May 17, 2007

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board Panel

In the Matter of	)	
	)	
Entergy Nuclear Generation Company and	)	Docket No. 50-293-LR
Entergy Nuclear Operations, Inc.	)	ASLBP No. 06-848-02-LR
	)	
(Pilgrim Nuclear Power Station)	)	

STATEMENT OF MATERIAL FACTS

Entergy hereby submits, in support of its Motion for Summary Disposition of Pilgrim Watch Contention 3, this statement of material facts as to which Entergy contends that there is no genuine dispute.

A. General

1. A SAMA analysis requires that hundreds of simulations of the model code be performed in order to obtain statistically relevant results. O'Kula Decl. at ¶ 15; WSMS Report at 13-14.

2. The SAMA cost-benefit evaluation looks at whether a SAMA is potentially cost effective by measuring the mean of the total costs avoided versus the cost of implementing the SAMA. O'Kula Decl. at ¶ 45; WSMS Report at 39.

3. The total cost avoided in the PNPS SAMA analysis consists of the offsite costs related to population dose risk ("PDR") in person-rem per year, the off-site economic cost risk ("OECR") in dollars per year, the on-site exposure costs and the on-site economic costs (defined as on-site clean-up and decontamination cost, and replacement power cost). WSMS Report at 39; O'Kula Decl. ¶ 43 and n. 5

4. MACCS2 is used to determine the PDR and the OECR. O'Kula Decl. at ¶ 9; WSMS Report at 5 and Table 1 at 9.

5. MACCS2 is not used to determine on-site exposure costs or on-site economic costs. O'Kula Decl. at ¶ 21; WSMS Report at 18-19.

6. In the PNPS SAMA analysis, the OECR accounted for 54% of total costs and the PDR accounted for 32% of total costs. O'Kula Decl. at ¶ 43; WSMS Report at 39.

7. For the next SAMA to become potentially cost effective, the baseline benefit, or the total cost avoided, would have to increase by more than 100%. O'Kula Decl. at ¶ 44; WSMS Report at 39.

B. Meteorological Model and Data

7. The Gaussian plume model employed in the PNPS MACCS2 analysis is the standard plume model used for nuclear safety and environmental evaluations. O'Kula Dec. at ¶ 14; WSMS Report at 14.

8. The Gaussian plume model is the standard model employed in SAMA analyses. O'Kula Dec. at ¶ 14; WSMS Report at 14.

9. Well over 100 simulations of the code for each of the 19 release conditions must be performed using different weather conditions to calculate statistically meaningful results. O'Kula Dec. at ¶ 15; WSMS Report at 13-14.

10. Computer codes that can accommodate multiple-station data so as to be able to model spatial and variation of wind speed and direction are simply impracticable to use for analyzing the large number of weather sequences needed for SAMA analyses. O'Kula Dec. at ¶ 15; WSMS Report at 13-14.

11. MACCS2 does account for time dependent weather conditions by analyzing multiple plumes under different weather conditions. O'Kula Dec. at ¶ 16; WSMS Report at 13.

12. The MACCS2 Gaussian plume model results are in good agreement with, and generally more conservative than, those obtained by more sophisticated models that address

variable meteorological and terrain effects. O'Kula Decl. at ¶ 17; WSMS Report at 14-16.

13. One study showed that the Gaussian plume model provided significantly more conservative results than both the actual dose measured by field equipment and the maximum dose predicted by the more sophisticated wind and terrain sensitive ARAC code. O'Kula Decl. at ¶ 17; WSMS Report at 14-15.

14. Another study showed that results from the MACCS2 code were in reasonably good agreement with those obtained from a fully three dimensional model that accounted for terrain changes and spatial variability of weather. O'Kula Decl. at ¶ 17; WSMS Report at 16.

15. The MACCS2 code was conservatively applied to the Pilgrim SAMA analysis so as to produce overall conservative results by utilizing a surface roughness length of 10 cm whereas a value of 100 cm could have reasonably been used for this parameter. O'Kula Decl. at ¶ 18; WSMS Report at 16-18.

16. MACCS2 Sensitivity Case 2 estimated the effects of changing wind direction trajectory and was conservative because it used conditions at the beginning of a plume release, when the release has larger dose quantity and less decay has occurred, rather than at a point an hour or more later into the release. The results show an increase in PDR and OECR of 3%. O'Kula Decl. at ¶ 19; WSMS Report at 15-16.

17. MACCS2 Sensitivity Case 3 approximated a terrain change by releasing the plume at the ground level, rather than at 30 meters high in the base case, and the results show a 1% increase in PDR and a 4% increase in OECR. O'Kula Decl. at ¶ 19; WSMS Report at 18.

18. MACCS2 Sensitivity Cases 2 and 3 did not result in the identification of any new potentially cost beneficial SAMAs. The increase in the baseline benefit or total cost avoided would be less than 4% compared to the more than 100% increase in benefit required for the identification of any additional potentially cost-effective SAMAs. O'Kula Decl. at ¶¶ 43-47; WSMS Report at 39-40.

19. The effect of sea breeze is taken into account in the PNPS site meteorological data. O'Kula Decl. at ¶ 20; WSMS Report at 21.

20. The effect of sea breeze is generally beneficial and disperses the plume, thus decreasing doses rather than increasing them. O'Kula Decl. at ¶ 20; WSMS Report at 19, 20-21, 46.

21. Any adverse impact of sea breeze conditions would only likely affect populations that are relatively close to PNPS (within about a mile), and occur infrequently (less than 1% of the time). WSMS Report at 20.

22. Exposures within the 20-50 mile zone dominate the PDR and OECR. O'Kula Decl. at ¶¶ 11, 20; WSMS Report at 8, 20, 46. The exposures within the 20-50 mile zone would not be adversely impacted by localized sea breeze conditions near the PNPS. O'Kula Decl. at ¶ 20; WSMS Report at 20, 46.

23. Because of their localized effects, any local variations in sea breeze will have negligible impact on regional population doses. O'Kula Decl. at ¶ 20; WSMS Report at 20, 46.

24. The MACCS2 model is not used to measure dispersion of the plume within one hundred meters of the source. O'Kula Decl. at ¶ 21;WSMS Report at 18-19.

25. The area within 100 meters of the source would be within the owner controlled area and would result in no additional impacts off-site. O'Kula Decl. at ¶ 21;WSMS Report at 18-19.

26. Use of meteorological data for a single representative year is typical for SAMA analyses. O'Kula Decl. at ¶ 21;WSMS Report at 22.

27. The meteorological data for the year used in the PNPS SAMA analysis is representative for the PNPS site. O'Kula Decl. at ¶ 21; Mogolesko Decl. at ¶ 10.

28. Continuous recording instruments to gather meteorological data are not applicable to a SAMA analysis and would be impractical for a SAMA cost-benefit analyses given the large number of weather trials that are needed to provide statistically valid consequence results. O'Kula Decl. at ¶ 21; WSMS Report at 23

C. Evacuation Time Estimates

29. MACCS2 models evacuation from the EPZ employing two parameters – evacuation delay time and evacuation speed. Sowdon Decl. at ¶ 6; O'Kula Decl. at ¶ 22.

30. Evacuation delay time is the time between notifying the public of an evacuation and the beginning of the evacuation of persons within the 10-mile EPZ. O'Kula Decl. at ¶ 23.

31. The evacuation speed is the speed at which the evacuation is accomplished. O'Kula Decl. at ¶ 23.

32. The PNPS SAMA analysis relied upon evacuation time estimates prepared in 1998 ("1998 Study"), which was the most current data when the analysis was performed. Sowdon Decl. at ¶ 7.

33. A subsequent study of evacuation time estimates was prepared in 2004 ("2004 Study"). The evacuation delay times developed in the 1998 and 2004 studies are identical. Sowdon Decl. at ¶ 15.

34. The evacuation time estimates in the 1998 Study used to derive the evacuation speeds for the SAMA analysis are virtually identical to the evacuation time estimates in the 2004 study. Sowdon Decl. at ¶ 16.

35. Both the 1998 and the 2004 studies developed evacuation time estimates for a range of scenarios. These scenarios included rain and snow conditions, summer and off-season periods of the year, including sudden rain with tourist and beach population at capacity, weekend and midweek days, and ranges of time during the day, including midday and evening and periods of heavy traffic. Sowdon Decl. at ¶¶ 18-19.

36. The PNPS SAMA analysis modeled and considered dose beyond the 10 mile EPZ. O'Kula Decl. at ¶¶ 27-28.

37. The PNPS SAMA analysis base case employed a forty-minute evacuation delay time and a constant evacuation speed of 2.17 mph. O'Kula Decl. at ¶ 23; WSMS Report at 25.

38. The PNPS SAMA analysis also considered a sensitivity case that increased the evacuation delay time to 120 minutes – an increase of 200% from the base case – which showed a maximum change in consequence estimates of less than 2%. O'Kula Decl. at ¶ 25; WSMS 7, 24.

39. Another sensitivity case considered an evacuation delay time of 6 hours – an increase of 800% from the base case – which showed a maximum change of 5% increase in PDR, or less than 2% change in total cost risk. O'Kula Decl. at ¶¶ 26, 31;WSMS Report 27-28.

40. The PNPS SAMA analysis also considered an evacuation speed of 1.54 mph, instead of the 2.17 mph in the base case – 30% slower than the base case – which showed a maximum change in consequence estimates of less than 2%. O'Kula Decl. at ¶ 25; WSMS Report 7, 24. This evacuation speed was slower than any of the evacuation speeds derived from the 1998 and 2004 evacuation time estimates. Sowdon Decl. at ¶ 17.

41. Another sensitivity case considered an evacuation speed of 0.76 mph – approximately 65% slower than the base case and more than 50% slower than the original sensitivity case – which showed a maximum change 3% increase in PDR, or less than 2% change in total cost risk. O'Kula Decl. at ¶¶ 26, 32; WSMS Report 27-28; Sowdon Decl. at ¶ 27.

42. A sensitivity analysis was run whereby the evacuation model was turned off and all EPZ residents were assumed to carry on with their normal activities. This no evacuation sensitivity analysis, resulted in a 6% increase in PDR, or a 2% increase of total cost risk. O'Kula Decl. at ¶¶ 26, 29; WSMS Report 26.

43. The no evacuation sensitivity analysis bounds the other sensitivity studies. O'Kula Decl. at ¶¶ 31-32. The 2% increase in baseline benefit, or total cost avoided, of the no evacuation sensitivity analysis is far less than (by a factor of 50) the 100% increase in benefit required for the identification of any additional potentially cost-effective SAMAs. O'Kula Decl. at ¶¶ 26, 43-47; WSMS Report at 39-40.

44. Any uncertainty in the evacuation delay time and the evacuation speed input parameters for EPZ evacuation is therefore inconsequential. O'Kula Decl. at ¶¶ 31-32. Changes to

these input parameters will have no impact on the results of the PNPS SAMA analysis. O'Kula Decl. at ¶ 26.

D. Economic Cost Modeling

45. The MACCS2 model accounts for a wide range of economic costs, including (1) cost of evacuation; (2) cost for temporary relocation (food, lodging, and lost income); (3) cost of decontaminating land and buildings; (4) loss of building/land use and any corresponding lost return on investment and depreciation associated with decontamination and interdiction; (5) cost of repairing temporarily interdicted property; (6) value of crops destroyed or not grown because they were contaminated by direct deposition or would be contaminated through root uptake; and (6) value of farmland and of individual, public, and non-farm commercial property that is condemned. O'Kula Decl. at ¶ 34; WSMS Report at 29.

46. The MACCS2 model accounts for losses associated with economic activity, such as loss of income, loss of value of crops not grown, and loss of use and return on property, including commercial and business property. O'Kula Decl. at ¶ 35; WSMS Report at 30-31.

47. The SAMA analysis for PNPS allows for a return of 12% on the actual fair market value of all business property, including land, buildings, equipment and inventory and, as such, does account for loss of economic activity. O'Kula Decl. at ¶¶ 36-37; WSMS Report at 31.

48. Additionally, the full value of business property, including land, buildings, equipment and inventory property that would be condemned would also be accounted as an economic cost in the SAMA analysis. O'Kula Decl. at ¶ 37.

49. The economic analysis performed by the MACCS2 code as described above and as applied in the PNPS SAMA analysis is the state of the art for SAMA analysis studies, and no other code exists that performs similar analyses for severe accidents at nuclear power plants. O'Kula Decl. at ¶ 38.

50. PNPS performed a sensitivity case that modified the input parameters for the value of non-farm property to include data that specifically account for county and metropolitan area gross domestic product, which directly accounts for tourism, business activity, and wages. O'Kula Decl. at ¶ 39; WSMS Report at 31-32

51. The sensitivity case resulted in an increase of the OECR of 2% which would not result in identifying any additional potentially cost effective SAMAs. O'Kula Decl. at ¶¶ 41-42; WSMS Report at 34 and Table G.2.

52. Because a 2% increase in the OECR increases the baseline benefit by approximately 1%, the OECR would have to increase by approximately 200% – two orders of magnitude more than that shown by the sensitivity analysis – before any additional SAMAs would be identified as potentially cost-effective. O'Kula Decl. at ¶¶ 42-44.; WSMS Report at 39.

E. SAMA Cost Benefit Incorporating Results of New Sensitivity Analyses

53. The maximum increase to the PDR for any of the new sensitivity studies discussed above was 6% and the maximum increase to the OECR for any of the sensitivity studies discussed above was 4%. O'Kula Decl. at ¶ 43; WSMS Report at 39.

54. The maximum increases 6% in PDR and 4% in OECR values would increase the total cost for each of the 59 SAMAs by about 4%, because the off-site population exposure cost contributes about 32% of the total cost resulting from the postulated accident evaluated as part of the SAMA analysis, and the off-site economic cost contributes about 54% of the total. O'Kula Decl. at ¶ 43; WSMS Report at 39.

55. The baseline benefit, or the total cost avoided, for the next closest SAMA to become potentially cost beneficial would have to increase by more than 100%. O'Kula Decl. at ¶ 44; WSMS Report at 39.

56. PNPS performed two bounding analyses as part of the original SAMA analysis: the baseline with uncertainty and one that used a 3% discount rate. O'Kula Decl. at ¶ 46; WSMS Report at 40.

57. Even under the baseline with uncertainty and the 3% discount rate sensitivity analyses, the increase in benefit of the sensitivity cases evaluated in the WSMS Report would need to be approximately an order of magnitude larger before these bounding analyses would be affected. O'Kula Decl. at ¶¶ 46-47; WSMS Report at 40

58. The maximum benefit increase of 4% calculated from any of the MACCS2 sensitivity analyses would not result in the identification of any new potentially cost effective SAMAs. O'Kula Decl. at ¶ 46; WSMS Report at 40.

Respectfully Submitted,

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