EPA Central data versus FieldDosimetry

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TABLE I: EPA and Field Screening measurements of β Concentration

EPA Data (pCi/m^3)		Ancillary Data (pCi/m^3)		EPA Data (pCi/m^3)		Ancillary Data (pCi/m^3)	
Sample Date	Result	Sample Date	Result	Sample Date	Result	Sample Date	Result
15-MAR-14	0.00496	15 Mar 2014	286.66	22-SEP-14	0.0096	22 Sep 2014	209.73
20-MAR-14	0.00607			26-SEP-14	0.01226	26 Sep 2014	334.49
23-MAR-14	0.007	23 Mar 2014	12.74	29-SEP-14	0.01377	29 Sep 2014	277.77
26-MAR-14	0.00971	26 Mar 2014	181.09	03-OCT-14	0.00832	03 Oct 2014	75.51
30-MAR-14	0.00896	30 Mar 2014	312.21	06-OCT-14	0.00605	06 Oct 2014	174.22
02-APR-14	0.00765			10-OCT-14	0.00859	10 Oct 2014	176.73
05-APR-14	0.01033	05 Apr 2014	188.66	13-OCT-14	0.00809	13 Oct 2014	78.46
09-APR-14	0.00628			17-OCT-14	0.00546	17 Oct 2014	310.64
13-APR-14	0.00853			20-OCT-14	0.01015	20 Oct 2014	301.57
16-APR-14	0.00885			24-OCT-14	0.0162	24 Oct 2014	1026.15
19-APR-14	0.01193	19 Apr 2014	152.74	27-OCT-14	0.01474	27 Oct 2014	88.55
23-APR-14	0.00754			31-OCT-14	0.00605	31 Oct 2014	84.17
27-APR-14	0.00842	27 Apr 2014	277.83	03-NOV-14	0.00992	03 Nov 2014	272.13
30-APR-14	0.00276			19-DEC-14	0.0152	19 Dec 2014	1441.16
04-MAY-14	0.0073			23-DEC-14	0.0237	23 Dec 2014	680.85
07-MAY-14	0.01205			29-DEC-14	0.00901		
10-MAY-14	0.00845			02-JAN-15	0.01286	02 Jan 2015	257.61
14-MAY-14	0.00448	14 May 2014	82.48	06-JAN-15	0.01246	06 Jan 2015	402.72
18-MAY-14	0.01404	18 May 2014	179	12-JAN-15	0.01143	12 Jan 2015	210.16
		21 May 2014	32.01	16-JAN-15	0.01235		
25-MAY-14	0.00877	25 May 2014	312.04	19-JAN-15	0.00543		
28-MAY-14	0.00874	28 May 2014	455.53	23-JAN-15	0.00314	23 Jan 2015	260.32
01-JUN-14	0.00741			26-JAN-15	0.00285	26 Jan 2015	130.61
08-JUN-14	0.00893	08 Jun 2014	46.94	30-JAN-15	0.00705	30 Jan 2015	363.6
12-JUN-14	0.00678	12 Jun 2014	45.47	03-FEB-15	0.00827	03 Feb 2015	541.48
16-JUN-14	0.00709	16 Jun 2014	153.49	06-FEB-15	0.01296	06 Feb 2015	388.51
20-JUN-14	0.00929	20 Jun 2014	147.37	09-FEB-15	0.00521	09 Feb 2015	213.55
23-JUN-14	0.00581	23 Jun 2014	77.83	13-FEB-15	0.01448	13 Feb 2015	263.64
27-JUN-14	0.00703	27 Jun 2014	101.12	16-FEB-15	0.01056	16 Feb 2015	477.67
30-JUN-14	0.00833	30 Jun 2014	213.96	20-FEB-15	0.00842	20 Feb 2015	223.21
04-JUL-14	0.00696	04 Jul 2014	149.31	23-FEB-15	0.01103	23 Feb 2015	120.61
07-JUL-14	0.01198	07 Jul 2014	289.6	27-FEB-15	0.00874	27 Feb 2015	164.86
10-JUL-14	0.00619	10 Jul 2014	202.23	09-MAR-15	0.00596	09 Mar 2015	117.5
14-JUL-14	0.00844	14 Jul 2014	193.26	13-MAR-15	0.01062		
18-JUL-14	0.00722	18 Jul 2014	493.83	16-MAR-15	0.00495	16 Mar 2015	329.35
22-JUL-14	0.01122	22 Jul 2014	311.8	20-MAR-15	0.00685	20 Mar 2015	302.58
25-JUL-14	0.01046	25 Jul 2014	392.52	23-MAR-15	0.00882	23 Mar 2015	179.07
28-JUL-14	0.01095	28 Jul 2014	198.12	27-MAR-15	0.0087		
01-AUG-14	0.0085	01 Aug 2014	444.64	31-MAR-15	0.00777		
04-AUG-14	0.01359	04 Aug 2014	555.88	11-APR-15	0.00611		
08-AUG-14	0.0225	08 Aug 2014	442.65	16-APR-15	0.0059		
11-AUG-14	0.00721	11 Aug 2014	227.61	22-APR-15	0.0057		
18-AUG-14	0.0169	18 Aug 2014	98.49	24-APR-15	0.00721	24 Apr 2015	606.52
22-AUG-14	0.01178	22 Aug 2014	586.41	27-APR-15	0.01056	27 Apr 2015	152.49
25-AUG-14	0.00759	25 Aug 2014	105.79	01-MAY-15	0.0093	01 May 2015	466.21
29-AUG-14	0.00564	29 Aug 2014	181.1	07-MAY-15	0.00979	07 May 2015	299.98
01-SEP-14	0.01024	01 Sep 2014	155.28	11-MAY-15	0.00502	11 May 2015	72.84
05-SEP-14	0.00538	05 Sep 2014	158.43	19-MAY-15	0.006		
08-SEP-14	0.00605	08 Sep 2014	230.42	26-MAY-15	0.00595		
12-SEP-14	0.00597	12 Sep 2014	91	29-MAY-15	0.01005	29 May 2015	187.49
15-SEP-14	0.00485	15 Sep 2014	185.29	01-JUN-15	0.00505	01 Jun 2015	149.36
18-SEP-14	0.01398	18 Sep 2014	334.52				

Clearly the Field Screening data is much different from the EPA's data:

EPA Central		Field Screening		α and β	
Gross beta in air $\left(\mathrm{pCi/m^3}\right)$		Beta $\left(\mathrm{pCi/m^3}\right)$		$[\mathcal{R}_\alpha + \mathcal{R}_\beta]\left(\mathrm{pCi/m^3}\right)$	
Maximum	0.0237	Maximum	1441.16	Maximum	1615.5
Mean $\pm$ σ	0.0089 ± 0.0036	Mean $\pm$ σ	267.9 ± 214.2	Mean $\pm$ σ	306.3 ± 242.5
Minimum	0.0028	Minimum	12.74	Minimum	28.6

This study generated one hundred three days of β activity measurements. Comparing Field Screening measurements to EPA Central measurements generated eighty coincident pairs of measurements. The two data sets have a weak correlation R = 0.44492, suggesting they do not measure the same thing.

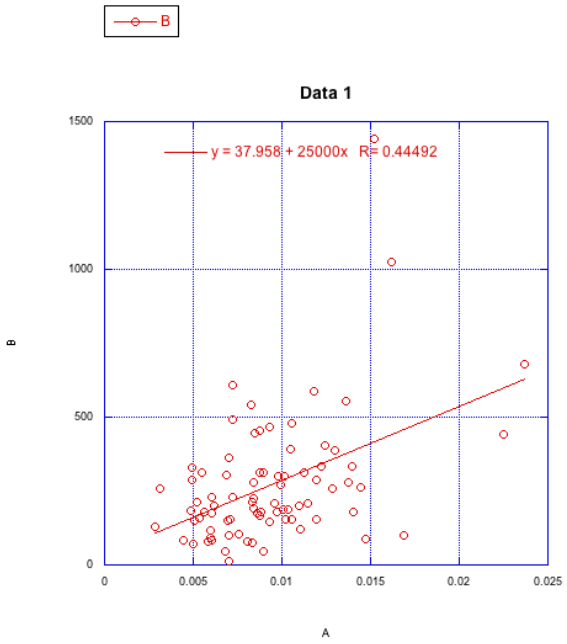

FIG. 1: Field Data verses EPA Data

Removing the two Field Data outliers, and the two EPA Data outliers from consideration exacerbates the disconnect between these two data sets. Measuring the concentration of long-lived (short-lived) radioisotopes does not predict the concentration of short-lived (long-lived) radioisotopes in the environment. This disconnect is important with respect to the Standard Operating Procedure (SOP) document adopted for the EPA's RadNet Air Monitoring System.

To service its mission objective:

> "To monitor environmental radioactivity in the United States in order to provide high quality data for assessing public exposure and environmental impacts resulting from nuclear emergencies and to provide baseline data during routine conditions."

The EPA should adopt this Ancillary Protocol as the basis for revising the EPA's RadNet Air Monitoring System SOP document.

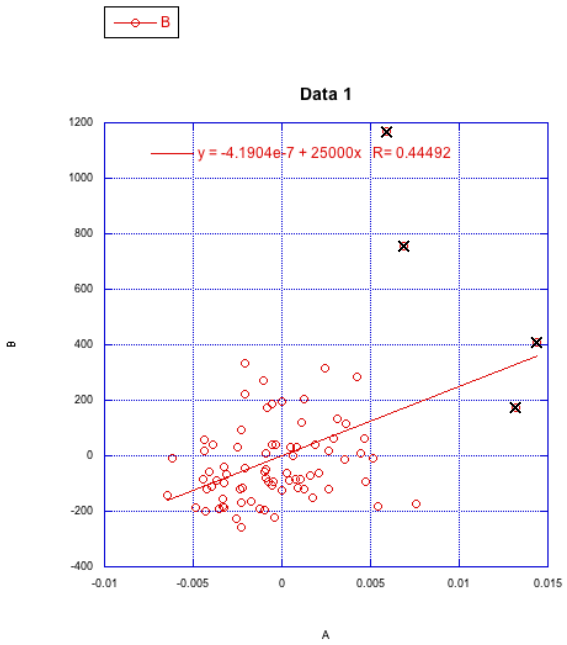

FIG. 2: Centered and Outliers Noted

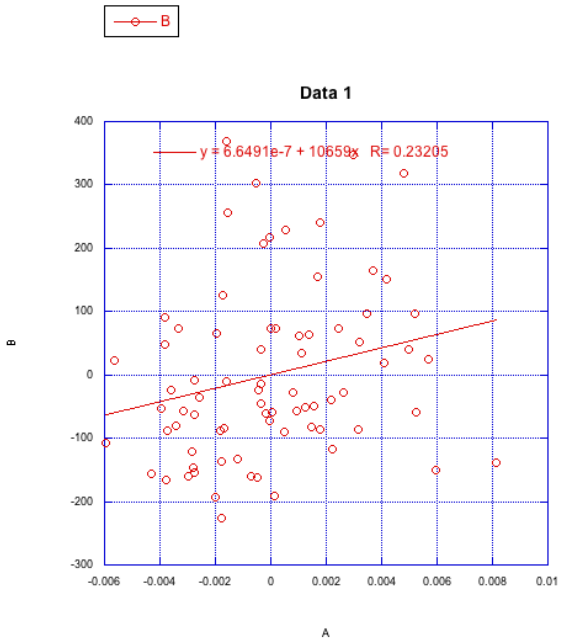

FIG. 3: Outliers Removed and Remaining Data Centered