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)	)	

TESTIMONY OF MARGARET A. REILLY AND STEPHEN A. RUNKLE
FOR THE COMMONWEALTH OF PENNSYLVANIA REGARDING CITY OF
PHILADELPHIA OFFSITE EMERGENCY PLANNING CONTENTIONS CITY-18 AND CITY-19

The purpose of this testimony is to respond to the City of Philadelphia's concerns regarding protection of the City's water supply in a radiological emergency. The contentions state:

CITY-18

> The State Plan is inadequate in the area of emergency planning because in the plan there is no adequate implementable plan for providing an alternate source of water for the City of Philadelphia which is appropriate to the locale of Philadelphia and which gives consideration to the PAG guidelines, namely, substitution of other drinking water sources, importation of water, rationing, substitution of other beverages and designation of critical users. "Implementable plan" includes consideration of ability to implement in which is included resources available.

CITY-19

> The State Plan is inadequate in the area of emergency planning because in the plan there is no adequate implementable plan or implementable alternatives and methods for decontamination of the City's water supply and water supply system. "Implementable plan" includes consideration of ability to implement in which is included resources available.

Q1. Ms. Reilly, please state your name, address and position with the Commonwealth of Pennsylvania.

A1. My name is Margaret A. Reilly. My business address is P. O. Box 2063, Harrisburg, PA 17120. I am Chief, Division of Environmental Radiation, Bureau of Radiation Protection, Department of Environmental Resources.

Q2. Have you prepared a statement of your professional qualifications?

A2. Yes. My statement is appended to this testimony.

Q3. Mr. Runkle, please state your name, address, and position with the Commonwealth of Pennsylvania.

A3. My name is Stephen A. Runkle. My business address is P.O. Box 1467, Harrisburg, PA 17120. I am a Chief, Delaware River Basin Section, State Water Plan Division, Bureau of Water Resources Management, Department of Environmental Resources.

Q4. Have you prepared a statement of your professional qualifications?

A4. Yes, My statement is appended to this testimony.

Q5. What is the purpose of offsite emergency plans for nuclear power station accidents?

A5. The purpose of offsite emergency plans for nuclear power station accidents is service as a decision making tool for offsite authorities for the avoidance of radiation dose and dose commitment by the public. The plans contain methods and procedures developed before real need occurs so that protective

action for dose and avoidance can be carried out expeditiously. The plans serve to relieve the implementors of the need to develop dose criteria, protective action rationale and implementation methods while in the stressful period of real emergency, when time is essential.

Q6. How do the plans satisfy the function?

A6. The plans satisfy the function by describing the responsibilities of parties to the plans, response organization, communications accident assessment techniques, dose criteria, protective action guides, alert and notification, resources, facilities equipment, protective action options, exposure control, and protection of ingestibles. Also included are housekeeping items such as plan development and updating, training of response personnel and exercises. The plans contain general guidance for re-entry and recovery operations.

The 'ans" consist of the Pennsylvania Disaster Operations Plan Annex E, which includes Appendix 12, the DER Bureau of Radiation Protection Plan for Nuclear Power Generating Station Incidents (Rev. 4a), and Appendix 17, Protection of Ingestion Pathway; DER/BRP Implementation Procedures; the PEMA Duty Officer Instruction Book Annex L, Appendix 8; and Limerick Generating Station Emergency Procedures.

Q7. How could accidents at Limerick Generating Station impact the water supply of the City of Philadelphia?

A7. Three kinds of accidents could impact the City of Philadelphia water supply. The least complicated is the accidental release of liquid effluents in concentrations in excess of 10 CFR 20 criteria. This condition could lead to concentrations at the City intakes at Belmont and Queen Lane in excess of values set forth in the National Interim Primacy Drinking Water Regulations. In this situation the initial concentration, the radionuclide mix, discharge duration, and travel time are known.

The plan calls for notification of the City and other downstream users with the recommendation to curtail intake in advance of estimated arrival time, through the duration of plume passage. The plan also calls for stream sampling and analysis for assessment and confirmation of existing conditions, and for ongoing communications. This circumstance is straight forward and relatively easy to deal with. All of the potential dose to users can be avoided. In addition, the need for alternate water supplies or for product and system decontamination should not arise.

A description of the sequence of events for accidental releases to the Schuylkill from Limerick follows:

1. The licensee detects the occurrence of the release in excess of 10 CFR 20 concentrations. This amounts to an unusual event according to Limerick Generating Station Emergency Procedure EP101 Rev.2. It will also produce concentrations at downstream intakes which equal or exceed Safe Drinking Water criteria.
2. Licensee contacts PEMA according to LGS Emergency Procedure EP102 Rev. 5, Appendix 102-3 Rev. 4, p.7.
   2a. Licensee contacts downstream users according to EP-312 Rev. 0 p.3 if concentrations are greater than 500 Unidentified Isotope MPC's, if requested by DER.
3. PEMA contacts BRP according to Annex E, Appendix 7, Attachment E.
4. Bureau of Radiation Protection calls LGS to verify message according to DER/BRPIP-001.
5. Bureau of Radiation Protection calls PEMA back according to DER/BRP/IP-001.
6. Bureau of Radiation Protection calls the City of Philadelphia Water Dept. Load Control according to DER/BRP/IP-209.
7. PEMA calls City of Philadelphia EMA according to PEMA Duty Officer Instruction Book, Annex L, Appendix 8.

8. Bureau of Radiation Protection calls Regional Bureau of Water Quality for stream sampling and Bureau of Community Environmental Control for sampling water supplies and notification of downstream users. (Annex E, Appendix 17 III A.2.)

Since the delivery time of the effluent from LGS to the Belmont intake is at least 50 hours, time to sample, analyze assess and confirm/discount a protective action appears to be adequate.

The other conditions which could impact the water supplies are:

(1) Severe accidents which result in containment melt-through to impact ground water and eventually the Schuylkill; and

(2) Severe accidents which result in airborne contamination which impact surface water by direct deposition and runoff.

Reactor accidents which threaten water supplies by containment melt-through or by deposition and runoff produce less clear cut parameters for predicting stream concentration, radionuclide mix, duration and delivery time than do accidental liquid discharges. However, the knowledge of their occurrence and the understanding of their potential threat to water supplies are more straight forward. In either case, large quantities of fission products will be loose in the environment and available for contamination of water supplies.

The City of Philadelphia is notified by PEMA for any accident at Limerick through the PEMA Duty Officer Instruction Book, Annex L, Appendix 8.

Depending on a host of factors the City water supply may or may not be at risk for contamination, immediately or long term. The City will be provided with Bureau of Radiation Protection recommendations based on the best judgments available.

Q8. How do these planning items satisfy NUREG-0654 "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants."

A8. Section J.11 calls for State specification of "the protective measures to be used for the ingestion pathway, including the methods for protecting the public for consumption of contaminated food stuffs."

Section J.11 goes on to state that "the plan shall identify procedures for detecting contamination, for estimating dose commitment consequences for uncontrolled ingestion, and for imposing protection procedures such as (emphasis added) impoundment, decontamination, processing, decay, product diversion, and preservation."

The several methods constitute possible options for protection. The fact that several methods are identified does not imply that all, or for that matter, any one be used. Impoundment is the option which the Bureau of Radiation Protection will choose in the face of threats to water supplies because that option provides the most effective dose avoidance. Impoundment will protect the public from ingesting contaminated water, a foodstuff. It is the option which the State will recommend for other ingestibles which fail

to meet Protective Action Guides. If the distributor of any ingestible chooses to use another protective action, he is entitled to try to do so.

The State does not plan to decontaminate any ingestible.

Q9. If an accident occurs at Limerick which results in melt-through to groundwater or in direct deposition and runoff to water supplies, how will the water supply situation be addressed?

A9. If one of these severe accidents were to occur at Limerick, the first consideration for the emergency response community is the reduction of the unavoidable exposure to the public from cloud shine, inhalation and ground shine. The second consideration is the reduction of avoidable exposure of the public through ingestion.

Once protective actions against unavoidable and avoidable exposures are implemented, the situation evolves into a re-entry and recovery mode. This mode deals with radiological evaluation followed by the orderly return of the population to evacuated areas, the restoration of the economic base, and the litany of considerations to be dealt with following a disaster. One such consideration is restoration of water supplies.

Reactor accidents of this severity would result in widespread contamination. After the State has made appropriate protective action recommendations and such actions have been implemented governments and emergency response organizations will be dealing with a situation for which there is no experience.

The organizational and material support to deal with providing the basic necessities of evacuated populations, the restoration of contaminated facilities and the restoration of economic base, and attending to all the social and economic consequences of such an upheavel over a large geographic area would certainly exceed the resources of any State in the nation. The work of continuing radiological assessment over fairly large geographic areas alone would transcend the capability of any State radiation protection organization.

In these circumstances, the Governor would ask the President for a declaration of major disaster pursuant to Section 301(b) of the federal Disaster Relief Act of 1974, P.L.93-288, 42 U.S.C. 5121 et seq. Assistance in the repair and restoration of public facilities is authorized in Section 402(a) of the Act. "Public facilities" are defined in Section 402(d) to include publicly owned water supply and distribution systems. The State Disaster Operations Plan, Annex E, Appendix 18 specifically contemplates the invocation of P.L. 93-288 when additional resources are needed.

Q10. If a severe accident were to occur at Limerick, what actions are available to the City of Philadelphia to provide water to its users?

A10. Assuming the Schuylkill River and watershed to be contaminated by deposition or melt-through, the City could meet essential water supply demands by bringing the bulk of the water required from the Baxter Intake on the Delaware River.

Of the current average City water use of 340 million gallons per day (mgd), 53 percent or 180 mgd is drawn from the Delaware River through the Baxter Intake, 60 mgd is drawn from the Schuylkill through the Belmont Intake, and 100 mgd is drawn from the Schuylkill through the Queen Lane Intake. The City has indicated that in an emergency the Baxter Intake could provide 120 to 125 mgd of the 160 mgd shortfall if the Schuylkill were "lost" as a water source. Water from Belmont would still be needed, however, to serve parts of the City Line Avenue Area, and Queen Lane water would still be needed to serve parts of Chestnut Hill and Roxborough.

The estimated time to implement is one or two days. The City would have to design the valving procedure to effect the augmentation from the Baxter Intake. The State Water Plan indicates that the City has one and one-half days supply treated water storage (504.6 million gallons) within the distribution system. with all but one reservoir (67 million gallons) being covered.

It would appear that adequate protected supplies are on hand for service while the valve lineup to Baxter Intake is effected.

The State can offer no viable alternative sources to replace the loss of the Baxter Intake on the Delaware for whatever reason.

In addition to diversion from the Delaware through the Baxter Intake, other supplemental options may be considered. The City Drought Water Emergency Plan, implemented by the City in the drought of 1980-81 effected a savings of 29 mgd during the interval from February through November, and 49.6 mgd during June, July and August of 1981. Restrictions on water use should therefore bring about some savings.

Another possible action is the continued use of the Schuylkill for the bulk of water demand (sanitation and firefighting) with substitution of packaged fluids from outside the impacted area for direct ingestion and food preparation. This approach could result in the contamination of the distribution system. Flushing the lines of the distribution system would be the first decontamination method used, after the combination of some kind of water treatment and raw water supply condition were expected to produce acceptable water quality.

Q11. Are methods for decontamination of water supplies available?

A11. Several methods are available in the literature for the removal of radioactive materials from water. The references offered with the testimony of NRC Staff Witness John C. Lehr dated June 4, 1984 with regard to City of Philadelphia DES Contention City-15 lists a number of methods.

Q12. If decontamination is listed in NUREG-0654 Section J.11 as a protective action option and methods are available, why does the State plan not contemplate that option for domestic water supplies?

A12. The objective of the State emergency plan is service as a tool for deciding whether a protective action for dose avoidance is needed during an emergency, and the communication of that decision to implementors. The protective action for dose avoidance from the water pathway is impoundment, or the recommendation against its use for human consumption.

In order for decontamination to become a true protective action for water supplies the treatment system for that decontamination would need to be continuously in place. This is contrary to guidance provided in NUREG-0396, "Planning Bases for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants." Section III.A. of that document lists examples of programs which are not recommended. These include "no new construction of special public facilities for emergency use." A new water treatment system would certainly be a new public facility.

Decontamination of water supplies as an add-on following impoundment, or as a true protective action option, would, in any case, require empirical knowledge of the actual consequences to the water supply for an event which, though modelled, has never occurred in this country.

The degree of decontamination required, which depends on radionuclide species and concentration actually in raw water, and their variability with time would have to be dealt with after the accident. The outcome predicted by a model becomes irrelevant in the face of the real event when one comes to the treatment of what may well be a long term problem.

If the State were to adopt some scheme for decontamination of water supplies as a protective action or as a recovery operation, it may not be effective in the actual circumstance.

Decontamination of water supplies is rightfully a recovery operation. NUREG-0654 Section M. Recovery and Reentry Planning and Post-accident Operations requires only general planning for recovery. It seems to be aware that government must deal with what exists; and that what exists may well not be something which can be effectively planned for in any detail.

At the severe end of the range of accident consequences which would result in a long term threat to water supplies, the State would in all probability invoke P.L.93-288 in order to secure federal assistance for manageing this and other recovery issues.

Q13. Could the City of Philadelphia itself plan for alternate water supplies or for decontamination of the City water supply?

A13 NUREG-0654, Section J. Protective Response, Item 9 states that "each State and local (emphasis added) organization shall establish a capability for implementing protective measures based on protective action guides and other criteria." The City has a responsibility for establishing its own capability to implement protective actions in a radiological emergency.

The City is also responsible for emergency planning with regard to its water supply under state law. The Pennsylvania Safe Drinking Water Act, the Act of May 1, 1984 (P.L.206, No.43) mandates the establishment of a public drinking water program capable of satisfying the federal Safe Drinking Water Act of 1974 requirement that states assume primary enforcement responsibility for safe drinking water. The State Department of Environmental Resources is required to adopt a water supply program which, among other things, ensures that each community water supplier develops emergency response procedures. Proposed regulations recently published by the Department direct each community supplier to develop a plan for the provision of safe and adequate drinking water under emergency circumstances. See 14 Pa. B. 3225, 3237 (Sept. 1, 1984), Section 109.707, to be codified at 25 Pa. Code Ch. 109. An emergency water plan must be prepared and submitted to the Department for approval within one (1) year of the effective date of these regulations. Final regulations will be effective upon publication, currently expected in late November 1984.

Professional Qualifications

MARGARET A. REILLY

Pennsylvania Department of Environmental Resources

Bureau of Radiation Protection

I am currently employed as Chief, Division of Environmental Radiation. My responsibilities include the routine surveillance of nuclear power stations in Pennsylvania and planning for the radiological assessment of accidents at these facilities.

Responsibilities related to emergency planning include participation in drills and exercises, and response to actual accidents, including the March 28, 1979 accident at Three Mile Island. Related responsibilities also include consultation with the staff State and Federal agencies having direct interest in reactor accidents, with staff of nuclear utilities, and with staff of radiation protection agencies in neighboring states. Responsibilities also include the development and maintenance of written plans, procedures, and equipment.

I serve on the Conference of Radiation Control Program Directors, Inc. Task Force E-6 "Emergency Planning" which concerns itself with radiation protection issues related to emergency planning nationwide.

I have a Bachelor of Science degree in Chemistry from College Misericordia (1963) and a Master of Science degree in Radiation Science from Rutgers, the State University (1967). I am a Health Physicist certified by the American Board of Health Physics (1975).

From 1963 to 1964, I was employed as a chemist in the Pennsylvania Department of Property and Supplies, Bureau of Standards. From 1964 to 1966, I was employed as a chemist in the Pennsylvania Department of Health, Bureau of Industrial Hygiene. From 1967 to the present I have been employed as a Health Physicist with primary responsibilities in routine surveillance and emergency planning with the Pennsylvania Department of Health until 1971 and, thereafter with the Department of Environmental Resources.

RESUME

Stephen A. Runkle
Hydraulic Engineering Supervisor II

EDUCATION:

Lehigh University, Bachelor of Science in Civil Engineering, June 1968.

The Pennsylvania State University, Master of Engineering in Civil Engineering (major in Water Resources), June 1971.

REGISTRATION:

Professional Engineer: Pennsylvania 1972

EXPERIENCE

EMPLOYER:

Pennsylvania Department of Highways (Summers of 1966 and 1967)

As a Civil Engineer Trainee, Mr. Runkle's duties included surveying, construction inspection and materials testing on two sections of the Pennsylvania Shortway (Interstate Route 80).

Pennsylvania Department of Environmental Resources (formerly Pennsylvania Department of Forests and Waters) (1968 to present)

As a Hydraulic Engineer Trainee, Mr. Runkle worked in each of the Divisions and Branches comprising the Department's Bureau of Engineering. His duties included surveying, construction inspection, hydraulic design, stream gaging and stream improvement operations.

As a Hydraulic Engineer I, Mr. Runkle did a preliminary design and cost analysis for the Swoyersville-Forty Fort Flood Control Project. Principle features of the project included ponding areas, flood channels and box culverts.

As a Hydraulic Engineer II, Mr. Runkle participated in both Interstate and State Water Resources studies and planning activities. At the Interstate Level, Mr. Runkle prepared a detailed report on the water supply sources and future water requirements of the Pennsylvania portion of the Delaware River Basin as part of a four State water supply study. On the State Level, Mr. Runkle conducted several water resources inventory studies in order to obtain input data for the State Water Plan. These statewide investigations included mapping and analyzing public water supplies, self-supplied industry and water allocations for public suppliers; and assessing flood da[illegible]ges from past floods.

Mr. Runkle represented the Department at meetings of the Technical Advisory Committee on Water Supply and Waste Disposal of the Delaware Valley Regional Planning Commision in Philadelphia.

As a Hydraulic Engineer III, Mr. Runkle supervised and prepared major portions of the State Water Plan draft report for Subbasin 3. This report included the topographic, physiographic, geologic, mineral and hydrologic background of the subbasin, along with water supply, demand, and source analyses for individual public water suppliers and watersheds within the subbasin. Mr. Runkle reviewed and prepared position statements on the environmental impacts of several major water resources projects. In addition, he supervised the water demand projections for all public water suppliers, self-supplied industry, power generating stations, agriculture, institutions and rural domestic users within the Commonwealth.

As a Hydraulic Engineer IV and Hydraulic Engineering Supervisor II, Mr. Runkle supervised State Water Plan activities for the Eastern portion of the Commonwealth. These activities included preparation and final publication of nine State Water Plan subbasin reports involving problem assessment and solution recommendations in each of the following functional areas: water supply, flood damage reduction, water oriented recreation, water quality and wild and scenic rivers. Detailed consideration was given to the physical, economic, environmental and social implications of each alternative before recommendations were made.

Mr. Runkle participated as a work group member, and in some cases as Pennsylvania's representative, in numerous interstate and River Basin Commission studies including the Delaware River Basin Comprehensive Level B Study, the Chesapeake Bay Model and Comprehensive Study, the National Water Assessment, the Northeastern United States Water Supply Study, the Susquehanna River Basin Groundwater Study and the Delaware River Basin Groundwater Study and Streamflow Management Study. These responsibilities included data input, materials review, plan formulation, coordination activities, work group meetings, advisory group meetings and special studies.

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 "Testimony of Ralph J. Hippert and Donald F. Taylor," "Testimony of Dr. Michael A. Worman," "Testimony of Henry W. Farrell and Fred N. Starsinic," "Testimony of Robert L. Reber," "Testimony of Margaret Reilly and Steven Runkle," "Testimony of Robert C. Furrer," "Testimony of Colonel Eugene P. Klynoot," and "Testimony of Margaret A. Reilly" 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 Commonwealth of Pennsylvania's internal mail system, or, as indicated by a double asterisk, by U.S. Postal Service Express Mail, this 1st day of November 1984:

**Helen F. Hoyt
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

**Dr. Richard F. Cole
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

**Dr. Jerry Harbour
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Atomic Safety and Licensing Appeal Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

**Troy B. Conner, Esq.
Conner and Wetterhahn, P.C.
1747 Pennsylvania Avenue, N.W.
Washington, D.C. 20006

Docketing and Service Section
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

**Benjamin H. Vogler, Esq.
Counsel for NRC Staff
Office of the Executive Legal Director
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Robert L. Anthony
Friends of the Earth of the
Delaware Valley
P.O. Box 186
103 Vernon Lane
Moylan, PA 19065

Joseph H. White, III
15 Ardmore Avenue
Ardmore, PA 19003

Charles W. Elliott, Esq.
Brose and Postwistilo
1101 Building
11th & Northampton Streets
Easton, PA 18042

*Thomas Gerusky, Director
Bureau of Radiation Protection
Dept. of Environmental Resources
5th Floor, Fulton Bank Building
Third and Locust Streets
Harrisburg, PA 17120

**Phyllis Zitzer
Limerick Ecology Action
P.O. Box 761
Pottstown, PA 19464

Steven P. Hershey, Esq.
Community Legal Services, Inc.
Law Center West
5219 Chestnut Street
Philadelphia, PA 19139

Timothy R.S. Campbell
Director
Dept. of Emergency Services
14 East Biddle Street
West Chester, PA 19380

Philadelphia Electric Company
ATTN: Edward G. Bauer, Jr.
Vice President & General Counsel
2301 Market Street
Philadelphia, PA 19101

Angus Love, Esq.
101 East Main Street
Norristown, PA 19104

*David Wersan, Esq.
Assistant Consumer Advocate
Office of Consumer Advocate
1425 Strawberry Square
Harrisburg, PA 17120

Martha W. Bush, Esq.
Kathryn S. Lewis, Esq.
City of Philadelphia
Municipal Services Building
15th and JFK Boulevard
Philadelphia, PA 19107

*Director, Pennsylvania Emergency
Management Agency
B-151, Transportation & Safety Bldg.
Harrisburg, PA 17120

**Spence W. Perry, Esq.
Associate General Counsel
Federal Emergency Mgmt. Agency
500 C. Street, S.W., Rm. 840
Washington, D.C. 20472

J. Gutierrez, Esq.
U.S. Nuclear Regulatory
Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

Zori G. Ferkin
Assistant Counsel
Governor's Energy Council

Date: November 1, 1984