr. 9954-56 (Linnemann).

10. If Pottstown Memorial Hospital were unavailable, other area hospitals have contingency plans and can adapt to a shutdown situation by moving patients to the nearest available hospital. In such cases, a health physicist would accompany a contaminated patient to whatever hospital he was taken. Tr. 9842-42 (Linnemann, Boyer).

11. As stated earlier, the primary hospital facility under agreement with PECO to provide medical assistance in the event of an accident at the LGS is Pottstown Memorial Hospital, which is within the ten mile plume exposure pathway Emergency Planning Zone (EPZ). The back-up hospital facility is HUP, which is in Philadelphia. The Applicant has agreements with no other hospitals. Limerick is similar to many other sites around the country where the primary hospital is within the EPZ and thus faces the possibility of evacuation during an emergency. However, one must look at the probability of evacuation of the primary facility versus the probability of needing immediate treatment for a patient with a traumatic injury. The NRC is more concerned with the need for treatment of the traumatic injury since the probability of evacuation is low. Tr. 9929-30 (Sears).

12. The hospital's proximity is important from a medical standpoint, since it is standard procedure that a patient needing immediate medical attention would be transported to the nearest available hospital. Thus, it is not unusual for the offsite hospital selected to be within the EPZ. Tr. 9843-44, 9906-07 (Linnemann). There are hospitals in the area surrounding LGS, such as Phoenixville and Norristown Hospitals, which are closer than HUP in the event that it is necessary to evacuate Pottstown Memorial Hospital. (Linnemann, Tr. 9906-7, 9911-12).

13. All hospitals have plans for handling contaminated injured patients because this is part of a national accreditation evaluation program for hospitals conducted by the Joint Committee on Hospital Accreditation, a nationally recognized organization based in Chicago that evaluates hospitals from a total medical point of view. The program requires all accredited hospitals to have plans for handling contaminated and injured patients. (Linnemann, Tr. 9912-14; Sears, Tr. 9931). It would be prudent to notify the other area hospitals that they might receive contaminated injured patients on an ad hoc basis. Tr. 9914-15 (Linnemann).

14. Based on the Applicant's expert testimony, the Staff supports the position that it is anticipated that any accredited hospital will accept contaminated patients when the primary hospital becomes unavailable. Tr. 9931 (Sears).

15. The Applicant has a letter of agreement with Goodwill Ambulance Unit to provide ambulance service to offsite medical facilities which can be found in Appendix A of the LGS EP. (Boyer, et al., ff. Tr. 9772, paragraph 19, p.10). (Boyer, et al., ff. Tr. 9772, paragraph 19, p.10;

Kankus, Tr. 9847). In the event that all of Goodwill's ambulances are unavailable, backup ambulance service could be obtained at the county level. Tr. 9848 (Boyer). Applicant's witness also indicated there would not be a problem with obtaining ambulance service during a situation involving a serious injury at LGS since the ambulance companies would work together to take priorities where they exist, no matter where they occur. Tr. 9849 (Linnemann). A supervisor in the control room has responsibility for notifying Goodwill Ambulance directly Tr. 9873-74 (Kankus, and Dubiel).

16. RMC is negotiating for backup ambulance services for the Applicant with Trappe Ambulance Company in Trappe, Pennsylvania and other companies located within the EPZ. Tr. 9872-73, 9933-34 (Kankus).

17. Section 6.5.1 of the LGS EP provides that all reasonable measures shall be taken to minimize radiation exposure of offsite emergency personnel providing ambulance or medical treatment services. Plastic liners and anti-contamination clothing will provide adequate protection or shielding from contamination by the contaminated patient. (LGS EP § 6.5.3). These materials are also used to cover the patient and the surface of the ambulance. (Boyer, et al., Tr. 9772 at p. 15). Whenever possible, the patient will be decontaminated prior to transportation to the offsite medical facility. (LGS EP § 6.5.2; Linnenmann, Tr. 9923).

18. Normally, the ambulance driver will be decontaminated at the medical facility. Tr. 9924 (Tr. 9924). If the medical personnel could not be decontaminated at the receiving medical facility, such as when the decontamination facilities are being used by patients, decontamination would be delayed until the return to the site for decontamination.

(Linnemann and Dubiel, Tr. 9924-26). The primary reason for decontamination of the ambulance personnel is personal hygiene. (Linnemann, Tr. 9924-25). Ninety percent of the contamination can be eliminated simply by removal of exposed clothing. Tr. 9922 (Linnemann). Any remaining contamination can usually be eliminated by showering with water and soap. (LGS EP § 6.5.2; Sears ff. Tr. 9776, at p. 21). Besides treatment of the contaminated, injured patient, the Applicant's major objective is to return the medical facilities and ambulances to normal service as quickly as possible. Tr. 9926 (Dubiel).

Offsite Agencies Responding Onsite

As litigated, Contention VIII-10(a) states:

The onsite plans fail to comply with 10 C.F.R. § 50.47(b)(2) and the guidance of NUREG-0654, Criterion B.9, in that:

(a) Where the Applicant has identified the services to be provided by some local agencies for handling emergencies, the agreements with those local support sources do not delineate the authorities, responsibilities and limits on the actions of the contractors/agencies, but merely briefly describe the general nature of the service to be provided.

Contention VIII-11 states:

The agreement with Linfield Fire Co. #1 to provide "all needed fire protection for the Philadelphia Electric Power generating station" is not adequate, as the Linfield Fire Co. #1 does not have adequate equipment to respond alone to the entire range of fires which may occur at the facility. Additional agreements should be reached with other local fire companies to provide additional fire protection.

Contention VIII-13(a) states:

The onsite plans fail to demonstrate that arrangements for requesting and effectively using assistance resources have been made, and other organizations capable of augmenting the planned response have been identified as required by 10 C.F.R. § 50.47(b)(3), especially in that:

(a) The Plan does not properly incorporate onsite Federal response capability into its operation plan, as it neither specified the nature of the resources expected from Federal agencies, including estimated arrival time at Limerick, nor incorporates specific licensee, State and local resources available to support the Federal response (e.g., air fields, command posts, telephone lines, radio frequencies and telecommunications centers), as required NUREG-0654, Criterion C.1.

19. Section 2.2.4 of the LGS EP provides that the Linfield Fire Company has agreed to respond to requests for assistance at LGS. The Applicant has also reached an agreement with the Limerick Fire Company to assist the Linfield Fire Company, if necessary. Sears, ff. Tr. 9776, at 13-14. See also, Applicant's Exhibits 44 and 45. The dispatch of fire companies has been changed to a county dispatch method. Thus, in the event of a fire at LGS, the Applicant would notify the county dispatch center where the county dispatcher, who is aware of the agreements between PECO and the fire companies, would send Linfield or Limerick Fire Companies, or both, to the site. (Attachment 1 to Staff Testimony ff. Tr. 9772; § 5.2.2.1.2 of the LGS EP; Kankus, Tr. 10,008).

20. Firefighting companies arriving onsite to provide fire protection may determine what equipment will be utilized but, shall be under the direction and control of PECO firefighting personnel at all times while onsite. Applicant's Exhibit #44; Boyer, et al., ff. Tr. 9772 at 7-8; Tr. 9967-68 (Kankus); See also, Sears, ff. Tr. 9776, at 13. Emergency Plan Implementing Procedure EP-260, Fire and Damage Team Activation, provides the method of activating the Applicant's firefighting group at LGS, but does not contain specifics on fighting a fire in a particular area of the site. (Kankus, Tr. 9970). LGS EP Table 8-1 provides for training of offsite personnel (Linfield Fire Company) in firefighting at

LGS. LGS EP Table 8-1 provides for general orientation training for offsite firefighting personnel at LGS.

21. PECO's firefighting personnel are provided a two-day intensive training course in firefighting techniques at the Applicant's fire school located in Conshohocken, Pennsylvania. Tr. 9970 (Kankus). The PECO firefighting personnel also attend an annual retraining session to retain their qualifications. (Ullrich, Tr. 10,008-09). The school has been in service for a number of years, and it provides general firefighting training to other fire companies in eastern Pennsylvania. Tr. 9971 (Reid and Boyer). The Applicant's firefighting procedures provide for one of the two shift supervisors, who are onsite twenty-four hours a day, to assume leadership of the firefighting group. Tr. 9972-73 (Kankus). Normal staffing at the plant is such that one shift supervisor is in the control room, while the other shift supervisor would assume leadership of the fire brigade. Tr. 9973 (Ullrich).

22. No problems are anticipated with the professional offsite firefighting departments taking direction from the Applicant's firefighting personnel because while the professional firefighters know how to use the equipment, they are not familiar with the layout of the plant, the electrical feeds that may be feeding the area fire, the ventilation systems for the fire or other specifics that may be important in extinguishing a fire. Tr. 10,012-13 (Ullrich). By the terms of the letter of agreement (Applicant's Exhibit #44), Linfield and Limerick Fire Companies agree that any service provided at LGS will be under the direction of PECO.

23. The Linfield Fire Company's firefighting equipment has been evaluated by station personnel and found to meet appropriate requirements. The Limerick Fire Company's equipment has not been evaluated. Tr. 9976 (Reid). The Applicant notes in their written testimony that the Linfield and Limerick Fire Companies equipment is purchased to National Fire Protection Association standards. (Boyer, et al., ff. Tr. 9772 at p. 13).

24. The Applicant is not likely to need additional backup for the Linfield and Limerick Fire Companies to fight a fire at the LGS because last year's operational experience for Linfield Fire Company showed that of 86 calls to Linfield Fire Company, the department was on another call only once. Boyer, et al., ff. Tr. 9772, at 13; Tr. 9978 (Reid, Kankus). As indicated in the Applicant's Fire Protection Evaluation Report, the design of the plant enables the onsite fire fighting force to be self-sufficient, thus, the anticipation of a fire requiring offsite support is small. Boyer, et al., ff. Tr. 9772, at 12; Tr. 9982-83 (Kankus, Reid). In addition, LGS has minimal combustion loading in safety related areas, and the structure of the facility is such that it is a significant passive fire barrier. Tr. 9983 (Reid).

25. Based on the record before it, the Board finds that the Applicant has made adequate arrangements for offsite firefighting support and has demonstrated sufficient ability to direct and coordinate firefighting activities at the LGS. Further, the letters of agreement with Linfield and Limerick Fire Companies delineate the authorities, responsibilities and limits on the actions of the fire department consistent with NUREG-0654, II.B.(9).

26. In addition to the letters of agreement with medical facilities discussed above, the Applicant has entered in letters of agreement with two local physicians to supply onsite medical assistance subject to the limited access provisions applicable offsite firefighters. Under these agreements, each physician assumes responsibility for medical assistance to and supervision of the patient(s) until arrival at a medical facility (i.e., Pottstown Hospital) or until the physician's services are no longer needed. Boyer, et al., ff. Tr. 9772, at 11; Applicant's Ex. 32, Appendix A; See, Sears, ff. Tr. 9776, at 13.

27. RMC and Keystone Helicopter have an agreement (Applicant's Exhibit 41) to provide helicopter services for Limerick, Salem, Calvert Cliffs, Oyster Creek, Three Mile Island, Susquehanna; and Peach Bottom nuclear facilities. (Boyer, et al., ff. Tr. 9772 at p. 11; Linneman, Tr. 9851-52). If sufficient ambulance service were unavailable, RMC would coordinate transportation with Keystone Helicopter Service. (Boyer, et al., ff. Tr. 9772 at p. 11). Under the terms of the agreement, Keystone will make available, on reasonable notice, a six-passenger helicopter or a five-passenger, fixed-wing aircraft. Tr. 9853-54 (Boyer and Linnemann). RMC's agreement requires Keystone to make an aircraft available on two hours notice. Tr. 9854 (Linnemann).

28. RMC does not expect to use Keystone as a means of transporting patients to the Pottstown Memorial Hospital because the primary means of transportation would be by ambulance. Tr. 9860-61 (Linnemann).

29. Keystone Helicopter Service will provide transportation for RMC's radiological emergency medical (REM) team, which is standby medical assistance (a health physicist and a physician) contracted to the

Applicant. Tr. 9858 (Linnemann). The REM team does not treat trauma, but instead assists the hospital in the evaluation of the patients radiation condition and in cleaning the area of the hospital that has been contaminated. Tr. 9858-59 (Linnemann).

30. The LGS EP, the Limerick FSAR and the letter of agreement between PECO and the Pennsylvania State Police describe the responsibilities of the Pennsylvania State Police with respect to access control during any potential radiological emergency at the site. Sears, ff. Tr. 9776, at 13; Boyer, et al., ff. Tr. 9772, at 12; see also, Applicant's Ex. 32, § 5.3.3.3 and Applicant's Ex. 38, § 2.1.2.3. The letter of agreement between PECO and the State Police adequately describes the services to be performed by State Police in carrying out their responsibility as a law enforcement agency as provided in NUREG-0654, II.B.(9) and 10 C.F.R. § 50.47(b)(2). (Sears, ff. Tr. 9776, at 13).

31. Federal support during an emergency at Limerick will be provided onsite and offsite by the NRC's Office of Inspection and Enforcement, Region I team and offsite by the Department of Energy (DOE) under its Radiological Assistance Program (RAP). Sears, ff. Tr. 9776, at 16; Tr. 9987-90 (Sears); Boyer, et al., ff. Tr. 9772, at 16; See, Applicant's Ex. 32, § 5.3.3, and App. A, Exhibit A-7. The regional team from King of Prussia can arrive at LGS by auto in about one hour under normal conditions, however, travel time depends on road conditions. Sears, ff. Tr. 9/76, at 16; Tr. 9984 (Sears). Road conditions should not present a problem since FEMA requires two-way traffic on roads in the EPZ during an evacuation. Thus, emergency vehicles would have a means of access through the EPZ. (Kankus, Tr. 10,005). Access controls set up at the

edges of the EPZ would permit emergency vehicles and response personnel to reach the site with minimal delay. Tr. 9986, 10,005 (Kankus). NRC Region I teams would report to the Technical Support Center (TSC) onsite and to the Emergency Operations Facility (EOF) offsite. Each team will consist of at least five members who will review, advise and evaluate what the Applicant is doing to alleviate the situation. Tr. 9987-89 (Sears). NRC regional staff members have authority to permit license conditions to be exceeded as necessary for the protection of public health and safety during an emergency situation. Tr. 9990 (Sears). It is not a prerequisite that NRC or offsite emergency response personnel arrive at the TSC or the EOF prior to the Applicant's exercise of any emergency actions. Tr. 10,009-11 (Sears).

32. The Applicant agreed that the Staff has authority to direct the Applicant without contacting NRC headquarters, and while PECO would normally comply with the NRC's instructions, discussion of any disagreements can be carried to the highest levels in each organization. Tr. 10,011-12 (Boyer).

33. The NRC has provided for immediate communications between its headquarters and all nuclear power plants, including Limerick, by requiring that a direct line (red phone) be present in the control room and TSC which must be used immediately after classification or reclassification of any event. Boyer, et al., ff. Tr. 9772, at 16; Tr. 10,006 (Ullrich); See, Applicant's Ex. 33, EP 103-105.

34. DOE's RAP Teams will support the efforts of the Pennsylvania Bureau of Radiological Protection (BRP), which has the primary responsibility to minimize the public radiation exposure. DOE personnel will

remain offsite to provide advice and assistance relating to ingestion of food and water in the area and tracking of the plume. When the BRP field survey team is activated, the Applicant assumes a support function.

Boyer, et al., ff. Tr. 9772, at 16-17; Tr. 9992 (Kankus); Applicant's Exhibit 32, § 5.3.3.2.

35. Based on the evidence above, the Board finds that the Applicant has properly incorporated onsite Federal response capability and has provided for appropriate State and local support of the Federal response into its Emergency Plan for the LGS.

Training Issues

As litigated, Contention VIII-16(c) states:

The onsite plans fail to demonstrate that adequate means for controlling radiological exposures in an emergency have been established for emergency workers and that such means include exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides, as required by 10 C.F.R. § 50.47(b)(11) in that:

(c) The Plan does not demonstrate how emergency workers will have sufficient information concerning radiation risks upon which to make an informed judgment regarding radiation exposure, although the plan leaves exposure limits to the individual;

Contention VIII-18 states:

The onsite plans fail to demonstrate that adequate radiological emergency response training will be provided to those who may be called upon to assist onsite in an emergency, as required by 10 C.F.R. § 50.47(b)(15), in that the training programs are not sufficiently described to assure compliance with the guidance of NUREG-0654, Criteria 0.2 and 4. Intervenor requests access to all training materials to be used for the purpose of compliance with 10 C.F.R. § 50.47(b)(15) as soon as available, and reserves the right to file contentions based upon the information contained therein, including contentions placing in issue the adequacy of such training materials. Applicant's response to Q 810.63 states that the

procedures for training will not be developed until training needs are identified (and vice versa).

36. The LGS EP establishes onsite exposure guidelines for emergency workers consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides (EPA 520/1-75/001). Specifically, emergency exposure guidelines that conform to Table 2.1 of the EPA guides are provided in appendices to relevant Emergency Plan Implementing Procedures and are in conformance with NUREG 0654, Criterion K.1. Sears, ff. Tr. 9776, at 24; See, Applicant's Ex. 33, EP-220, 222, 230, 250-252 and 261. These implementing procedures will be utilized during emergency preparedness training for all personnel, and it is through such training that the impact of the guidelines will be presented. (EP-220, 222, 230, 250-252; Sears, ff. Tr. 9776, at 24; Boyer, et al., ff. Tr. 9772, at 27-28).

37. Training personnel are full-time instructors from PECO's nuclear training section. Training instructors are required to follow a specific outline and present the required information. This training will be completed prior to July 25, 1984, the date set for the scheduled joint exercise. Tr. 10,035, 10,042 (Dubiel). Training in radiation risk for offsite emergency response organizations that may assist onsite is addressed in Table 8-1 of the LGS EP. Tr. 10,045-46 (Kankus).

38. Offsite emergency response personnel are entitled to whatever information on radiation risk is available, and such personnel will be informed of various risks of exposure to low levels of ionizing radiation during training, prior to their arrival onsite to assist in an emergency. Tr. 10,018-20 (Dubiel); Boyer, et al., ff. Tr. 9772, at 28). Individuals

belonging to emergency response organizations expected to assist onsite in an emergency have agreed to receive this training. Tr. 10,044 (Kankus).

39. During training there is a discussion of the acute effects of high levels of exposure. Tr. 10,024-25 (Dubiel). These trainees are informed of the delayed effects that may occur in the case of low level radiation, such as genetic effects, teratogenetic effects and the principle of ALARA. Tr. 10,024-26 (Dubiel). The BEIR-3 report is used as the basis for presentation of radiological risk information, and it identifies the increase in probability of cancer according to two benchmarks; one for a single exposure, the other for continuous exposure. Tr. 10,029-30 (Dubiel).

40. Information on risks to pregnant women consistent with the information in Regulatory Guide 8.13, is presented, but may not be presented in detail if women are not in the training group. (Dubiel, Tr. 10,032-33, 10,037). Training for offsite emergency response personnel who come onsite includes information and instruction in reading personal dosimetry and instruction in respiratory protection. Trainees are taught standard practices for identifying restricted areas so that these areas are not entered inadvertently. Tr. 10,037-41, 10,046-47 (Dubiel).

41. The emergency director will rely on PECO employees to assist where lifesaving functions must be performed and established dose limits may be exceeded. Under no conditions will an emergency response worker be asked to volunteer to exceed the dose limit absent specific authorization by the emergency director. 10,054-56 (Dubiel); Boyer et al., ff. Tr. 9772, at 27-28, 32.

42. Onsite workers (PECo employees) also receive further orientation and general employee training concerning the radiation work permit system, how normal daily exposure limits are determined and maintained, ALARA principles and information about the acute effects of high levels of radiation in accordance with Table 8-1 of the LGS EP. Tr. 10,047-48 (Dubiel).

43. Additional training will be provided for support personnel arriving onsite to respond to an emergency on an ad hoc basis. This training would apply to personnel of other reactor licensees, vendors, and utility organizations, and this training would be conducted on an expedited basis to permit such personnel to provide immediate onsite assistance. Boyer, et al., ff. Tr. 9772, at 32; Applicant's Ex. 33, EP-307.

44. Based on the record, the Board finds that the Applicant will provide adequate training for both onsite personnel and offsite emergency response personnel, which will include sufficient information concerning radiological exposure risks.

Emergency Response Facilities

Contention VIII-8 states:

The LNGSEP fails to demonstrate that adequate emergency facilities and equipment to support emergency response are provided and maintained as required by 10 C.F.R. § 50.47(b)(8), especially in that:

(b) The Plan's descriptions of the Emergency Operations Facility (Plan § 7.1.2), the Technical Support Center (Plan § 7.1.3), the Operational Support Center (Plan § 7.1.4), and emergency equipment and supplies are all insufficient to meaningfully assess compliance with 10 C.F.R. § 50.47(b)(8) and to evaluate the facilities with respect to the criteria of NUREG-0696. Intervenor contends the applicant has not

demonstrated that the facilities proposed are adequate. Applicant's response to Q. 810.30 states that the plan will be expanded when final information is available on these facilities.

45. The Emergency Response Facilities will be appraised by the NRC Onsite Emergency Response Facilities Appraisal Team to determine conformance to NRC guidelines. These facilities include the Emergency Operations Facility (EOF), the Technical Support Center (TSC) and the Operations Support Center (OSC). Sears, ff. Tr. 9776, at 10-12. See also, Boyer, et al., ff. Tr. 9772, at 6-7; Applicant's Ex. 32, § 7.1.

46. The Staff will use NUREG-0737, Supp. 1 as a guide in determining the adequacy of PECO's emergency response facilities and compliance with NRC requirements. As part of its review, the Staff will expect a demonstration of the facilities by the Applicant and will review the hardware at that time in accordance with NUREG-0737, Supp. 1.

47. The Staff will request information concerning reliability of the instrumentation and equipment because it is important to know whether such equipment and instrumentation will operate on demand. This information is readily available since Limerick is not the first facility which has purchased this type of material. Tr. 10,061-65 (Sears). While the reliability criterion found in NUREG-0696 are used as guidelines, they are not requirements. Tr. 10,065-67 (Sears).

48. Based on the record above, the Board finds that the description of the Emergency Response Facilities (ERFs) and equipment therein is adequate to provide reasonable assurance that when fully functional, these facilities will meet all relevant requirements and criteria provided in NUREG-0737, Supp. 1. The Board notes that NUREG-0737, Supp. 1, at p. 24 provides that the "NRC will conduct appraisals of completed

facilities and verify that these requirements have been satisfied and that ERFs are capable of performing their intended function." (p. 24).

Prompt Notification to Offsite Authorities

Contention VIII-6 states:

The onsite plans for emergency notification fail to comply with 10 C.F.R. § 50.47(b)(5) and the guidance of NUREG-0654, in that:

(a) The Plan does not yet demonstrate that the bases established for the Applicant's notification of response organizations with responsibility for onsite augmentation are mutually agreeable;

(c) The Plan's provisions for prompt notification do not comply with the guidance of NUREG-0654, Appendix 1, in that the Plan at § 6.1 provides for notification of emergency organizations "within about 15 minutes after classifying the event" for each emergency class. NUREG-0654, Appendix 1, p. 1-3 requires that notification take place within 15 minutes from the time at which operators recognize that events have occurred which make declaration of an emergency class appropriate, not from the time of classification, and requires notification sooner than 15 minutes for classes more serious than unusual events.

49. The letters of agreement in the LGS EP, include Pottstown Memorial Hospital, RMC, Goodwill Ambulance Company, the Linfield Fire Company, Limerick Fire Company, the Pennsylvania State Police, Dr. Charles Delp of Boyertown and Dr. Authur Mann of Pottstown and provide that each of these organizations and individuals have agreed to respond and assist as needed in the event of an emergency situation at Limerick. The LGS EP, § 5.3.4.1, provides that the Institute of Nuclear Power Operations (INPO), when called upon, can assist in quickly applying the resources of the nuclear industry to meet the needs of the emergency. The LGS EP conforms with Annex E, Appendix 8 of the State of Pennsylvania's

"Bureau of Radiation Protection Philosophy for Protective Action".

Therefore, the Applicant's agreements with Federal, State, local entities and individuals who will respond onsite to an emergency situation at the LGS satisfy requirements and guidelines of 10 C.F.R. § 50.47(b)(5), Part 50, Appendix E and NUREG-0654, Criterion E.1.

50. The LGS EP § 6.1.1 provides that notification to the offsite authorities shall be within 15 minutes from the time when the operators recognize events have occurred that make declaration of an emergency appropriate. This is consistent with NUREG-0654, Appendix 1, at p. 1-3. Sears, ff. Tr. 9776, at 7-8; See, Applicant's Ex. 32 and 33; See also, Boyer, et al., ff. Tr. 9772, at 5-6. PECO's procedures allow operators to immediately notify offsite organizations when an event is classified, which can be sooner than 15 minutes. Tr. 10,082 (Kankus). When offsite authorities must be notified, capability exists for simultaneous phone calls to the response agencies through the communications system. Tr. 10,098 (Ullrich, Kankus). Operators in the control room rely on verbal and visual reports, in addition to instrumentation monitors, to determine symptoms of an event so that it can be immediately classified. Tr. 10,084 (Ullrich).

51. The process of notification begins with the classification of an event is a separate function from the notification for site evacuation and involves a different group of people. These two functions may or may not be carried out simultaneously. Tr. 10,121-22 (Ullrich). While the emergency director's first responsibility is to verify the emergency classification, the procedures do not have to be followed in sequence and

escalation to the general emergency stage can be immediate if plant conditions warrant. Tr. 10,123-24 (Ullrich).

52. Depending on the situation, an evacuation of the site could be carried out prior to reaching a site emergency classification. Security would be notified prior to the announcement of a site evacuation to allow them time to prepare. Security would need less than five minutes to prepare for evacuation. Tr. 10,101-3 (Ullrich). Subsequent to the notification to security, the personnel safety team would be called to inform Bechtel that a site evacuation is being called, to select assembly areas for site personnel, to activate a site alarm which sounds for thirty seconds and the actual announcement of the site evacuation. It would take approximately five minutes for the personnel safety team leaders to place individuals at the exit points. The highest priority would be the site evacuation itself, while lower priority items, such as activation of the vehicle contamination group, would be implemented as the situation warrants. The actual evacuation announcement is made by the interim emergency director after the personnel safety team leaders have been dispatched and are ready to support the evacuation. Tr. 10,103-9 (Dubiel).

53. The Board finds that the LGS EP provides for prompt notification to offsite authorities within the time specified in the relevant requirements and guidelines.

Onsite Personnel Augmentation

Contention VIII-7(c), as litigated, states:

The onsite plans fail to demonstrate that the on-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentations of response capabilities is available, and the interfaces among various onsite response activities and offsite support activities is specified, as required by 10 C.F.R. § 50.47(b)(2), especially in that:

(c) The Applicant's staffing provisions (See Plan, Figures 5-1, 5-2, 5-5 and Table I-1) do not comply with the minimum staffing requirements set forth in NUREG-0654, Table B-1 (pp. 37-38) in that:

(3) 30 and 60 minute augmentations of minimum staffing does not comply with Table B-1 (See Plan, Table I-1) and while Figure 5-2 is referenced in Table I-1, neither augmentation timing, nor position augmentation are coherently shown.

54. The Applicant has conducted survey of transit times for PECO personnel in positions outlined in Table B-1 of NUREG-0654. Tr. 10,127-29, 10,167 (Kankus); see also, Boyer, et al., ff. Tr. 9772, at 6. While the 30- and 60-minute augmentation periods of Table B-1 in NUREG-0654 are goals, not regulatory requirements, the Applicant has met those goals. (Sears, Tr. 10,155).

55. Mr. Dubiel indicated that a minimum of two health physics technicians must be onsite at all times and that, according to the survey, seven additional technicians will be available within 30 minutes, based on the present plant staff. Tr. 10,130 (Dubiel).

56. In the event of a release, the procedure established by the Applicant for the performance of offsite surveys requires that teams will be established consisting of one qualified health physics technician and a driver. Although the procedure can be implemented by only one technician, two more teams would be available within 30 minutes. If the event

continued for several hours, up to four additional teams can be activated to relieve individuals those conducting monitoring and to minimize their exposure, if necessary. Tr. 10,134-35 (Dubiel).

57. More than 30 health physics personnel can be on site within an hour after declaration of an emergency. This provides reasonable assurance that each of the functions for the various groups can be carried out as the situation warrants. Tr. 10,148-50 (Dubiel). These thirty health physics technicians are a combination of PECO employees and individuals under contract from Applied Radiological Control (ARC). The contract between ARC and PECO provides that ARC will supply qualified health physics technicians to PECO, and this contract is expected to run until the Applicant has completed hiring and training of its own technicians. Of the total health physics technicians employed at Limerick, about twelve are ARC employees who have no duties other than at the LGS.

Tr. 10,159-62 (Kankus). These twelve technicians are intended to be a part of the onsite complement to support the initial plant start-up, as opposed to only emergency response personnel. Tr. 10,163-67 (Dubiel).

58. Based on the evidence presented above, the Applicant can provide adequate staff augmentation within the time limits specified in the relevant guidelines. Therefore, the Board finds that LGS EP adequately describes procedures for staff augmentation in an emergency at the LGS and that the LGS EP meets all relevant requirements and guidelines concerning staffing levels.

Onsite Monitoring

Contention VIII-3 states:

The onsite plans do not identify and establish the onsite monitoring systems that are to be used to initiate emergency measures in accordance with Appendix 1 of NUREG-0654, as required by Criterion H.5 of that document. Applicant's response to Q. 810.32 states that this information will not be available until the fourth quarter of 1983.

Contention VIII-14 states:

The onsite Plans fail to demonstrate that adequate methods, systems and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition will be in use by the Applicant, as required by 10 C.F.R. § 50.47(b)(9) especially, in that the Plans do not demonstrate or describe:

(c) Adequacy of procedures for analysis of offsite dosimetry and procedures describing methods for calculating offsite doses, as referred to in section 6.2, pp. 6-3 and 4 of the Plan, in that these procedures have not been provided, and assessment of adequacy is impossible.

(d) The specific kinds of monitoring instruments to be used and their capabilities.

(e) Adequate onsite capability and resources to provide initial values and continuing assessment throughout the course of an accident. Applicant's response to Q 810.48 states that the design of the assessment system will not be complete until 1984.

(f) Adequate methods and techniques to be used for determining the source term of releases of radioactive material within plant systems, and the magnitude of the release of radioactive materials based on plant system parameters and effluent monitors. Applicant's response to Q 810.40 states that this information will not be available until 1984.

(h) The methodology for determining the release rate and projected doses if the instruments used for assessment are off scale or inoperable. Applicant's response to Q 810.44 states that these procedures will not be available until 1984.

59. The onsite monitoring system for classifying emergencies are identified in the Appendices of EP-101, Classification of Emergencies.

The onsite monitoring systems and levels for declaring emergencies will be reviewed in detail during the NRC Emergency Plan Implementation Appraisal. This appraisal will be performed as part of the preoperational test program prior to fuel loading. Sears, ff. Tr. 9776, at 6; see also, Applicants Ex. 33, EP-101.

60. Geophysical phenomena monitors are addressed in Section 7.3.1 of the LGS EP, which states that seismic instrumentation includes time-history accelerographs, peak recording accelerographs and seismic switches. Specific instrumentation used in emergency classification is also provided for in the emergency procedures. Boyer, et al., ff. 9772, at 2-3, Applicant's Ex. 32 & 33; See; Tr. 10,175, 10,216 (Boyer).

61. The LGS EP provides information as to the acquisition of meteorological and release point data. The Radiological and Meteorological Monitoring System (RMMS) and two independently powered meteorological towers on the site provide the capability for acquiring and evaluating meteorological information sufficient to meet the criteria of NUREG-0654, Appendix 2. The Limerick meteorological system has been designed in depth to provide information should a key input parameter become unavailable. For instance, the RMMS will automatically switch to a secondary or even a tertiary sensor if a primary sensor fails. Data is available from the RMMS through a data logger and strip charts in the Control Room. If all of these sources of information fail, data is still available from instrument shacks at the base of each tower. The meteorological data includes 15 minute averages of wind speed, direction, sigma theta and delta T measurements for stability determination. The release point data includes 15 minute averages of vent flow rate data and gross activity

release rate data as measured by the vent effluent monitoring system. The 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 by the NRC and the appropriate State emergency response agency. Sears, ff. Tr. 9776, at 17-18; Boyer, et al., ff. Tr. 9772, at 3-4; Tr. 10,198-200 (Murphy, Kankus); See also, Applicant's Ex. 32.

62. If the meteorological and plant effluent data used as inputs to the RMMS become unavailable, or if a total failure of the RMMS occurs, manual backup methodology provided in EP-316 is available to determine offsite doses during an emergency. Offsite monitoring data are shared by the Commonwealth's Bureau of Radiation Protection (BRP) and the Applicant's EOF. Boyer, et al., ff. Tr. 9772, at 17-18; See, Applicant's Ex. 33.

63. The detection of toxic chemicals not specifically monitored by plant instrumentation will have to be made by plant personnel. Generally, plant personnel would be alert for symptoms of the existence of toxic chemicals such as detection of an unusual odor or experiencing nausea. Depending on the situation, plant employees would initiate isolation of the ventilation control system or wear masks as appropriate, which would be the triggering event for the declaration of an alert. The Applicant will monitor for all chemicals capable of incapacitating control room operators based on surveys of area manufacturers and users. Tr. 10,183-84, 10,205-08 (Boyer, Kankus).

64. Offsite dose assessment analysis will be accomplished through data provided by approximately 48 predesignated sites for thermoluminescent dosimeters (TLDs) as listed in the EP and described in the Environmental Report. See, Applicant's Ex. 32, Table 7-5; Applicant's Ex. 36. The Applicant performed an atmospheric dispersion analysis of all sections of the plume exposure EPZ to determine whether the TLDs have been placed in the locations where relative air concentrations are likely to be maximized on an average annual basis. TLD placement is done according to Reg. Guide 4.8, which provides adequate coverage to give a good indication of the accumulated dose. This Reg. Guide provides guidance for the location of 40 TLD stations consisting of two rings of TLD stations and additional locations. Offsite TLDs will also be placed at certain control points and in specific densely populated areas. Tr. 10,202-05 (Daebeler).

65. When an offsite release has occurred, the Health Physics and Chemistry Coordinator or an alternate directs sample collectors to the appropriate stations where TLDs are picked up, returned to a laboratory for processing and replaced with another dosimeter. Information concerning TLDs is transmitted to the EOF or appropriate PECO personnel at other locations. This process is repeated as necessary. The LGS EP also provides that samples of airborne particles, surface water, drinking water and milk will be analyzed. Boyer, et al., ff. Tr. 9772, at 18-19; See also, Applicant's Ex. 32, 36.

66. The TLD program is routine and is used for determining annual doses to the environment. It can be used in an emergency situation for providing confirmatory information at some extended time period after the

event. The intent is not to determine high dose rate, rather, it is intended to give an indication of dose in the particular sectors where TLDs are located. Tr. 10,208-10 (Daebeler, Dubiel).

67. Groups of personnel with specific responsibility for evaluating radiological data are described in the EP and include: the Field Survey Group, a part of the Radiation Protection Team, which conducts offsite field surveys; the Plant Survey Group, part of the Personnel Safety Team, which performs onsite and inplant surveys; the Chemistry Sampling and Analysis Team, which is responsible for obtaining and analyzing normal and post-accident samples and assessing the results; and, the Dose Assessment Team, which calculates offsite exposure data from available radiological monitoring, meteorological and radiation survey data. The Emergency Director or Interim Emergency Director performs assessment actions and monitors the effects of the emergency, based on the information provided by these various teams. The Site Emergency Coordinator obtains this information from the TSC, maintains an awareness of plant status and offsite consequences of the 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. Boyer, et al., ff. Tr. 9772, at 21-22; See also, Applicant's Ex. 32, § 5.2.2.

68. Basically, samples will be obtained from the effluent monitor sampling lines located at the point of release from the North Stack and actual data obtained will be fed into the RMMS system. Information from the analysis of these samples will be used in conjunction with the X/Q tables in EP-316 and the Reg. Guide 1.109 dose conversion factors

provided in EP-316 to calculate releases and offsite doses, which complies with NUREG-0654, Criterion I.6. Boyer, et al., ff. Tr. 9772, at 23; Sears, ff. Tr. 9776, at 19-20; see, Applicant's Ex. 33.

69. Mr. Sears has toured the Applicant's facility, reviewed the Applicant's methods, systems and equipment for assessing and monitoring offsite consequences of a radiological emergency, and the LGS EP. He has concluded that the Applicant has established adequate means to assess and monitor the offsite consequences of a radiobiological emergency as called for by 10 C.F.R. § 50.47(b)(9). Sears, ff. Tr. 9776, at 19. As stated earlier, the Emergency Plan Implementation Appraisal team will evaluate the onsite monitoring systems as part of the preoperational testing program prior to fuel loading.

70. Based on the record presented above, the Board finds that the Applicant has provided adequate facilities and methodologies for onsite monitoring and has reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

Personnel Dosimetry, Monitoring and Decontamination

Contention VIII-15 states:

The on-site plans fail to demonstrate that an adequate range of protective actions has been developed for the Plume Exposure Pathway for persons on-site, as required by 10 C.F.R. § 50.47(b)(10), in that:

(b) The Plan fails to establish that the Applicant has provided for adequate radiological monitoring of people evacuated from the site, as required by NUREG-0654, Criteria J.3., (p. 59), especially in that the plans do not reflect the time within which the taking of whole body counts and the processing of dosimetry devices of evacuees, can be completed; nor do the plans indicate that all plant personnel, visitors, construction

workers, etc, who may be exposed to radioactivity during an accident will have possession of dosimetry devices; nor do the plans indicate when and how techniques will be established which will provide data for estimating neutron dose where suspected. With respect to neutron dose, the plan refers to implementing procedures which have not been provided (p. 6-12);

(d) The Plan fails to describe the decontamination capabilities at the point of radiological monitoring, with sufficient specificity to determine adequacy of the monitoring required by NUREG-0654, Criterion J.3, 4;

(e) The Plan fails to demonstrate a capability within 30 min to account for all individuals on-site at the time of an emergency, as required by NUREG-0654, Criterion J.5;

(f) The Plan fails to establish that the Applicant has made provisions for each person remaining or arriving on-site during the emergency to have individual respiratory protection, protective clothing and individual thyroid protection, as required by Criterion J.6.

Contention VIII-16 states:

The onsite plans fails to demonstrate that adequate means for controlling radiological exposures in an emergency have been established for emergency workers and that such means include exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides, as required by 10 C.F.R. § 50.47(b)(11) in that:

(d) The Plan fails to establish that the Applicant has made provisions for 24 hour-per-day capability to determine the doses received by emergency workers involved in an accident at Limerick, has made provisions for distribution of sufficient dosimeters, as ensured that the dosimeters are read at appropriate frequencies, and that dose record are maintained, as required by NUREG-0654, Criteria K.3.(a)-(b). While the Plan (§ 6.5.1) makes reference to emergency access procedures, these have not been provided for review.

(g) The Plans fail to demonstrate that the Applicant has established the capability for decontamination of relocated onsite personnel, including provision for extra clothing and decontaminates suitable for expected contamination, including radioiodine contamination of the skin, as required by NUREG-0654, Criteria K.7., p. 68. The quantity of extra clothing is nowhere

mentioned in the equipment lists set forth in the plans, and while mention is made of "decontamination chemicals", these are not described sufficiently either in the Plan or in the Applicant's response to Q 810.59 to ascertain effectiveness for radioiodine skin contamination.

71. Section 6.4.1.1(e) of the LGS EP provides for monitoring for contamination of evacuees. Sears, ff. Tr. 9776, at 21. 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. There will be portal monitors at the normal exits in the administration building and at the TSC. If portal monitors are inoperable or a portal monitor alarm is activated by certain personnel, health physics personnel will use portable survey instruments to check personnel for contamination. Boyer, et al., ff. Tr. 9772, at 23-24; Tr. 10,238 (Dubiel).

72. If an evacuation is necessary, the emergency director will decide if evacuees are to be randomly monitored. Tr. 10,224-25 (Dubiel). If the priority is evacuation, personnel monitoring can be accomplished later at reassembly areas. All persons will be monitored either upon evacuation or during reassembly, according to criterion of EP-224 (Vehicle and Evacuee Control Group), EP-255 (Vehicle Decontamination) and EP-305 (Site Evacuation). Tr. 10,226-27 (Dubiel).

73. Evacuees will assemble in one of the predesignated reassembly areas at the Limerick Airport or Cromby Station. The plume direction is the primary factor in determining which reassembly area will be used. Tr. 10,231-32 (Dubiel).

74. Site evacuees will remain at the reassembly areas until they are monitored and released. Tr. 10,236 (Kankus). Individuals not monitored at the portal monitors will be monitored by hand survey instruments according to normal health physics procedures. Tr. 10,226-28, 10,255 (Dubiel); Tr. 10,237 (Kankus). Health physics technicians will be informed by the Personnel Safety Team Leader at the reassembly areas as to those individuals who were not monitored prior to leaving the site. Persons monitored at the reassembly areas would be moved through a control point, which would assure that all individuals have been monitored. Tr. 10,228-30, 10,255, 10,259 (Dubiel).

75. Transit time between the Limerick site and the reassembly areas is five to ten minutes. There could be up to a one-hour delay before a person is monitored at the reassembly area at the control point, but this would not create any health hazard due to contamination. Tr. 10,262-63 (Dubiel). Individual monitoring at the reassembly area would not take very long, even in the worst-case scenario where all site evacuees, including Bechtel and subcontractor personnel were to be monitored, since the Applicant has health physics personnel available to conduct the monitoring. Tr. 10,261 (Sears); Tr. 10,261 (Dubiel).

76. Whole body counts of personnel are unnecessary during emergencies. Since whole body counts are a normal part of health physics operations, they can be done later at an appropriate facility if ingestion has occurred. (Boyer, et al., ff. Tr. 9772, at 24).

77. Personnel requiring access to Radiologically Controlled Areas are provided with dosimetry in accordance with 10 C.F.R. § 20.202. Certain personnel who are not required to wear dosimetry will have their

work areas monitored by TLDs. TLDs will be placed at appropriate areas within the site to assist in monitoring evacuation routes. Therefore, adequate monitoring is provided for all plant personnel. Boyer, et al., ff. Tr. 9772, at 24.

78. All individuals reporting from offsite in support of emergency response will receive a self-reading dosimeter and a TLD from security personnel as they arrive onsite. Tr. 10,221-22 (Dubiel). Dosimetry for ambulance personnel will be issued when the ambulance arrives at the Limerick gate and would be surrendered either when ambulance personnel leave the site or at the hospital after the victim is removed from the ambulance. Tr. 10,262 (Dubiel). Capability on a 24-hour basis to determine doses received by emergency workers will be available under the procedures for reading TLDs and will be provided by individuals trained and qualified to operate the processing equipment, who will be onsite within an hour. Boyer, et al., ff. Tr. 9772, at 29; see, Applicant's Ex. 38, § 12.5.3.5.1; see also, Sears, ff. Tr. 9776, at 25.

79. If an actual radiological emergency occurred, health physics technicians would take the pocket dosimeters from exiting personnel, read the dosimeter and record the indicated dose. Personnel whose dosimetry readings exceed prescribed levels would report to the dosimetry office in the TSC for immediate processing of their TLDs. Personnel would not be allowed to reenter radiologically affected areas until it has been determined that their dose levels are below the prescribed limits under 10 C.F.R. Part 20. Self-reading pocket dosimeters and, if necessary, ring or clip-on dosimeters for various extremities which might be particularly subject to exposure will be issued to personnel required to enter

radiologically affected areas. Personnel exposure records are maintained according to "Practice for Occupational Radiation Exposure Record System," ANSI N13.6, as described in the FSAR. Boyer, et al., ff. Tr. 9772, at 29-30; See, Applicant's Ex. 38, § 12.5.2.2.4.

80. As part of the screening process, a health physics technician would determine whether there is contamination of the nose or mouth area, or if there is reason to believe that respiratory protection equipment may have failed. If this occurred, the individual would be sent to the whole body counting room in the TSC where bioassay is performed. A health physics technician will be stationed at each entry point into an affected area and any emergency worker entering such an area will be given a specific stay-time or dose level, which may not be exceeded. Boyer, et al., ff. Tr. 9772, at 30-31.

81. The Applicant has addressed personnel accountability in the LGS EP and that the capability of the Applicant, pursuant to NUREG-0654, Criterion J.5, to account for all individuals within 30 minutes after the assembly announcement is made will be demonstrated during required drills and exercises. Sears, ff. Tr. 9776, at 22; See, Applicant's Ex. 32, § 6.4.1.d; see also, Boyer, et al., ff. Tr. 9772, at 26.

82. EP-110 provides that all individuals must be accounted for at the time of an emergency and names of missing persons must be ascertained within 30 minutes of the start of an emergency. Accountability is addressed in EP-305, Site Evacuation, in which personnel are directed to provide their badges to the guards. The guards will use computer print-outs with names of personnel in the plant that day and will check off badge numbers against the list to determine the names of persons not

accounted for. Tr. 10,244, 10,247-48, 10,251 (Kankus); Tr. 10,245 (Dubiel). If missing individuals could not be accounted for by collection of badges or by the paging system, or by other personnel reporting locations, a search and rescue team would be assembled for dispatch to the person's last known location. The team would search until all missing personnel are located. Tr. 10,266 (Kankus).

83. Implementing procedures EP-254, Vehicle and Evacuee Control Group, and EP-255, Vehicle Decontamination, provide guidelines for decontamination of evacuees and vehicles, which will be accomplished in accordance with the Applicant's health physics procedures. This complies with NUREG-0654, Criteria J.3 and J.4. Sears, ff. Tr. 9776, at 21-22. Since contamination present would most likely be due to short-lived daughter products of noble gases, any contamination remaining after removal of clothing can be eliminated by showering and washing exposed skin areas and, also, by clipping any contaminated portions of hair. There are two showering facilities onsite (Radwaste Enclosure or TSC) to be used for decontamination. Water used for decontamination is collected and retained until analyzed. Contaminated clothing and other materials used for decontamination are also collected and tagged for identification so it will be properly disposed of. Tr. 10,243-44, 10,266 (Dubiel); Boyer, et al., ff. Tr. 9772 at pp. 25 and 31).

84. In the event that normal decontamination techniques cannot reduce the contamination below pre-defined action levels, qualified medical assistance will be available through outside organizations such as RMC. Any necessary replacement clothing will be issued. Boyer et al., ff. Tr. 9776, at 25. As Mr. Sears of the Staff noted, decontamination

control procedure and capability will be appraised during the NRC Onsite Emergency Preparedness Implementation Appraisal. Sears, ff. Tr. 9776, at 22.

85. Based on the evidence above, the Board finds that the Applicant has properly provided adequate facilities and procedures for personnel monitoring, dosimetry and decontamination in their emergency plan for the LGS, and is in compliance with relevant NRC regulations and related criteria.

Spectrum of Accidents

Contention VIII-1 states:

The Emergency Plan is inadequate, and does not comply with 10 C.F.R. § 50.47 and the planning bases for the Commission's regulations on emergency planning in that the spectrum of credible accidents for which emergency planning is required. The Plan, at § 4.2, states that "the adequacy of this Emergency Plan is demonstrated by applying its provisions and noting that the provisions encompass the estimated radiological consequences of the postulated accident." Table 4-1 shows that the postulated accidents are merely design basis accidents, with a maximum estimated dose at the LPZ of 1090 mrem (LOCA).

The regulations and planning bases for emergency planning plainly contemplate planning for accidents of much greater severity. (See, e.g. NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants").

86. LEA did not pursue this contention during the hearing. The LGS EP has been designed to provide protective action response to the four classes of emergency described in NUREG-0654, Appendix 1. These classes include (1) notification of an unusual event, (2) alert, (3) site area emergency and (4) general emergency, as reflected in Table 4-2 of

the LGS EP, Revision , entitled "Planning Basis Summary (4)." The General Emergency class includes accidents involving substantial fuel degradation beyond the design basis accident (DBA). Table 4-1 of the LGS EP does not indicate limits on PECO's ability to respond to an emergency beyond the DBA. PECO's instrumentation and mechanisms for prompt detection and continuing assessment of radiological hazards both onsite and offsite, technical expertise available, capability to notify officials and provisions for preplanned protective measures onsite and offsite are sufficient to respond to emergencies of the level of DBA's and beyond. *Sears, ff. Tr. 9776, at 5-6. See, Applicant's Ex. 32.* The LGS EP clearly provides for response to accidents exceeding design basis accidents and, therefore, the Board finds no merit to this contention.

Conclusions of Law

87. Based upon the foregoing Findings of Fact which are supported by reliable, probative and substantial evidence as required by the Administrative Procedure Act and the Commission's Rules of Practice, and upon consideration of the entire evidentiary record in this proceeding, the Board reaches the following conclusion pursuant to 10 C.F.R. § 2.760a:

88. By virtue of the Emergency Plan and implementing procedures concerning onsite emergency preparedness at the Limerick facility, the Applicant has provided reasonable assurance, with regard to the contested issues, that adequate protective measures, which are in compliance with all relevant regulations and criteria, can and will be taken in the event of a radiological emergency at the Limerick Generating Station.

Order

WHEREFORE IT IS ORDERED in accordance with 10 C.F.R. §§ 2.760, 2.762, 2.764, 2.785 and 2.786 of the Commission's Rules of Practice, that this Partial Initial Decision shall become effective immediately and shall constitute with respect to the matters decided therein the final action of the Commission forty-five (45) days after the date of issuance hereof, subject to any review pursuant to the Commission's Rules of Practice.

Exceptions to this Partial Initial Decision may be filed by any party within seven (7) days after service of this Partial Initial Decision. Within fifteen (15) days thereafter (twenty (20) days in the case of the Staff), any party filing such exceptions shall file a brief in support thereof. Within fifteen (15) days of the filing of the brief of the appellant (twenty (20) days in the case of the Staff), any other party may file a brief in support of, or in opposition to, the exceptions.

IT IS SO ORDERED.

THE ATOMIC SAFETY AND LICENSING BOARD

Judge Lawrence Brenner, Chairman

Judge Peter A. Morris, Member

Judge Richard F. Cole, Member

Dated at Bethesda, Maryland
this _____ day of _____, 1984

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))

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S FINDINGS OF FACT AND CONCLUSIONS OF LAW IN THE FORM OF A PARTIAL INITIAL DECISION" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, or as indicated by an asterisk through deposit in the Nuclear Regulatory Commission's internal mail system, this 2nd day of July, 1984:

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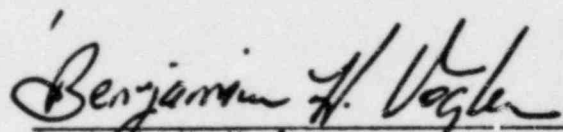
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