From: Jason Schaperow RES
To: Robert Palla
Date: Thu, Aug 3, 2000 3:16 PM
Subject: Comments on Appendix 4B

I am resending our comments on Appendix 4B. Comment 3 under General Comments has been revised to correct the consequence numbers at 50 miles and 100 miles. Also, I have attached the results you requested for 50 miles.

CC: Charles Tinkler, George Hubbard, John Flack, Ti...

I-81

August 3, 2000

SMSAB Comments on July 20, 2000, Version of Appendix 4B

Appendix 4B provides comparisons in three areas: (a) spent fuel pool accident consequences versus NUREG-1150 reactor accident consequences, (b) spent fuel pool accident risk versus NUREG-1150 reactor accident risk, (c) spent fuel pool accident risk versus quantitative health objectives. As a result of these comparisons, Appendix 4B correctly concludes that the spent fuel pool accident consequences and risk are acceptable, even for the cases with late evacuation. The following are comments for improving Appendix 4B.

General Comments

1. It is reasonable to use the $1x10^{-5}$ /year pool performance guideline when comparing spent fuel pool accident risk with the QHO's, because $1x10^{-5}$ /year is the limit on spent fuel pool accident frequency and the QHO's are limits on risk. However, when spent fuel pool accident risk is compared with NUREG-1150 risk for Surry to understand the relative risk of a spent fuel pool versus an operating reactor, the actual spent fuel pool accident frequency (i.e., less than $3x10^{-6}$ /year) should be used. In this case, use of the $1x10^{-5}$ /year pool performance guideline would bias the comparison.

2. After one year of decay, ample time will be available for early evacuation. However, Appendix 4B uses consequence results with one year of decay and late evacuation to show that spent fuel pool accident risk is acceptable, even making the conservative assumption of late evacuation after one year. We believe that this assumption is overly conservative for the purpose of assessing risk at one year. However, this assumption could be used to assess risk after thirty days to potentially allow emergency planning requirements to be relaxed after 30 days instead of after one year.

3. Appendix 4B compares spent fuel pool accident consequences and risk for the population within 100 miles to the NUREG-1150 accident consequences and risk for the population within 50 miles. This may be a reasonable comparison for early fatalities, because early fatalities occur near the facility. However, it is misleading for latent effects which are influenced by the population both near and away from the facility. For example, for our best-estimate case, Case 46b, the cancer fatalities go from 6880 to 5860 in going from 100 miles to 50 miles. Also, the societal dose goes from $7.94x10^{6}$ rem to $6.29x10^{6}$ rem.

Page 1

1. Ruthenium release is due to air-fuel reaction, not "air-cladding reaction."

2. Consequence calculations do not show that large inventories of radioisotopes could be released; consequence calculations assume large inventories are released. Detailed severe accident analysis, such as with the MELCOR code, could show that large inventories of radioisotopes could be released, but we did not do such analysis.

Page 2

1. The controlling decision could be shifted to latent health effects because of the effect of early evacuation, not of the ruthenium release.

2. NUREG/CR-4551, not NUREG-4551.

3. What is the significance (i.e., frequency) of the source terms that produced the greatest early health effects and the greatest latent health effects? Absolute consequences should be compared for accidents with similar frequencies.

Page 3

1. We used a release fraction of .75, because that is the realistic release fraction for volatile isotopes in NUREG-1465. Therefore, the following clarification is recommended: "Rubbling of the fuel, release from not all parts of all assemblies, and deposition would limit the release fraction of volatile fission products to less than one. Rubbling of the fuel may limit the ruthenium release to much less than one."

Page 4

1. There could be a large difference in number of latent health effects within 50 miles and within 100 miles.

2. Page 4 states that for Surry the frequency of a large release for a spent fuel pool accident is a factor of 10 higher than for a reactor accident. Because spent fuel pools and reactors are both built to the same seismic standards and reactor accidents are dominated by non-seismic events, it is not clear why spent fuel pool accident frequency is a factor of 10 higher.

3. The last paragraph seems to be in the wrong section. It is in the Comparison of Risk section, but may fit better in the Comparison with Quantitative Health Objectives section.

Page 5

1. Suggest adding references for the Safety Goal Policy Statement, the quantitative health objectives, and the numerical objectives.

Results of Release Fraction Sensitivities
(95% evacuation, Surry Population Density)

Case	Release Fraction							Mean Consequences within 50 miles	
	I,Cs	Ru	Te	Ba	Sr	Ce	La	Societal Dose (person-rem)	Cancer Fatalities
Base		$2x10^{-5}$						$3.16x10^{6}$	1,700
45a	1	1	.02	.01	.01	.01	.01	$1.14x10^{7}$	10,600
45b	.75	.75	.02	.01	.01	.01	.01	$1.00x10^{7}$	9,320
13[a]		$2x10^{-5}$						$2.81x10^{6}$	1,370
46a[a]	1	1	.02	.01	.01	.01	.01	$7.04x10^{6}$	6,970
46b[a]	.75	.75	.02	.01	.01	.01	.01	$6.29x10^{6}$	5,860

[a]Based on evacuation before release.