

A. Comparison w/ NUREC/CR-4982

Case 2  $\Rightarrow$  Two B. OUT

atmos 6b.inp  
daily 3.inp  
atmos 1-n.inp  
METSUR.INP  
 $\rightarrow$  Two C. OUT  
atmos 6c.inp

Revise from Susquehanna power level  
 $\Rightarrow$  back to Millstone 1 power level

atmos 6b.inp  $\rightarrow$  atmos 6b.inp

atmos 6b.r  
daily 3  
atmos 1-n  
METSUR

Two B. OUT  
 $\rightarrow$  Two C. OUT  
atmos 6c.r

This is  
Case 2  
in my  
MACS report

2/66

5/21/99

# B. Comparison w/ NUREG/CR-6451

Need early fatalities at 50 miles for Case 3  $\Rightarrow$

Case 3  $\equiv$  TB. OUT, TC. OUT, TD. OUT

atmos 7b.inp	}	TB. OUT
early 3.inp		
chrnc 1-n.inp		
METSUR.INP		
" "		

So add outputs for early fatalities at 50 miles  $\Rightarrow$

early 3.inp  $\rightarrow$  early 3e.inp

atmos 7b.inp	}	7BE. OUT
early 3e.inp		
chrnc 1-n.inp		
METSUR.INP		
" "		

DistancePopulation

0-30 miles

1000 persons/mile<sup>2</sup>

30-50 miles

city of 10 million, 280 persons/mile<sup>2</sup> elsewhere

50-500 miles

200 persons/mile<sup>2</sup>

⇒ higher everything

maybe 18x higher within 50 miles

maybe 2x higher within 500 miles

Exclusion Area

4 miles (.65 km)

⇒ lower primate densitiesAmount of decay

12 days

⇒ 50% higher primate densitiesAmount of long-lived isotopes

3x higher

⇒ up to 3x higher cancer fatalities  
and sexual doseRange Size1150 Mwe vs. Susquehanna ( ) primate densities

$$\frac{\pi R^2}{\text{0-30 miles} \rightarrow \pi (30 \text{ miles})^2 = 2827 \text{ miles}^2}$$

$$\text{0-50 miles} \rightarrow \pi (50 \text{ miles})^2 = 7854 \text{ miles}^2$$

$$\text{0-500 miles} \rightarrow \pi (500 \text{ miles})^2 = 785,400 \text{ miles}^2$$

$$\frac{\text{0-30 miles}}{1000 \frac{\text{persons}}{\text{mile}^2} \times 2827 \text{ miles}^2 = 2.827 \times 10^6 \text{ persons}}$$

$$\frac{\text{30-50 miles}}{\left\{ \begin{array}{l} 280 \frac{\text{persons}}{\text{mile}^2} \times (7854 - 2827) \text{ miles}^2 = 1.332 \times 10^6 \text{ persons} \\ + \text{city of } 10 \times 10^6 \text{ persons} \end{array} \right.}$$

$$\frac{10 \times 10^6 + 1.332 \times 10^6 \text{ persons}}{7854 - 2827 \text{ miles}^2} = \frac{2554 \text{ persons}}{\text{mile}^2}$$

$$\frac{\text{50-500 miles} \rightarrow 200 \frac{\text{persons}}{\text{mile}^2} \cdot (785,400 - 7854) \text{ miles}^2 = 155 \times 10^6 \text{ persons}}$$

$$\frac{\text{0-50 miles}}{10 \times 10^6 + 1.332 \times 10^6 + 2.827 \times 10^6 \text{ persons} = 1800 \frac{\text{persons}}{\text{mile}^2}}$$

$$7854 \text{ miles}^2$$

$$\frac{\text{0-500 miles}^2}{10 \times 10^6 + 1.332 \times 10^6 + 2.827 \times 10^6 + 155 \times 10^6 \text{ persons} = 215 \frac{\text{persons}}{\text{mile}^2}}$$

$$785,400 \text{ miles}^2$$

Societal Dose and Cancer Fatalities

Power correction of 3

atmos T6.inp → atmos T6r.inp

Population density of 1800 persons/mile<sup>2</sup>

early 3e → early 3ea.inp

Population density of 215 persons/mile<sup>2</sup>

early 3e → early 3eb.inp

Case 3ra:	atmos T6r.inp	}	7BRA.OUT
	early 3ea.inp		
	chrnc1-n		
	" "		
	METSUR		

Case 3rb:	atmos T6r.inp	}	7BRB.OUT
	early 3eb.inp		
	chrnc1-n		
	" "		
	METSUR		

Case 3ra

Societal Dose 0-50 miles 389,000

Cancer Fatalities 0-5 miles 20,800

Case 3rb

Societal Dose 0-50 miles 57,900

0-500 miles 994,000

Cancer Fatalities 0-50 miles 3,050

0-500 miles 44,900

Overall

Societal Dose 0-50 miles  $\rightarrow$  389,000

0-500 miles  $\rightarrow$   $389,000 + (994,000 - 57,900)$   
 $= 1,330,000$

Cancer Fatalities 0-50 miles  $\rightarrow$  20,800

0-500 miles  $\rightarrow$   $20,800 + (44,900 - 3,100)$   
 $= 62,600$

5/23/99

7

Prompt Fatalities

<u>Excl Area</u>	<u>Pop. Density</u>	<u>Power Cor</u>	<u>Files</u>	<u>Early Fatalities</u>	
				<u>0-50</u>	<u>0-500</u>
0	1800 p/mi <sup>2</sup>	3	atmos 7br, early 3ec, 7bra.out	785	785
.32	1800 p/mi <sup>2</sup>	3	atmos 7br, early 3ec, 7brc.out	751	751
.32	1000 p/mi <sup>2</sup>	3	atmos 7br, early 3ed, 7brd.out	417	417
.32	1000 p/mi <sup>2</sup>	1.8	atmos 7bs, early 3ed, 7bsd.out	186	186
.75	1000 p/mi <sup>2</sup>	1.8	atmos 7bs, early 3ee, 7bse.out	159	159
.32	1000 p/mi <sup>2</sup>	1.7	atmos 7bt, early 3ed, 7btd.out	168	168
0	1000 p/mi <sup>2</sup>	1.7	atmos 7bt, early 3ef 7btf.out	183	183

Power Correction

Millstone 1 is 2006 MWe / 654 MWe

NUREG/CR-6451 is 1155 MWe

$$\Rightarrow \text{Power Correction is } \frac{1155}{654} = 1.8$$

Exclusion Area

NUREG/CR-6451 is .4 miles

	<u>km</u>	<u>miles</u>
1 →	.0	0
3 →	.52	.32
4 →	1.21	.75