Particles in the Environment Update for Quarter 2 2016/17

1 Beach Monitoring

1.1 Progress and Areas Monitored

To date, 72.7 ha of beach has been monitored against a programme target of 66 ha. A total of 84 particles and 25 stones have been recovered so far during the 2016/17 financial year, see Table 1.

The programme is on schedule to meet the annual monitoring target of 160 ha agreed with the EA. There were no unusual events (e.g. storms or vehicle breakdowns) to report.

Table 1. Beach finds in 2016/17 (up to the end of Quarter 2)

Beach location	Area covered (ha)	No. of particles found			No. of stones found			Total Finds
		Alpha rich	Beta Rich	Other	Alpha rich	Beta Rich	Other	
St. Bees	14.1	13	0	0	0	0	0	**13**
Braystones	9.6	18	0	0	0	0	0	**18**
Sellafield	35.2	38	15	0	0	24	1*	**78**
Seascale	13.8	0	0	0	0	0	0	**0**
ALL AREAS TOTAL	**72.7**	**69**	**15**	**0**	**0**	**24**	**1***	**109**

Notes: Proportion of particles as % of total finds 70.9%. * ^{226}Ra find unrelated to Sellafield discharges.

Two of the finds detected so far during 2016/17 have exceeded the characterisation triggers set within the intervention criteria or PHE risk assessment.

- A beta rich particle was detected in April 2016 on Sellafield beach with a ^{137}Cs activity of 1.01E+05 Bq.
- A beta rich particle was detected in May 2016 on Sellafield beach with a ^{137}Cs activity of 1.03E+05 Bq

Both particles were within the range of previous measurements and therefore do not require immediate further consideration and do not challenge the Public Health England risk assessment. However, as they contained more than 1E+05 Bq of ^{137}Cs, they will be included within the next batch of samples that are sent for more detailed laboratory analysis.

The Public Health England risk assessment states *"The conclusion, based on the currently available information, is that the overall health risks to beach users are very low and significantly lower than other risks that people accept when using the beaches".*

1.2 Find rates

Average find rates are compared with find rates over the last two financial years in Table 2. For clarity of presentation, the find rates in Table 2 are rounded to the nearest whole number.

There has been a small reduction in alpha-rich particle find rates this financial year, when compared with the find rates reported in 2015/16. Beta-rich find rates remain broadly similar to previous years. There has been insufficient monitoring on Braystones beach so far during 2016/17 to derive a reliable estimate of find rates.

Similar find rates over time indicate that the numbers of particles present at the surface of the beach at any time does not vary significantly. This provides confidence that the chance of encounter used in the PHE risk assessment is fit for purpose.

Find rates have not exceeded the Environment Agency's proposed intervention trigger levels at any of the monitored beaches.

More details including maps showing the areas monitored and the locations of finds can be found at:

http://sustainability.sellafieldsites.com/environment/environment-page/particles-in-the-environment/.

Table 2. Find per hectare and area monitored for main beach areas

Beach Location	Financial Year	Area covered (ha)	Find category & Type (finds per hectare)			
			Alpha-rich Particle	Beta-rich Particle	Beta-rich Stone	Other Finds
St. Bees	2014/15	38.7	1	<1	<1	<1
	2015/16	21.3	2	<1	<1	<1
	2016/17	14.1	<1	<1	<1	<1
Braystones	2014/15	19.0	3	<1	<1	<1
	2015/16	24.3	<1	<1	<1	<1
	2016/17	9.6	IA	IA	IA	IA
Sellafield	2014/15	38.2	5	<1	<1	<1
	2015/16	83.1	2	<1	<1	<1
	2016/17	35.2	1	<1	<1	<1
Seascale	2014/15	36.8	<1	<1	<1	<1
	2015/16	27.1	<1	<1	<1	<1
	2016/17	13.8	<1	<1	<1	<1

Notes: IA - Insufficient area coverage to estimate finds rates (<10 ha).

1.3 Find activities

The activities of alpha rich and beta rich particle finds are compared to the activities measured over the two preceding financial years in Figure 1. Data covers April 2014 until 31st March 2016 and from 1st April 2016 – 23rd September 2016. Maximum particle activity recorded during this time period for ^{241}Am is 1.45E+05 Bq (21/05/2015) and for ^{137}Cs is 1.74E+05 Bq (02/06/2015).

Similar activities over time indicate that the activity of particles present at the surface of the beach at any time does not vary significantly. This provides confidence that the risks following encounter used in the PHE risk assessment is fit for purpose.

1.4 Further analyses

The 10 samples currently undergoing further analyses have now had dosimetric measurements taken using TLD, Gafchromic film and ion chamber techniques. Reporting of these measurements are expected during October 2016. The 10 samples are currently undergoing petrological investigation at BGS Keyworth. Reporting of these investigations is expected in late October 2016.

Head of Environment, Sellafield Site
13/10/2016

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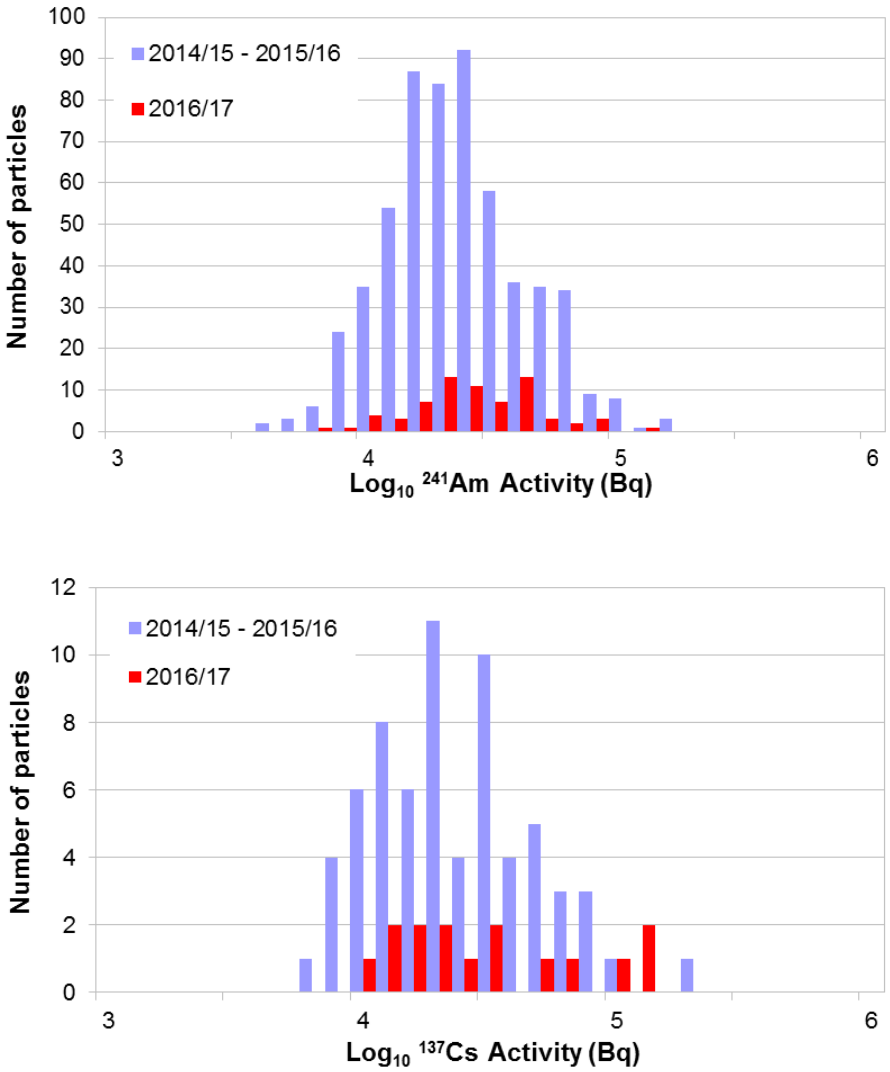

Figure 1: Radioactivity of finds classified as alpha-rich particles (upper) and beta rich particles (lower).