

## Particles in the Environment Update for Quarter 3 2016/17

### 1 Beach Monitoring

#### 1.1 Progress and Areas Monitored

To date, 125.4 ha of beach have been monitored against a programme target of 116 ha. A total of 135 particles and 39 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 Environment Agency. 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 3)**

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	
Allonby	10.7	0	0	0	0	0	0	0
St. Bees	14.1	13	0	0	0	0	0	13
Braystones	19.2	20	0	0	0	0	0	20
Sellafield	67.7	85	17	0	0	38	1*	141
Seascale	13.8	0	0	0	0	0	0	0
<b>ALL AREAS TOTAL</b>	<b>125.4</b>	<b>118</b>	<b>17</b>	<b>0</b>	<b>0</b>	<b>38</b>	<b>1*</b>	<b>174</b>

Notes: Proportion of particles as % of total finds 77.6%. <sup>226</sup>Ra find unrelated to Sellafield discharges.

As reported previously, two of the finds detected so far during 2016/17 have exceeded the characterisation triggers set within the draft EA intervention criteria or Public Health England (PHE) risk assessment.

- A beta rich particle was detected in April 2016 on Sellafield beach with a <sup>137</sup>Cs activity of 1.01E+05 Bq.
- A beta rich particle was detected in May 2016 on Sellafield beach with a <sup>137</sup>Cs activity of 1.03E+05 Bq

Both finds were within the range of previous measurements and therefore do not require immediate further consideration and do not challenge the PHE risk assessment. However, as they contained more than 1E+05 Bq of <sup>137</sup>Cs, they have been included within the next batch of ten samples which were sent for more detailed laboratory analysis in December 2016.

When separated from the rest of the sample by the contracted laboratory, preliminary size analysis has shown that the May 2016 find is actually a stone, with dimensions of 10 x 3 x 2 mm. The April 2016 find was measured as having dimensions of 2 x 2 mm.

The PHE 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 reduction in alpha-rich particle find rates on Sellafield beach, when compared with the find rates of the previous two financial years. Beta-rich find rates across all beaches remain low and are broadly similar to previous years.

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
Allonby	2014/15	13.1	<1	<0.1	No Finds	No Finds
	2015/16	10.4	No Finds	No Finds	No Finds	No Finds
	2016/17	10.7	No Finds	No Finds	No Finds	No Finds
St. Bees	2014/15	38.7	1	<0.1	No Finds	No Finds
	2015/16	21.3	2	No Finds	No Finds	<0.1
	2016/17	14.1	<1	No Finds	No Finds	No Finds
Braystones	2014/15	19.0	3	No Finds	No Finds	No Finds
	2015/16	24.3	<1	<0.1	No Finds	No Finds
	2016/17	19.2	1	No Finds	No Finds	No Finds
Sellafield	2014/15	38.2	5	<1	<1	No Finds
	2015/16	83.1	2	<1	<1	<0.1
	2016/17	67.7	1	<1	<1	<0.1
Seascale	2014/15	36.8	<1	<0.1	No Finds	No Finds
	2015/16	27.1	<1	No Finds	No Finds	No Finds
	2016/17	13.8	No Finds	No Finds	No Finds	No Finds

### 1.3 Find activities

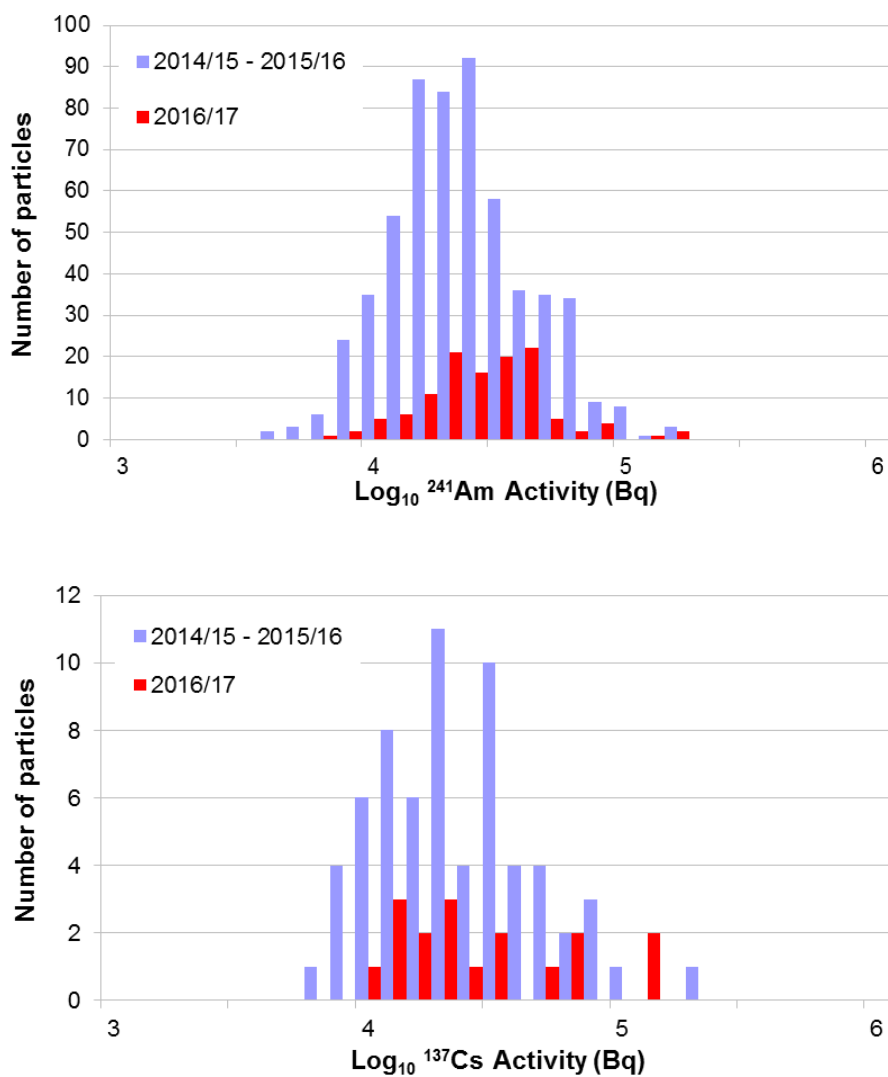
The activities of alpha rich and beta rich particle finds are compared to the activities measured over the two preceding financial years in Figure 1. Data covers April 2014 until 31<sup>st</sup> March 2016 and from 1<sup>st</sup> April 2016 – 23<sup>rd</sup> September 2016. Maximum particle activity recorded during this time period for <sup>241</sup>Am is 1.45E+05 Bq detected on 21/05/2015 and for <sup>137</sup>Cs is 1.74E+05 Bq detected on 02/06/2015 (further analysis has shown this find to have dimensions of 5 x 5 x 2 mm).

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 remains fit for purpose.

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