UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

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

APPLICANT'S STATEMENT OF MATERIAL FACTS AS TO WHICH THERE IS NO GENUINE ISSUE TO BE HEARD WITH REGARD TO CONTENTIONS V-3a AND V-3b

1. The Atlantic Richfield Company ("ARCO") refined petroleum products pipeline passes within about 1,600 feet of the Unit 2 reactor enclosure, which is the nearest it approaches safety-related structures (Affidavit of John D. Walsh at ¶4).

2. The pipeline is approximately 1,675 feet from the Unit 2 diesel generator building at its closest point of approach (Walsh Affidavit at ¶4).

3. The pipeline runs generally north-south in the vicinity of the plant; pumpages are in a northward direction (Walsh Affidavit at ¶4).

4. Routing of the pipeline and its relationship to the Limerick Station is as shown on FSAR Figure 2.2-4 (Walsh Affidavit at ¶4; Affidavit of Vincent S. Boyer Regarding Contentions V-3a and V-3b at ¶¶2-3).

5. This pipeline is buried a minimum of three feet below grade (Walsh Affidavit at ¶4).

6. The pipeline is a dedicated carrier for refined ARCO petroleum products such as gasoline and diesel and home heating oil (Walsh Affidavit at ¶ 4).

7. Propane is not and never has been carried by this pipeline, and could not be carried by the pipeline without major modifications (Walsh Affidavit at ¶4).

8. Philadelphia Electric Company has obtained an agreement from ARCO that it will not transport propane through this pipeline (Walsh Affidavit at ¶4; Boyer Affidavit at ¶4).

9. The pumping stations for this pipeline are equipped with pressure sensors to detect a sudden rise or fall in pressure which could indicate a leak or break in the lines (Walsh Affidavit at ¶5).

10. The pumps would automatically be shut off in this event (Walsh Affidavit at ¶5).

11. Following a pipeline rupture, operators monitoring the pipeline and pump stations would also note a speedup of the pumps and could terminate pumping (Walsh Affidavit at ¶5).

12. Even small pipeline leaks would be detected through routine inventory procedures in a relatively short time (Walsh Affidavit at ¶5).

13. Analyzing the potential effects upon the Limerick Station from a rupture of this pipeline, it is conservative to assume a gasoline release since gasoline is the most

volatile substance carried and has the highest energy content (Walsh Affidavit at ¶5).

14. Possum Hollow Run is the lowest point between the adjacent high points of the terrain in the vicinity of the Limerick Station (Walsh Affidavit at ¶6).

15. Rupture of the pipeline at this location would have the greatest effect on the Station (Walsh Affidavit at ¶6).

16. Ruptures of the pipeline at other locations in the vicinity would either release less gasoline, because of the relative elevation, or the gasoline would drain into other, less proximate drainage systems (Walsh Affidavit at ¶6).

17. Such ruptures would have less effect (Walsh Affidavit at ¶6).

18. The entire calculated gasoline content of the pipeline between those two adjacent high points of land (1,400 feet north and 600 feet south) is 4,962 gallons (Walsh Affidavit at ¶7).

19. Assuming that 4,962 gallons of gasoline flowed into the streambed, it would be distributed over the bed between the pipeline and the first downstream bridge in a pool 610 meters by 1 meter wide by approximately 3 centimeters deep (Walsh Affidavit at ¶7).

20. The pooling capacity of the creek bed is very small (Walsh Affidavit at ¶7).

21. Even if more than the entire calculated gasoline content of the pipeline between the two high points were

released, the additional gasoline would drain downstream away from the plant (Walsh Affidavit at ¶7).

22. Accordingly, larger releases than postulated would not significantly change the predicted impact on the Station (Walsh Affidavit at ¶7).

23. Assuming pipeline failure, air would enter the lines at the point of rupture and travel through the upper portions of the pipe above the surface of the draining fluid until it reached the adjacent high points, where it would accumulate and prevent further drainage by gravity flow (Walsh Affidavit at ¶8).

24. No siphoning effect would occur from beyond the high points because a siphon requires the presence of atmospheric pressure at both ends (Walsh Affidavit at ¶8).

25. Gasoline from the ruptured pipeline would distribute in the Possum Hollow Run creek bed and evaporate, forming a gradient of gasoline vapor at decreasing concentrations above the stream and confined horizontally within the valley walls (Walsh Affidavit at ¶9).

26. The greatest concentration of gasoline vapor will exist if winds are calm such that the only mixing which occurs is due to the vapor pressure of the evaporating gasoline forcing vapor upward (Walsh Affidavit at ¶9).

27. If winds were not calm, even assuming wind in the direction of the Station, greater dilution of the gasoline vapor would exist, resulting in lesser concentrations of

vapor within flammable limits near the Station (Walsh Affidavit at ¶9).

28. Using accepted values, the explosive limits of gasoline vapor is 1.3 to 6.0 percent by volume in air (Walsh Affidavit at ¶10).

29. Assuming detonation of the gasoline vapor approximately 800 feet from the Unit 2 reactor enclosure, a wide spot in the valley where direct exposure to safety related structure exists, and using Regulatory Guide 1.91 methodology, the resulting peak reflected overpressure is 1.9 pounds per square inch ("psi") (Walsh Affidavit at ¶10).

30. This calculation does not credit intervening terrain at the location of the explosion centroid (Walsh Affidavit at ¶10).

31. If the closest approach of Possum Hollow Run (approximately 550 feet) were selected as the explosion centroid location, the calculated peak overpressure would be approximately 3 psi and would have no effect on Limerick safety related structures (Walsh Affidavit at ¶10).

32. No credit was taken for the shielding effects of the Possum Hollow Run valley walls in this calculation (Walsh Affidavit at ¶10).

33. The design reflected average overpressure of the affected safety related structures at Limerick is 12 psi (Walsh Affidavit at ¶10).

34. An alternative assumption is that the 5,000 gallons of spilled gasoline deflagrates in a 15-minute period, which

conservatively maximizes the heat generation rate (Walsh Affidavit at ¶11).

35. The heat from such a deflagration would produce a radiant heat load of 85 Btu per square foot per hour at the Unit 2 reactor enclosure (Walsh Affidavit at ¶11).

36. A radiant heat load of 85 Btu per square foot per hour would not have any effect on the reactor enclosure other than a slight warming of the concrete surface, even for an extended period of deflagration (Walsh Affidavit at ¶11).

37. By comparison, a flat surface in the sun at mid-day would receive solar radiation at approximately 50 to 60 Btu per square foot per hour (Walsh Affidavit at ¶11).

38. Neither the peak overpressure of 1.9 psi by detonation nor the radiant heat at 85 Btu per square foot per hour by deflagration of spilled gasoline vapors would affect safety related structures (Walsh Affidavit at ¶12).

39. Columbia Gas Transmission Company pipelines Nos. 1278 and 1010 carry only natural gas and pass within 3,500 feet of the Unit 2 reactor building at the closest approach (Walsh Affidavit at ¶13).

40. Both pipelines share the same right-of-way and run south-southwest to north-northeast (Walsh Affidavit at ¶13).

41. The routing of these gas pipelines and their relationship to the facility are as depicted on FSAR Figure 2.2-4 (Walsh Affidavit at ¶13; Boyer Affidavit at ¶¶2-3).

42. Pipeline No. 1278 is 14 inches in diameter, operates at a maximum pumping pressure of 1,000 psig, is 34 years old and is buried at a minimum of 3 feet below grade (Walsh Affidavit at ¶13).

43. Pipeline No. 1010 is 20 inches in diameter, operates at a maximum pumping pressure of 1,200 psig, is 17 years old and is buried at a minimum of 3 feet below grade (Walsh Affidavit at ¶13).

44. In calculating potential effects of pipeline rupture, the conservative assumption is a double-ended rupture (complete separation of the pipe at the point of rupture) and vertical orientation of the two pipe ends due to pressure and whip (Walsh Affidavit at ¶14).

45. This assumption takes no credit for burial of the pipelines, which would mitigate the whip effect (Walsh Affidavit at ¶14).

46. If the pipe ends were not in a vertical orientation, the momentum of the two opposing streams of gas would cause rapid mixing and dilution and would cause the gas emitted to be a ground level source, resulting in an explosion centroid further from the Limerick Station than conservatively assumed (Walsh Affidavit at ¶14).

47. The amount of gas released during a pipeline rupture is inconsequential since calculations of the effect of an explosion of natural gas from the pipeline are dependent upon the rate of release rather than the total amount available for release (Walsh Affidavit at ¶15).

48. In analyzing the postulated failure of this pipeline, it is conservative to assume that the escaping gas rises in a column to about 500 feet above plant grade, where the momentum energy decays, and that the gas then travels horizontally, directly toward the Unit 2 reactor enclosure (Walsh Affidavit at ¶16).

49. The mitigating effect of the height above plant grade was not used in the calculation of overpressure (Walsh Affidavit at ¶16).

50. It is conservative to assume that the natural gas begins to disperse downward toward the Limerick Station from directly above the rupture point, at a low dispersion rate using Pasquill "F" stability with one meter per second wind speed (approximately the 95th percentile meteorology) (Walsh Affidavit at ¶17).

51. These conservative assumptions allow the natural gas plume to travel nearest the plant prior to reaching detonable concentrations (Walsh Affidavit at ¶17).

52. The explosive limits of natural gas are between 6.0 and 14.0 percent by volume in air (Walsh Affidavit at ¶17).

53. Detonation of natural gas released from the postulated pipeline failure results in a peak overpressure at the Unit 2 reactor enclosure of 10 psi, which is less than the design overpressure for critical safety related structures (Walsh Affidavit at ¶18).

54. If the wind were blowing in any direction other than directly towards the plant, the effects of a gas

explosion on the facility would be less (Walsh Affidavit at ¶18).

55. If the wind speed were higher, greater dilution would occur and the zone of explosive limits would be closer to the point of release and further from the Station (Walsh Affidavit at ¶18).

56. The calculations are also conservative because natural gas clouds seldom detonate in the open air (Walsh Affidavit at ¶18).

57. If the natural gas cloud were to deflagrate rather than detonate, the flame front would probably move back and have a negligible effect on the plant (Walsh Affidavit at ¶19).

58. It is conservative to assume that the cloud continues to burn at the original point of ignition (Walsh Affidavit at ¶19). The radiant heat load at the Unit 2 reactor enclosure resulting from the postulated detonation would be 70 Btu per square foot per hour (Walsh Affidavit at ¶19).

59. This radiant heat load level would only cause slight warming of the outer layer of concrete, and would not cause noticeable or lasting effects, even for an extended period of deflagration (Walsh Affidavit at ¶19).

60. Diesel fuel storage tanks and associated piping are buried and would not be affected by either the detonation or deflagration of the natural gas postulated in these analyses (Walsh Affidavit at ¶20; Boyer Affidavit at ¶2).

61. Whether detonation or deflagration of natural gas released from either of the two Columbia Gas Transmission Company pipelines were postulated to occur, no adverse effects on safety related structures or equipment at the Limerick Generating Station would result (Walsh Affidavit at ¶21).

Respectfully submitted,

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