

11/2/99

Societal Dose (0-500 miles) - mean value

	total	early (1)	early (2)	chronic
30 days (chronic-n)	571,000	22,100	21,300	549,000
90 days (chronic-n)	586,000	20,000	19,300	566,000
1 year (chronic-n)	595,000	17,900	17,300	577,000

$$\text{Total} = .995 \cdot \text{early (1)} + .005 \cdot \text{early (2)} + \text{chronic}$$

No. at risk:

$$\begin{aligned}
 .995 \cdot 22,100 + .005 \cdot 21,300 + 549,000 &= 571,096 \quad \checkmark \\
 .995 \cdot 20,000 + .005 \cdot 19,300 + 566,000 &= 585,996 \quad \checkmark \\
 .995 \cdot 17,900 + .005 \cdot 17,300 + 577,000 &= 594,897 \quad \checkmark
 \end{aligned}$$

ELB

11/3/99

Understand better the small increase in societal
loss in going from 30 days to 1 year. (for 0-500 miles)

Rerun chrc1-n.inp to print additional break down
of societal loss for 0-500 miles =>
Add output TYPE9OUT003 for 0 to 500 miles. =>
chrc1n1.inp

Rerun 3 cases:

30 days	amos 7b.	} best b1.out
	early 299	
	chrc1n1	
	METUR	
	SUREST	
90 days	amos 7c	→ best c1.out
1 year	amos 7d	→ best d1.out

	total	early (1)	early (2)	chronic	checked against chronic 1-n
30 days (chronic 1)	571,000	22,100	21,300	549,000	✓
90 days (chronic 1)	586,000	20,000	19,300	566,000	✓
1 year (chronic 1)	595,000	17,900	17,300	577,000	✓

0-805 km

30 days		90 days		1 yr	
total	549,000	566,000	577,000	577,199	✓
direct exp	516,000	533,000	546,000		
ingestion	25,200	24,900	24,500		
decom (city)	7,850	7,430	6,440		
decom (farm)	301	294	259		
	549,351	565,624	577,199		

Direct exposure is the one that has the counter-inhibitive trend.

30 days		90 days		1 yr	
direct exp	516,000	533,000	546,000		
gravidship	514,000	531,000	544,000		
resuspension	1620	1,650	1,630		

Calculation of direct exposure in chance node:

- Land is immediately habitable
- Land will be habitable after decontamination
- Land will be habitable after decontamination and interdiction

Immediately habitable

projected individual dose (0-5 yrs) < 4 rem

Habitable after decontamination

- 1) $DF = 3$ and decontamination period = 60 days
- 2) $DF = 15$ and decontamination period = 120 days

Habitable after decontamination and interdiction

- $DF = 15$ and decontamination period = 120 days and
- 1) interdiction period = 1 yr
 - 2) interdiction period = 5 yr
 - 3) interdiction period = 30 yr

Land is condemned if it is not habitable or if the time cost to restore it to habitable is more than the land's value.

I went through the detailed MAECs output.

I found the following item that might be helpful:

Peak dose found on spatial grid (under chronic).

I tabulated the info for 30 days and 1 year.

I found:

- peak doses that exceeded .05 Sv
- larger peak doses at 1 year than at 30 days.

11/4/99

Investigation of why 0-500 miles CHRONC dose goes from
549,000 Sv (30 days) to 577,000 Sv (1 year).

$$577,000/549,000 = 1.0510018$$

CHRONC

interval (km)	Peak dose found on spatial grid (Sv)		Ratio of 1 year dose 30 day dose
	30 days (atmos7b)	1 year (atmos7d)	
0	0.2	0.00000	0.00000
0.2	0.5	0.00260	0.00627
0.5	1.2	0.00163	0.00155
1.2	1.6	0.00016	0.00015
1.6	2.1	0.00002	0.00002
2.1	3.2	0.00000	0.00000
3.2	4	0.00368	0.00371
4	4.8	0.00309	0.00319
4.8	5.6	0.00478	0.00494
5.6	8.1	0.02490	0.02530
8.1	11.3	0.04570	0.05910
11.3	16.1	0.04950	0.05710
16.1	20.9	0.05380	0.05670
20.9	25.8	0.04970	0.05000
25.8	32.2	0.04590	0.04690
32.2	40.2	0.06890	0.07290
40.2	48.3	0.07930	0.08190
48.3	64.4	0.09710	0.09800
64.4	80.5	0.12700	0.13500
80.5	113	0.13200	0.13300
113	161	0.12300	0.12400
161	241	0.09690	0.10300
241	322	0.08370	0.08640
322	563	0.08680	0.09020
563	805	0.06020	0.06810
805	1609	0.01550	0.01470

avg. =
1.066402

I went through the inventory data in atmos 7b and atmos 7d (30 days and 1 year, respectively).

The only isotopic inventories that were higher at 1 year than at 30 days were for Pu-238 and Am-241.

	(atmos 7b) <u>30 days</u>	(atmos 7d) <u>1 year</u>
Pu-238	1.70 E 16	1.78 E 16
Am-241	1.08 E 16	1.20 E 16

Revise atmos 7d to use Pu-238 and Am-241 inventories at 30 days \Rightarrow

atmos 7d \rightarrow atmos 7d2

atmos 7d2
early 299
chron 1n1
MET SUR
SURSIT

best d2. out

(Amos 7D) (less Pa-238 and Am-241) / year

(Amos 7D) / year

total	577,000	577,000
direct exp	546,000	546,000
ingestion	24,500	24,500
decont (ing)	6,440	6,440
decont (farm)	259	259
		577,000

Also, peak dose on special grid was exactly the same
 => Reducing R-238 and Am-241 in uranium
 had no effect (as expected)