

New MNRC MHA Source Term

*Isotopes with half lives of less than 60 s were not accounted for
Based on thermal fission of U-235*

402 C release fraction 2.38E-05
reactor room volume (ml) 210000000

Maximum fissions per element 7.83E+14

MHA

<u>Isotope</u>	<u>fission yield</u>	<u>Saturation Act</u>	<u>Saturation Activity (Ci)</u>	<u>Saturates (Y/N)</u>
Br-83	0.00536	4.20E+12	113.4	Y
Kr-83m	0.00536	4.20E+12	113.4	Y
Br-84	0.00985	7.71E+12	208.4	Y
Kr-85m	0.0129	1.01E+13	273.0	Y
Kr-85	0.00283	2.22E+12	3.7	N
Kr-87	0.0256	2.00E+13	541.8	Y
Kr-88	0.0355	2.78E+13	751.3	Y
I-131	0.0289	2.26E+13	611.6	Y
Xe-131m	0.000405	3.17E+11	8.6	Y
I-132	0.0431	3.37E+13	912.1	Y
I-133	0.067	5.25E+13	1417.9	Y
Xe-133m	0.00189	1.48E+12	40.0	Y
Xe-133	0.067	5.25E+13	1417.9	Y
I-134	0.0783	6.13E+13	1657.0	Y
I-135	0.0628	4.92E+13	1329.0	Y
Xe-135m	0.011	8.61E+12	232.8	Y
Xe-135	0.0654	5.12E+13	1384.0	Y
Xe-138	0.063	4.93E+13	1333.2	Y

24 decay failure in water

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Xe-133	0.067	5.25E+13	1417.9	Y
I-134	0.0783	6.13E+13	1657.0	Y

I-135	0.0628	4.92E+13	1329.0	Y
Xe-135m	0.011	8.61E+12	232.8	Y
Xe-135	0.0654	5.12E+13	1384.0	Y
Xe-138	0.063	4.93E+13	1333.2	Y

<u>Half-Life</u>	<u>Release fraction to environment</u>	<u>Release from Fuel (Ci)</u>
2.4 h	0.25	2.70E-03
1.83 h	1	2.70E-03
31.8 m	0.25	4.96E-03
4.48 h	1	6.50E-03
10.73 y	1	8.89E-05
1.27 h	1	1.29E-02
2.84 h	1	1.79E-02
8.04 d	0.25	1.46E-02
11.9 d	1	2.04E-04
2.28 h	0.25	2.17E-02
20.8 h	0.25	3.37E-02
2.19 d	1	9.52E-04
5.243 d	1	3.37E-02
52.6 m	0.25	3.94E-02
6.57 h	0.25	3.16E-02
15.3 m	1	5.54E-03
9.1 h	1	3.29E-02
14.1 m	1	3.17E-02

<u>Half-Life</u>	<u>24 hour decay</u>	<u>24 hour activity</u>
2.4 h	9.77E-04	1.11E-01
1.83 h	1.13E-04	1.28E-02
31.8 m	0.00E+00	0.00E+00
4.48 h	2.44E-02	6.66E+00
10.73 y	1.00E+00	3.74E+00
1.27 h	2.05E-06	1.11E-03
2.84 h	2.86E-03	2.15E+00
8.04 d	9.17E-01	5.61E+02
11.9 d	9.43E-01	8.09E+00
2.28 h	6.78E-04	6.18E-01
20.8 h	4.49E-01	6.37E+02
2.19 d	7.29E-01	2.91E+01
5.243 d	8.76E-01	1.24E+03
52.6 m	0.00E+00	0.00E+00

6.57 h
15.3 m
9.1 h
14.1 m

7.95E-02
0.00E+00
1.61E-01
0.00E+00

1.06E+02
0.00E+00
2.22E+02
0.00E+00

Release to Environment (Ci)

6.75E-04
2.70E-03
1.24E-03
6.50E-03
8.89E-05
1.29E-02
1.79E-02
3.64E-03
2.04E-04
5.43E-03
8.44E-03
9.52E-04
3.37E-02
9.86E-03
7.91E-03
5.54E-03
3.29E-02
3.17E-02

Release to Reactor room (u Concentration (uCi/ml)

6.75E+02
2.70E+03
1.24E+03
6.50E+03
8.89E+01
1.29E+04
1.79E+04
3.64E+03
2.04E+02
5.43E+03
8.44E+03
9.52E+02
3.37E+04
9.86E+03
7.91E+03
5.54E+03
3.29E+04
3.17E+04

3.21E-06
1.29E-05
5.91E-06
3.09E-05
4.23E-07
6.14E-05
8.51E-05
1.73E-05
9.71E-07
2.58E-05
4.02E-05
4.53E-06
1.61E-04
4.69E-05
3.77E-05
2.64E-05
1.57E-04
1.51E-04

Release fraction to environment

0.025
1
0
1
1
1
1
0.025
1
0.025
0.025
1
1
0

release to reactor room

6.59E-08
3.04E-07
0.00E+00
1.59E-04
8.89E-05
2.64E-08
5.11E-05
3.34E-04
1.92E-04
3.68E-07
3.79E-04
6.94E-04
2.96E-02
0.00E+00

room concentration (uCi/cc)

3.14E-10
1.45E-09
0.00E+00
7.55E-07
4.23E-07
1.26E-10
2.43E-07
1.59E-06
9.16E-07
1.75E-09
1.81E-06
3.30E-06
1.41E-04
0.00E+00

0.025	6.29E-05	2.99E-07
0	0.00E+00	0.00E+00
1	5.29E-03	2.52E-05
0	0.00E+00	0.00E+00

<u>DAC whole body (uCi/ml)</u>	<u>ALI Thyroid (uCi)</u>	<u>DAC value</u>	<u>2 Minute Stay TEDE (mrem)</u>	
3.00E-05		n/a	1.07E-01	8.93E-03
1.00E-02		n/a	1.29E-03	1.07E-04
3.00E-05		n/a	1.97E-01	1.64E-02
2.00E-05		n/a	1.55E+00	1.29E-01
1.00E-04		n/a	4.23E-03	3.53E-04
5.00E-06		n/a	1.23E+01	1.02E+00
2.00E-06		n/a	4.26E+01	3.55E+00
2.00E-08		50	8.66E+02	7.22E+01
4.00E-04		n/a	2.43E-03	2.02E-04
3.00E-06	8.00E+03	8.61E+00		7.18E-01
1.00E-07	300	4.02E+02		3.35E+01
1.00E-04		n/a	4.53E-02	3.78E-03
1.00E-04		n/a	1.61E+00	1.34E-01
2.00E-05	50000	2.35E+00		1.96E-01
7.00E-07	2000	5.38E+01		4.48E+00
9.00E-06		n/a	2.93E+00	2.44E-01
1.00E-05		n/a	1.57E+01	1.31E+00
4.00E-06		n/a	3.78E+01	3.15E+00
				1.21E+02

<u>DAC whole body (uCi/ml)</u>	<u>ALI Thyroid (uCi)</u>	<u>DAC value</u>	<u>2 Minute Stay TEDE (mrem)</u>	
3.00E-05		n/a	1.05E-05	8.72E-07
1.00E-02		n/a	1.45E-07	1.21E-08
3.00E-05		n/a	0.00E+00	0.00E+00
2.00E-05		n/a	3.77E-02	3.15E-03
1.00E-04		n/a	4.23E-03	3.53E-04
5.00E-06		n/a	2.51E-05	2.10E-06
2.00E-06		n/a	1.22E-01	1.01E-02
2.00E-08		50	7.95E+01	6.62E+00
4.00E-04		n/a	2.29E-03	1.91E-04
3.00E-06	8.00E+03	5.84E-04		4.87E-05
1.00E-07	300	1.81E+01		1.50E+00
1.00E-04		n/a	3.30E-02	2.75E-03
1.00E-04		n/a	1.41E+00	1.17E-01
2.00E-05	50000	0.00E+00		0.00E+00

7.00E-07	2000	4.28E-01	3.56E-02
9.00E-06	n/a	0.00E+00	0.00E+00
1.00E-05	n/a	2.52E+00	2.10E-01
4.00E-06	n/a	0.00E+00	0.00E+00
			8.51E+00

<u>5 Minute Stay TEDE (mrem)</u>	<u>Intake per minute (uCi)*</u>	<u>2 Minute Stay CDE thyroid (mrem)</u>
2.23E-02		
2.68E-04		
4.10E-02		
3.22E-01		
8.82E-04		
2.56E+00		
8.87E+00		
1.81E+02	3.47E-01	6.93E+02
5.06E-04		
1.79E+00	5.17E-01	6.46E+00
8.37E+01	8.03E-01	2.68E+02
9.44E-03		
3.35E-01		
4.89E-01	9.39E-01	1.88E+00
1.12E+01	7.53E-01	3.77E+01
6.11E-01		
3.27E+00		
7.87E+00		
3.02E+02		1.01E+03

<u>5 Minute Stay TEDE (mrem)</u>	<u>Intake per minute (uCi)*</u>	<u>2 Minute Stay (mrem)</u>
2.18E-06		
3.02E-08		
0.00E+00		
7.86E-03		
8.82E-04		
5.24E-06		
2.53E-02		
1.66E+01	3.18E-02	6.36E+01
4.77E-04		
1.22E-04	3.50E-05	4.38E-04
3.76E+00	3.61E-02	1.20E+01
6.88E-03		
2.93E-01		
0.00E+00		

8.91E-02	5.99E-03	2.99E-01
0.00E+00	0.00E+00	0.00E+00
5.25E-01		
0.00E+00		
2.13E+01		7.59E+01

* based on 1.2 m³/hr breathing rate

5 Minute Stay CDE thyroid (mrem)

1.73E+03

1.62E+01

6.70E+02

4.69E+00

9.41E+01

2.52E+03

5 Minute Stay (mrem)

1.59E+02

1.10E-03

3.01E+01

7.48E-01
0.00E+00

1.90E+02

