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Air Sampling Results

UCB Air Sampling Results

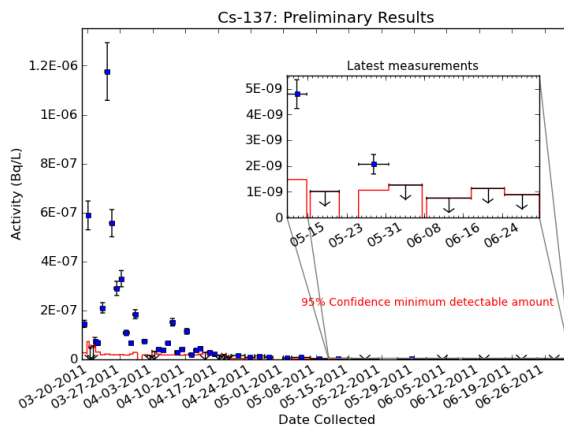
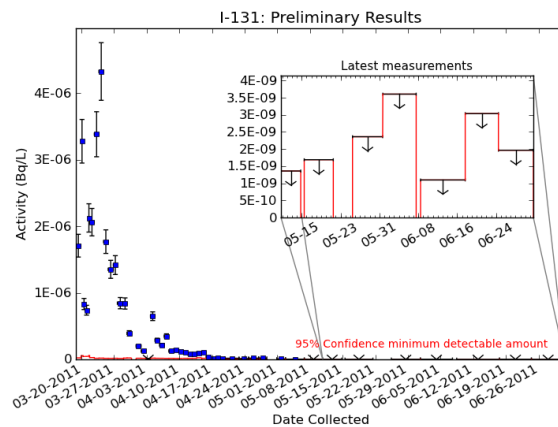
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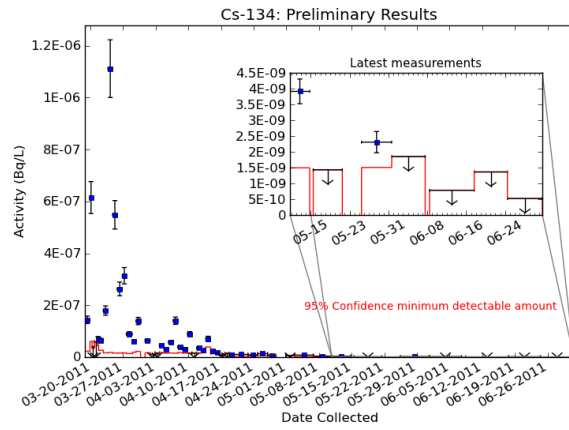
The following are results for air filter samples taken on the roof of Etcheverry Hall on UC Berkeley campus beginning on 3/17/2011.

Major revision note (6/17/11): A small amount of contamination in our lab from Cs-137 was discovered after taking a long background data sample on 6/9-13, and this background was subtracted from all of the previous Cs-137 measurements. Therefore, the levels of Cs-137 have decreased relative to the original numbers. The previous air sample numbers are kept on an [archive page](#).

In the table below the three plots, we are providing two numbers for each of the isotopes. The first is a standard concentration unit of Becquerel per liter (Bq/L) which describes the number of particles decaying over the period of one second in one liter. For the general public, we have converted this number to an exposure dose per liter of air breathed. The number in parentheses is the number of years of breathing the air that would be needed for a person to receive the radiation exposure of a single round trip flight from San Francisco to Washington D.C. (0.05 mSv). For more information on how this equivalent dose is calculated, the details are here: [How Effective Dose is Calculated](#)

[Description of Air Filtration Experiment B](#)





Start	End	Air Volume	I131	I132	Cs134	Cs137	Te132	Be7*	D
		Liters	Bq/L (years**)	Bq/L (years**)	Bq/L (years**)	Bq/L (years**)	Bq/L (years**)	Bq/L (years**)	
03/18/2011 19:40	03/19/2011 21:13	4.07E+06	1.7e-06 [MDA=2.3e-08] (4.3e+02)	3.4e-07 [MDA=3.8e-08] (2.2e+05)	1.4e-07 [MDA=2.3e-08] (5.1e+03)	1.5e-07 [MDA=2.7e-08] (5.1e+03)	2.6e-07 [MDA=1.9e-08] (1.3e+04)	1.8e-06 [MDA=1.8e-07] (6.2e+04)	da
03/19/2011 21:13	03/20/2011 09:24	1.94E+06	3.3e-06 [MDA=5.5e-08] (2.3e+02)	1.7e-06 [MDA=9.4e-08] (4.3e+04)	6.1e-07 [MDA=6.1e-08] (1.2e+03)	5.9e-07 [MDA=7.3e-08] (1.3e+03)	1.5e-06 [MDA=4.4e-08] (2.2e+03)	8.4e-07 [MDA=5.0e-07] (1.3e+05)	da
03/20/2011 08:30	03/20/2011 18:45	1.63E+06	8.3e-07 [MDA=4.3e-08] (8.9e+02)	1.3e-07 [MDA=6.9e-08] (5.6e+05)	less than MDA [MDA=3.9e-08]	less than MDA [MDA=4.9e-08]	1.3e-07 [MDA=3.8e-08] (2.5e+04)	1.8e-06 [MDA=3.6e-07] (6.3e+04)	da
03/20/2011 18:45	03/21/2011 10:55	2.57E+06	7.4e-07 [MDA=4.5e-08] (1.0e+03)	8.9e-08 [MDA=7.2e-08] (8.3e+05)	less than MDA [MDA=5.9e-08]	less than MDA [MDA=5.3e-08]	5.9e-08 [MDA=3.4e-08] (5.7e+04)	1.4e-06 [MDA=3.9e-07] (7.9e+04)	da
03/21/2011 10:55	03/21/2011 18:34	1.22E+06	2.1e-06 [MDA=5.6e-08] (3.5e+02)	2.5e-07 [MDA=1.1e-07] (2.9e+05)	6.9e-08 [MDA=4.7e-08] (1.1e+04)	7.3e-08 [MDA=6.2e-08] (1.0e+04)	1.6e-07 [MDA=5.4e-08] (2.1e+04)	1.5e-06 [MDA=4.7e-07] (7.2e+04)	da
03/21/2011 18:43	03/22/2011 18:17	3.75E+06	2.1e-06 [MDA=2.8e-08] (3.6e+02)	1.4e-07 [MDA=4.5e-08] (5.3e+05)	6.5e-08 [MDA=2.7e-08] (1.1e+04)	6.8e-08 [MDA=3.0e-08] (1.1e+04)	1.0e-07 [MDA=2.5e-08] (3.2e+04)	1.7e-06 [MDA=2.1e-07] (6.7e+04)	da
03/22/2011 18:25	03/23/2011 18:12	3.79E+06	3.4e-06 [MDA=1.7e-08] (2.2e+02)	3.0e-07 [MDA=2.8e-08] (2.5e+05)	1.8e-07 [MDA=1.7e-08] (4.1e+03)	2.1e-07 [MDA=1.9e-08] (3.5e+03)	2.3e-07 [MDA=1.4e-08] (1.4e+04)	1.6e-06 [MDA=1.4e-07] (7.0e+04)	da
03/23/2011 18:13	03/24/2011 18:02	3.79E+06	4.3e-06 [MDA=1.9e-08] (1.7e+02)	1.1e-06 [MDA=3.0e-08] (6.8e+04)	1.1e-06 [MDA=1.8e-08] (6.7e+02)	1.2e-06 [MDA=2.2e-08] (6.3e+02)	8.8e-07 [MDA=1.6e-08] (3.8e+03)	1.7e-06 [MDA=1.6e-07] (6.6e+04)	da
03/24/2011 18:07	03/25/2011 17:46	3.76E+06	1.8e-06 [MDA=1.6e-08] (4.2e+02)	4.3e-07 [MDA=2.8e-08] (1.7e+05)	5.5e-07 [MDA=1.6e-08] (1.3e+03)	5.6e-07 [MDA=1.9e-08] (1.3e+03)	3.4e-07 [MDA=1.4e-08] (9.7e+03)	1.7e-06 [MDA=1.3e-07] (6.5e+04)	da
03/25/2011 17:48	03/26/2011 20:10	4.2E+06	1.4e-06 [MDA=1.6e-08] (5.5e+02)	1.8e-07 [MDA=2.9e-08] (4.1e+05)	2.6e-07 [MDA=1.6e-08] (2.8e+03)	2.9e-07 [MDA=1.9e-08] (2.6e+03)	1.4e-07 [MDA=1.4e-08] (2.4e+04)	2.6e-06 [MDA=1.3e-07] (4.3e+04)	da
03/26/2011 20:13	03/27/2011 17:00	3.31E+06	1.4e-06 [MDA=1.7e-08] (5.2e+02)	1.8e-07 [MDA=3.1e-08] (4.0e+05)	3.1e-07 [MDA=1.7e-08] (2.4e+03)	3.3e-07 [MDA=2.0e-08] (2.2e+03)	1.3e-07 [MDA=1.5e-08] (2.6e+04)	4.0e-06 [MDA=1.4e-07] (2.8e+04)	da

03/27/2011 17:05	03/28/2011 23:04	4.77E+06	8.5e-07 [MDA=1.5e-08] (8.8e+02)	6.1e-08 [MDA=2.6e-08] (1.2e+06)	8.9e-08 [MDA=1.4e-08] (8.3e+03)	1.1e-07 [MDA=1.8e-08] (6.8e+03)	3.3e-08 [MDA=1.3e-08] (1.0e+05)	1.6e-06 [MDA=1.2e-07] (6.7e+04)	da
03/28/2011 23:04	03/29/2011 18:26	3.08E+06	8.4e-07 [MDA=2.0e-08] (8.8e+02)	3.5e-08 [MDA=3.0e-08] (2.1e+06)	6.0e-08 [MDA=1.9e-08] (1.2e+04)	6.8e-08 [MDA=2.2e-08] (1.1e+04)	3.5e-08 [MDA=1.7e-08] (9.6e+04)	1.4e-06 [MDA=1.7e-07] (7.8e+04)	da
03/29/2011 18:37	03/30/2011 18:06	3.74E+06	3.9e-07 [MDA=2.2e-08] (1.9e+03)	9.9e-08 [MDA=4.4e-08] (7.5e+05)	1.4e-07 [MDA=2.2e-08] (5.3e+03)	1.8e-07 [MDA=2.9e-08] (4.0e+03)	3.5e-08 [MDA=1.8e-08] (9.4e+04)	1.6e-06 [MDA=1.8e-07] (7.1e+04)	da
03/31/2011 17:22	04/01/2011 19:12	4.11E+06	2.0e-07 [MDA=1.8e-08] (3.7e+03)	less than MDA [MDA=1.9e-08]	6.4e-08 [MDA=1.7e-08] (1.2e+04)	7.4e-08 [MDA=1.8e-08] (1.0e+04)	less than MDA [MDA=1.1e-08]	5.9e-06 [MDA=1.4e-07] (1.9e+04)	da
04/01/2011 19:40	04/02/2011 20:17	3.92E+06	1.3e-07 [MDA=1.6e-08] (5.9e+03)	less than MDA [MDA=5.0e-08]	less than MDA [MDA=1.1e-08]	less than MDA [MDA=1.5e-08]	less than MDA [MDA=1.7e-08]	1.4e-06 [MDA=1.3e-07] (7.7e+04)	da
04/02/2011 20:26	04/03/2011 19:15	3.63E+06	less than MDA [MDA=1.3e-08]	less than MDA [MDA=4.2e-08]	less than MDA [MDA=1.6e-08]	less than MDA [MDA=3.2e-08]	less than MDA [MDA=1.4e-08]	less than MDA [MDA=1.6e-07]	da
04/03/2011 19:18	04/04/2011 18:36	3.71E+06	6.5e-07 [MDA=1.9e-08] (1.1e+03)	less than MDA [MDA=3.2e-08]	4.6e-08 [MDA=1.8e-08] (1.6e+04)	4.1e-08 [MDA=2.2e-08] (1.8e+04)	less than MDA [MDA=1.2e-08]	7.6e-06 [MDA=1.5e-07] (1.5e+04)	da
04/04/2011 18:39	04/05/2011 18:05	3.73E+06	2.9e-07 [MDA=1.7e-08] (2.6e+03)	less than MDA [MDA=2.8e-08]	3.2e-08 [MDA=1.6e-08] (2.3e+04)	3.8e-08 [MDA=1.8e-08] (1.9e+04)	less than MDA [MDA=2.1e-08]	3.8e-06 [MDA=1.4e-07] (2.9e+04)	da
04/05/2011 18:05	04/06/2011 17:50	3.78E+06	2.2e-07 [MDA=1.7e-08] (3.4e+03)	less than MDA [MDA=2.6e-08]	5.8e-08 [MDA=1.6e-08] (1.3e+04)	6.6e-08 [MDA=1.8e-08] (1.1e+04)	less than MDA [MDA=2.0e-08]	3.0e-06 [MDA=1.3e-07] (3.7e+04)	da
04/06/2011 17:50	04/07/2011 18:00	3.85E+06	3.5e-07 [MDA=1.5e-08] (2.1e+03)	less than MDA [MDA=1.8e-08]	1.4e-07 [MDA=1.5e-08] (5.3e+03)	1.5e-07 [MDA=1.8e-08] (4.9e+03)	less than MDA [MDA=1.9e-08]	2.2e-06 [MDA=1.3e-07] (5.1e+04)	da
04/07/2011 18:03	04/08/2011 18:25	3.88E+06	1.3e-07 [MDA=1.6e-08] (5.9e+03)	less than MDA [MDA=1.9e-08]	3.9e-08 [MDA=1.8e-08] (1.9e+04)	3.0e-08 [MDA=1.8e-08] (2.5e+04)	less than MDA [MDA=1.0e-08]	2.1e-06 [MDA=1.3e-07] (5.4e+04)	da
04/08/2011 18:26	04/09/2011 19:25	3.98E+06	1.4e-07 [MDA=1.5e-08] (5.2e+03)	less than MDA [MDA=4.4e-08]	3.2e-08 [MDA=1.6e-08] (2.3e+04)	4.2e-08 [MDA=1.7e-08] (1.7e+04)	less than MDA [MDA=1.0e-08]	2.2e-06 [MDA=1.3e-07] (5.0e+04)	da
04/09/2011 19:27	04/10/2011 18:15	3.63E+06	1.2e-07 [MDA=1.5e-08] (6.0e+03)	less than MDA [MDA=2.3e-08]	9.0e-08 [MDA=1.6e-08] (8.3e+03)	1.1e-07 [MDA=1.9e-08] (6.5e+03)	less than MDA [MDA=2.0e-08]	4.5e-06 [MDA=1.3e-07] (2.4e+04)	da
04/10/2011 18:15	04/11/2011 19:00	3.94E+06	1.0e-07 [MDA=1.6e-08] (7.2e+03)	less than MDA [MDA=1.9e-08]	less than MDA [MDA=1.6e-08]	2.1e-08 [MDA=1.8e-08] (3.6e+04)	less than MDA [MDA=1.1e-08]	5.4e-06 [MDA=1.3e-07] (2.1e+04)	da
04/11/2011 19:11	04/12/2011 18:13	3.67E+06	8.1e-08 [MDA=1.6e-08] (9.1e+03)	less than MDA [MDA=2.1e-08]	3.5e-08 [MDA=1.6e-08] (2.1e+04)	3.8e-08 [MDA=1.8e-08] (1.9e+04)	less than MDA [MDA=2.0e-08]	2.8e-06 [MDA=1.4e-07] (4.0e+04)	da
04/12/2011 18:19	04/13/2011 17:30	3.69E+06	8.5e-08 [MDA=1.7e-08] (8.7e+03)	less than MDA [MDA=3.2e-08]	2.8e-08 [MDA=1.7e-08] (2.6e+04)	4.5e-08 [MDA=2.1e-08] (1.6e+04)	less than MDA [MDA=1.3e-08]	2.2e-06 [MDA=1.3e-07] (5.1e+04)	da

04/13/2011 17:36	04/14/2011 18:20	3.94E+06	9.9e-08 [MDA=2.5e-08] (7.5e+03)	less than MDA [MDA=4.1e-08]	7.1e-08 [MDA=3.9e-08] (1.0e+04)	less than MDA [MDA=2.8e-08]	less than MDA [MDA=1.6e-08]	1.8e-06 [MDA=2.4e-07] (6.2e+04)	da
04/14/2011 18:20	04/15/2011 18:01	3.77E+06	1.0e-07 [MDA=1.7e-08] (7.2e+03)	less than MDA [MDA=3.0e-08]	2.3e-08 [MDA=1.3e-08] (3.2e+04)	2.7e-08 [MDA=1.8e-08] (2.7e+04)	less than MDA [MDA=1.1e-08]	2.8e-06 [MDA=1.4e-07] (3.9e+04)	da
04/15/2011 18:02	04/16/2011 16:18	3.54E+06	4.0e-08 [MDA=1.6e-08] (1.9e+04)	less than MDA [MDA=1.9e-08]	1.9e-08 [MDA=1.4e-08] (3.8e+04)	2.1e-08 [MDA=1.7e-08] (3.4e+04)	less than MDA [MDA=1.0e-08]	1.8e-06 [MDA=1.3e-07] (6.1e+04)	da
04/16/2011 16:18	04/17/2011 19:46	4.37E+06	1.3e-08 [MDA=1.2e-08] (5.8e+04)	less than MDA [MDA=2.6e-08]	less than MDA [MDA=9.2e-09]	less than MDA [MDA=1.8e-08]	less than MDA [MDA=9.1e-09]	4.6e-07 [MDA=1.2e-07] (2.4e+05)	da
04/17/2011 19:47	04/18/2011 18:06	3.55E+06	1.8e-08 [MDA=1.1e-08] (4.1e+04)	less than MDA [MDA=2.0e-08]	less than MDA [MDA=1.5e-08]	less than MDA [MDA=2.0e-08]	less than MDA [MDA=1.6e-08]	1.1e-06 [MDA=1.3e-07] (9.9e+04)	da
04/18/2011 18:08	04/19/2011 18:50	3.93E+06	1.5e-08 [MDA=8.3e-09] (5.0e+04)	less than MDA [MDA=3.3e-08]	9.2e-09 [MDA=8.0e-09] (8.0e+04)	less than MDA [MDA=9.4e-09]	less than MDA [MDA=6.7e-09]	6.6e-07 [MDA=7.0e-08] (1.7e+05)	da
04/19/2011 18:52	04/22/2011 19:04	1.15E+07	1.8e-08 [MDA=3.8e-09] (4.2e+04)	less than MDA [MDA=7.8e-09]	1.1e-08 [MDA=3.3e-09] (6.9e+04)	1.6e-08 [MDA=4.2e-09] (4.6e+04)	less than MDA [MDA=3.5e-09]	2.6e-06 [MDA=3.0e-08] (4.2e+04)	da
04/22/2011 19:04	04/24/2011 20:19	7.84E+06	1.3e-08 [MDA=5.0e-09] (5.7e+04)	less than MDA [MDA=1.1e-08]	8.9e-09 [MDA=4.6e-09] (8.3e+04)	8.3e-09 [MDA=5.9e-09] (8.9e+04)	less than MDA [MDA=4.0e-09]	1.9e-06 [MDA=4.2e-08] (5.8e+04)	da
04/24/2011 20:19	04/27/2011 00:08	8.25E+06	1.9e-08 [MDA=5.5e-09] (3.9e+04)	less than MDA [MDA=7.8e-09]	1.4e-08 [MDA=5.5e-09] (5.3e+04)	1.4e-08 [MDA=6.0e-09] (5.1e+04)	less than MDA [MDA=5.3e-09]	2.5e-06 [MDA=4.6e-08] (4.4e+04)	da
04/27/2011 00:08	04/28/2011 18:13	6.7E+06	2.0e-08 [MDA=6.9e-09] (3.7e+04)	less than MDA [MDA=8.6e-09]	7.4e-09 [MDA=6.3e-09] (1.0e+05)	9.3e-09 [MDA=7.5e-09] (8.0e+04)	less than MDA [MDA=5.2e-09]	2.7e-06 [MDA=5.0e-08] (4.2e+04)	da
04/30/2011 21:23	05/02/2011 18:19	7.15E+06	7.2e-09 [MDA=4.3e-09] (1.0e+05)	less than MDA [MDA=7.1e-09]	less than MDA [MDA=6.7e-09]	5.7e-09 [MDA=5.0e-09] (1.3e+05)	less than MDA [MDA=5.9e-09]	4.5e-06 [MDA=3.6e-08] (2.5e+04)	da
05/02/2011 18:21	05/06/2011 18:58	1.54E+07	4.0e-09 [MDA=2.2e-09] (1.9e+05)	less than MDA [MDA=5.6e-09]	8.0e-09 [MDA=1.9e-09] (9.3e+04)	8.2e-09 [MDA=2.4e-09] (9.0e+04)	less than MDA [MDA=2.9e-09]	5.1e-06 [MDA=1.7e-08] (2.2e+04)	da
05/06/2011 19:00	05/10/2011 17:40	1.51E+07	less than MDA [MDA=1.8e-09]	less than MDA [MDA=5.0e-09]	4.2e-09 [MDA=2.2e-09] (1.8e+05)	3.3e-09 [MDA=2.4e-09] (2.2e+05)	less than MDA [MDA=4.2e-09]	7.5e-07 [MDA=1.7e-08] (1.5e+05)	da
05/10/2011 17:40	05/14/2011 19:22	1.56E+07	less than MDA [MDA=1.4e-09]	less than MDA [MDA=5.7e-09]	3.9e-09 [MDA=1.5e-09] (1.9e+05)	4.8e-09 [MDA=1.5e-09] (1.5e+05)	less than MDA [MDA=4.3e-09]	2.5e-06 [MDA=1.2e-08] (4.5e+04)	da
05/15/2011 12:32	05/21/2011 12:00	2.28E+07	less than MDA [MDA=1.7e-09]	less than MDA [MDA=1.9e-08]	less than MDA [MDA=1.4e-09]	less than MDA [MDA=1.0e-09]	less than MDA [MDA=6.8e-09]	8.1e-07 [MDA=8.4e-09] (1.4e+05)	da
05/25/2011 10:56	05/31/2011 15:50	2.37E+07	less than MDA [MDA=2.4e-09]	less than MDA [MDA=1.5e-08]	2.3e-09 [MDA=1.5e-09] (3.2e+05)	2.1e-09 [MDA=1.1e-09] (3.6e+05)	less than MDA [MDA=6.6e-09]	1.9e-06 [MDA=8.9e-09] (5.9e+04)	da

05/31/2011 16:42	06/07/2011 13:20	2.62E+07	less than MDA [MDA=3.6e-09]	less than MDA [MDA=2.0e-08]	less than MDA [MDA=1.9e-09]	less than MDA [MDA=1.3e-09]	less than MDA [MDA=1.1e-08]	1.2e-06 [MDA=1.1e-08] (9.3e+04)	da
06/08/2011 11:07	06/17/2011 15:30	3.51E+07	less than MDA [MDA=1.1e-09]	less than MDA [MDA=1.0e-08]	less than MDA [MDA=7.9e-10]	less than MDA [MDA=7.5e-10]	less than MDA [MDA=7.4e-09]	1.7e-06 [MDA=6.2e-09] (6.7e+04)	da
06/17/2011 15:31	06/24/2011 11:29	2.61E+07	less than MDA [MDA=3.0e-09]	less than MDA [MDA=1.5e-08]	less than MDA [MDA=1.4e-09]	less than MDA [MDA=1.1e-09]	less than MDA [MDA=5.9e-09]	1.2e-06 [MDA=8.4e-09] (9.3e+04)	da
06/24/2011 11:30	07/01/2011 15:56	2.74E+07	less than MDA [MDA=2.0e-09]	less than MDA [MDA=1.1e-08]	less than MDA [MDA=5.2e-10]	less than MDA [MDA=8.9e-10]	less than MDA [MDA=4.0e-09]	8.4e-07 [MDA=7.7e-09] (1.3e+05)	da

* Be-7 is observed normally due to its being [produced by cosmic rays interacting with the atmosphere](#).

** The number in parentheses is the number of years that one would need to breathe the air to equal the radiation exposure of a single round trip flight from San Francisco to Washington D.C. (0.05 mSv). To see how we calculate these numbers, please visit [our explanation of the equivalent dose calculation](#).

Results from Air Filtration Experiment A

The following data is from [our original air filtration equipment](#), which we have since [upgraded](#). The original system did not detect any radioisotopes but it also was not very sensitive. We are working on converting this data into equivalent upper limits on the radioisotopes for inclusion with our results from System B.

Start	End	Air Vol. (m ³)	K-40 (cph*)	I-131 (cph*)	Cs-137 (cph*)	Te-132 (cph*)	Data
03/16 1800	3/17 0900	0.63	28.2 +/- 2.2	-1.31 +/- 0.99	-0.48 +/- 1.26	0.30 +/- 1.36	data
03/17 0900	3/17 2000	0.39	26.1 +/- 1.40	-0.49 +/- 0.84	0.53 +/- 1.04	-0.14 +/- 1.05	data
03/17 2000	3/18 1000	0.59	30.3 +/- 1.90	0.12 +/- 0.99	-1.01 +/- 1.11	-1.18 +/- 1.15	data

* cph = radiation counts per hour in detector.

Note: K-40 is natural background for reference.

Negative numbers indicate statistical fluctuations below the background baseline measurement. These can be interpreted as zero.

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