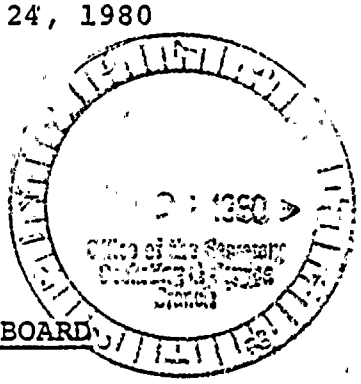
October 24, 1980



UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
PENNSYLVANIA POWER & LIGHT COMPANY	)	Docket Nos. 50-387
and	)	50-388
ALLEGHENY ELECTRIC COOPERATIVE, INC.	)	
	)	
(Susquehanna Steam Electric Station, Units 1 and 2)	)	

AFFIDAVIT OF WALTER J. RHOADES
IN SUPPORT OF SUMMARY DISPOSITION OF
CONTENTION 16 (COOLING TOWER DISCHARGE)

County of Lehigh)
: SS
Commonwealth of Pennsylvania)

Walter J. Rhoades, being duly sworn according to law, deposes and says as follows:

1. I am Nuclear Group Supervisor - Mechanical, Nuclear Plant Engineering Department, Pennsylvania Power & Light Company, and give this affidavit in support of Applicants' Motion for Summary Disposition of Contention 16 (Cooling Tower Discharge). I have personal knowledge of the matters set forth herein and believe them to be true and correct. A summary of my professional qualifications and experience is attached as Exhibit "A" hereto.

2. Contention 16 in this proceeding asserts that seventy million gallons of radioactive evaporated water will be vented daily from the two cooling towers of the

Susquehanna facility, posing an economic threat to the dairy industry in the Eastern - Central area of Pennsylvania. The contention is erroneous. The water which will be evaporated from the Susquehanna cooling towers on a daily basis will not contain radioactivity from the facility.

3. Water evaporated from the cooling towers comes from the three sources of water supplied to the towers. These three sources are makeup water, the return flow of the Circulating Water System, and the return flow of the Service Water System. None of these sources are radioactive. Therefore, the water evaporated from the cooling towers is not radioactive.

4. The cooling towers are used to cool the Circulating Water and Service Water Systems. Water to be cooled is supplied to the towers and is distributed above the fill inside the towers. Due to the heating of the air in the towers and the height of the structure, air is drawn into the towers below the fill and flows upward, coming into contact with the water flowing downward. The air picks up heat from the water. Some of the water is evaporated and is carried out of the towers with the heated air. The cooled water which is not carried out of the towers with the heated air is collected in the cooling tower basins (large reservoirs at the base of the towers) and recirculated through the Circulating Water and Service Water Systems. To replace the water lost by evaporation, makeup water is supplied to the cooling tower basins from the Susquehanna River.

5. The makeup water supplied to the basins from the Susquehanna River is not mixed with any other plant water and thus cannot be the source of radioactive contamination.

6. The other two sources of water to the cooling towers, the Circulating Water and Service Water Systems, draw water from the cooling tower basins and circulate the water through various equipment in the plant for cooling before returning the water to the cooling towers. Both Systems are designed so that they are not radioactive. This is accomplished with two independent methods. First, both Systems have physical barriers (i.e., tube walls in heat exchangers) between the water which eventually flows to the cooling towers and any radioactive fluids. These barriers are to assure that there is no physical contact between water which may be evaporated in the cooling towers and radioactive fluids. Second, the Systems are designed so that if there is a breach in these physical barriers, radioactive contamination will not enter the Systems. This is achieved by operating the Systems at a higher pressure than the systems that contain radioactive fluids. Thus, if there should be a breach in any of the physical barriers, the flow will be <u>from</u> the Circulating and Service Water Systems <u>into</u> the systems containing radioactive fluids, rather than from the systems containing radioactive fluids into the Circulating Water and Service Water Systems.

7. The only equipment cooled by the Circulating Water System is the main turbine condenser. Steam produced in the reactor passes through the turbine. The energy of the steam is used to spin the turbine which drives the plant's electrical generator. In the process of giving up the energy in the steam, its pressure is reduced. The reduced pressure steam is exhausted from the turbine into the plant's main turbine condenser at pressures lower than atmospheric pressure. The circulating water passes through stainless steel tubes inside the condenser. The reduced pressure steam is condensed into water outside the tubes and is pumped back to the reactor. Under normal operating conditions, there is no exchange between circulating water and the steam. Even if a condenser tube were to develop a leak, circulating water would flow out of the tube into the condenser because the steam is condensing at a pressure much lower than the pressure in the Circulating Water System. As a further precaution, if the pressure of the condensing steam rises above 7.3 inches of mercury absolute (a pressure lower than that of the circulating water), the turbine is automatically tripped and the flow of steam to the condenser stopped. Thus, even at the point at which the flow of steam to the condenser would be shut off, any flow would be from the Circulating Water System into the condenser.

8. The Service Water System is similar to the Circulating Water System in that water drawn from the cooling

tower basin is pumped through plant equipment as a cooling medium and returned to the cooling tower. Nineteen groups of equipment are cooled by the Service Water System:

1) ISO-Phase Bus Cooler
2) Generator Stator Coolers
3) Generator Alterrex Air Coolers
4) Generator Hydrogen Coolers
5) Turbine Lube Oil Coolers
6) Turbine Building Closed Cooling Water Heat Exchangers
7) Radwaste Building Chillers
8) Radwaste Evaporator Condensers
9) Control Structure Chiller
10) Reactor Feed Pump Turbine Lube Oil Coolers
11) Turbine Building Chillers
12) Motor-Generator Set Hydraulic Fluid Coolers
13) Reactor Building Closed Cooling Water Heat Exchangers
14) Reactor Building Chillers
15) Pipe Tunnel Coolers
16) Gaseous Radwaste Recombiner Closed Cooling Water Heat Exchanger
17) Fuel Pool Heat Exchangers
18) Radwaste Evaporator Condensate Tank
19) Emergency Switchgear & Load Center Air Handling Unit

Only groups 8, 13, 16 and 17 contain potentially radioactive fluids. The remaining fifteen groups do not contain radioactive fluids and do not come in contact with radioactive fluids.

9. As with the Circulating Water System, physical barriers (i.e., tube walls in heat exchangers) separate the service water from potentially radioactive fluids. And as with the Circulating Water System, the service water is maintained at a pressure higher than the pressure of the fluids being cooled. Thus, in the event of a breach in the physical barriers in the various chillers, coolers and heat exchangers, service water would flow <u>into</u> the fluid being cooled and the

Service Water System would not be contaminated. The following is a description of the four instances where the Service Water System cools potentially radioactive fluids:

a. Radwaste Evaporator Condensers: There are two radwaste evaporators. One is used as a backup to the normally operating evaporator. One evaporator handles liquid radwaste from both units; however under heavy loads the backup evaporator may be used to augment the normally running system. The steam going to the radwaste evaporator condenser is non-radioactive or at most slightly radioactive. The operating pressure existing in the evaporator condenser is 1 psig. Service water is supplied to the evaporator condenser at a pressure of approximately 128 psig. Even if a tube should leak, the lower pressure condenser water would not leak into the higher pressure service water.

b. Reactor Building Closed Cooling Water Heat Exchangers: This system has two 100% capacity heat exchangers. The water on the reactor building closed cooling water (RBCCW) side is circulated at a pressure of approximately 81 psig. The service water is supplied at a pressure of approximately 108 psig. Even if a heat exchanger tube should leak, the lower pressure RBCCW would not leak into the higher pressure service water. Under normal circumstances, the RBCCW is itself non-radioactive, although it could become radioactive if a tube leak were to occur in one of the heat exchangers which it serves. However, the pressure

differential between the RBCCW and the Service Water System will prevent any RBCCW leakage into the service water.

c. Gaseous Radwaste Recombiner Closed Cocling Water Heat Exchanger: Three 100% capacity gaseous radwaste recombiner closed cooling water heat exchangers are provided. One heat exchanger is provided for Unit 1, the second heat exchanger is for Unit 2, and the remaining heat exchanger acts as a common backup to both Units 1 and 2. Closed cooling water (CCW) is supplied to the recombiner condenser, motive steam jet condenser and the condensate cooler. These three heat exchangers all contain radioactive fluids on the shell side. The shell side pressure for these exchangers is less than 5 psig. The CCW circulates on the tube side at a pressure of about 76 psig. Therefore the lower pressure (shell side) radioactive water cannot be passed into the higher pressure CCW tube side even if a tube should leak in any of these exchangers. Service water is supplied to the gaseous radwaste recombiner CCW heat exchanger at 128 psig. Since the CCW side pressure is about 76 psig, leakage into the Service Water System is not possible should a tube leak in this exchange occur. Further, the CCW should never be radioactive due to the pressure differences between the shell and tube side of the condensate cooler, recombiner condenser and motive steam jet condenser and the gaseous radwaste recombiner CCW system.

d. Fuel Pool Heat Exchangers: The system consists of three heat exchangers. Water to be cooled from the fuel pool flows by gravity through the fuel pool heat exchangers. A maximum pressure of 30 psig is developed due to the static head from the skimmer surge tank to the fuel pool heat exchanger. Service water circulates through the heat exchanger at a pressure of 84 psig. Leakage into the Service Water System is not possible due to the difference in pressure between the two systems.

10. Based on the above described system design, it is my opinion that no radioactive water will be vented from the Susquehanna cooling towers.

Walter J. Rhoades

Walter J. Rhoades

Sworn to and subscribed
before me this 24th day
of OCT., 1980.

JOHN P. MILLER, JR., Notary Public
Allentown, Lehigh County, Pa.
My Commission Expires May 24, 1981

WALTER J. RHOADES

Nuclear Group Supervisor - Mechanical
Nuclear Plant Engineering
Pennsylvania Power & Light Company

Education

Formal

Drexel University, B.S.M.E. (1970)
Graduate Course in Nuclear Engineering - Lehigh University (1979)

Continuing Education

Boiling Water Reactor Technology
Light Water Reactor Safety Course
Probability and Risk Assessment
Single and Multiphase Transients in Reactors and Nuclear Piping Systems
Quality Assurance and In-Service Inspection
ASME Code Design Course
ASME Radwaste Systems Design

Registration

Professional Engineer, Commonwealth of Pennsylvania (PE-22519-E)(1974).

Work Experience

June, 1974 - Present

Nuclear Group Supervisor-Mechanical, Susquehanna Project. Assigned to manage and provide techical supervision of the mechanical/nuclear group. Responsible for directing technical reviews of the design work being done for PP&L by General Electric Company and Bechtel Corp. in the area of mechanical/nuclear systems. The mechanical/nuclear group presently consists of twenty (20) engineers. Its responsibilities include reviewing system drawings and equipment specifications for over eighty plant systems. This review includes an evaluation of materials used, design specifications, interface requirements, and conformity with applicable industry standards and NRC requirements.

Current position includes responsibility for the substantive work of the engineers of the mechanical/nuclear group and is the highest position in PP&L with technical responsibility for the design and safety of these eighty systems. Among these systems

are the Service Water and Circulating Water Systems which are the only two systems connected to the cooling towers.

Generated a Service Water System Computer Analysis covering steady state operation of the service water system. The analysis verified pressure in the system to ensure that the correct pressure differences were maintained.

December, 1971 - June, 1974

Engineer & Project Engineer - Responsible for design reviews and equipment specifications for Circulating Water, Feedwater, Condensate, Extraction, Air Removal and Sealing, Compressed Air, Reactor Feedback Pump Turbine, High Pressure Coolant Injection and Reactor Core Isolation Cooling systems. Provided reviews of codes and standards information for both PSAR and FSAR reviews to ensure that the proper codes were included. This work required a working knowledge of both the applicable codes and the systems involved.

Performed initial work for in-service and pre-service inspection programs. Responsible for reviewing and approving specifications for the main condenser and other heat exchangers in the plant. Responsible for reviewing analysis of circulating water hydraulic transients in the plant

Other work Experience

BALDWIN-LIMA-HAMILTON CORPORATION, Eddystone, Pa.

Engineer: Responsible for the design and installation of large steam surface condensers. Work consisted of processing design from conceptual to final stages. Responsible for substantive technical discussions with customer, procurement of materials and supervision of the work through completion of the system. Also responsible for condenser design at Duke Power Company's Oconee Station and the engineering of supports for the vertical feedwater heaters.

Assistant Engineer: Duties included structual design calculations of large steam surface condensers, land based desalting plants and feedwater heaters. Design of these pressure vessels involved use of ASME Section VIII, HEI and TEMA standards. Duties also included the preparation of technical literature, maintenance manuals, proposals and computer applications.

February, 1967 to September, 1967

NATIONAL LICORICE COMPANY, 13th and Washington Avenue, Philadelphia, PA.

Plant Engineer: Supervisor of maintenance. Responsible for the installation of new equipment and purchasing of maintenance supplies. Maintenance Department consisted of five (5) mechanics, two (2) helpers and a foreman. Work with outside vendors included installation of a new office and facilities for freight manager, extensive in-plant revisions of facilities such as cafeteria and machinery which included boiler feed system, packing machines and process equipment.

January, 1964 to February, 1967

GENERAL ELECTRIC COMPANY, 69th and Elmwood Avenue, Philadelphia, PA.

Tool and Die Trainee: Received training consisting of 4,000 shop hours and 2,000 hours in various assignments including tool design and manufacturing engineering.

THOMAS AND HAIR

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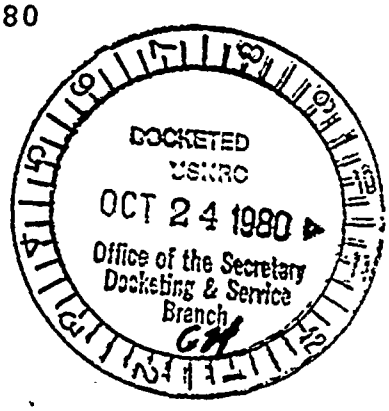
October 23, 1980



Mr. Samuel Chilk, Secretary
Docketing and Service Branch
US Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Susquehanna Steam Electric Stations 1 & 2
Docket Nos. 50-387, 50-388

Dear Mr. Chilk:

Pursuant to 10 CFR § 2.715 (a), I hereby request time to make a limited appearance statement at the licensing proceedings for the above captioned facility (Applicant: Pennsylvania Power & Light Co.).

Kindly advise me when and where the hearings will take place, and when my statement will be heard.

In order to ensure adequate public input, I would request that time be made available on weekends and/or evenings for these statements.

Thank you for your attention to this request.

Very truly yours,

Charles W Elliott

CHARLES W. ELLIOTT

CWE:seh

Acknowledged by card.....10/24/80

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
PENNSYLVANIA POWER AND LIGHT COMPANY	)	Docket No.(s) 50-387 50-388
(Susquehanna Steam Electric Station, Units 1 and 2)	)	

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document(s) upon each person designated on the official service list compiled by the Office of the Secretary of the Commission in this proceeding in accordance with the requirements of Section 2.712 of 10 CFR Part 2 - Rules of Practice, of the Nuclear Regulatory Commission's Rules and Regulations.

Dated at Washington, D.C. this
24th day of Oct 1980.

Peggy K. Dawning
Office of the Secretary of the Commission

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
PENNSYLVANIA POWER AND LIGHT COMPANY, ET AL.	)	Docket No.(s) 50-387 50-388
	)	
(Susquehanna Steam Electric Station, Units 1 and 2)	)	

SERVICE LIST

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