

Briefing Note – Enhanced beach monitoring for radioactive particles near Sellafield site – April 2011 update

Background

Environmental monitoring must be carried out as a condition of the environmental permits that we issue to nuclear site operators. Environmental monitoring is important in order to demonstrate that discharges from nuclear sites are being properly controlled, and to demonstrate that the impacts of discharges on people and the environment continue to be minimised.

We require that operators use the best available techniques to carry out their monitoring, and that improved techniques are used if these become available.

In 2006 Sellafield Ltd tested a new, vehicle-mounted detector system to monitor local beaches for small radioactive objects and particles. This work was successful, and since May 2007 this new equipment has been used routinely to survey beaches in the vicinity of Sellafield site.



Vehicle-mounted radioactive particle detection system

The monitoring programme has focused on beach areas between St Bees and Drigg. It has also included areas as far south as Silecroft, and up to the Solway Firth to the north. To date, a total beach area of over 1200 hectares has been monitored.

Monitoring results to date

Since the trials in 2006 up to 31 March 2011, 1233 radioactive objects (small particles, pebbles and stones) have been found and removed from the beaches. The majority of the finds have been found in or on sand in the stretch of beach extending around 3km north from the Sellafield site (up to and including Braystones). The numbers of finds in each of the areas monitored are shown in the following table.

Beach location	Area surveyed Hectares	No of pebbles and stones found (objects 2mm or more in size)	No of particles found (objects less than 2mm in size)
Cumbria			
Allonby	30.02	0	1
Workington	25.56	0	1
Harrington	3.90	0	2
Parton	4.14	0	0
Whitehaven	8.93	0	9
St_Bees	187.33	0	73
Nethertown	9.17	0	0
Sellafield	351.33	435	456
Braystones	198.13	0	192
Seascale	249.89	3	44
Drigg	138.29	0	17
Silecroft	13.91	0	0
Dumfries & Galloway			
Goatwell Bay	8.18	0	0
Southernness	15.74	0	0
ALL AREAS TOTAL	1244.53	438	795

These numbers also include the results of repeat surveys that have been carried out on most of the beaches. These repeat surveys show that, after time, new particles are being found on the beaches. This is not entirely surprising, as the seabed sediment and beach sediments are continually being mixed and exchanged due to tidal action.

Types of objects being found

The objects that have been retrieved are varied in their size, shape, and in the radioactive components that they contain. 'Particles' are considered to be objects less than 2mm in diameter, with objects larger than this being considered to be pebbles or stones. The objects are also classified according to their radionuclide composition:

- particles, pebbles or stones contaminated mainly with caesium-137, cobalt-60 or strontium-90 are classified as 'beta-rich';
- particles, pebbles or stones contaminated mainly with americium-241 and isotopes of plutonium are classified as 'alpha-rich'.

The results to date indicate that find-rates for the beta-rich particles, and for pebbles/stones, are reducing with time, suggesting that the 'detect and remove' monitoring programme is making good progress in removing these objects from the environment.

Find rates for 'alpha-rich' particles were also seen to fall between 2006 and 2009, but have increased since August 2009, coinciding with the introduction of a new, further improved detection system, which has greater sensitivity for this type of particle. Consequently we are not yet able to show conclusively that the monitoring and retrieval programme is also significantly depleting the numbers of 'alpha-rich' particles in the environment.

What risks do the finds present to the public?

- Beta-rich particles, pebbles or stones: if in contact with the skin, these types of objects could cause temporary skin reddening or minor ulceration. However, the levels of these isotopes found in these objects so far are such that only very prolonged contact (many hours) in exactly the same area of skin would be necessary to cause these effects. The chance of coming into contact with such a particle, and then for it to remain in such prolonged contact with the skin, is considered to be very low.
- Alpha-rich particles, pebbles or stones: although these types of objects are of little health concern if outside of the body, they could cause an increased risk of cancer if swallowed or inhaled. While a minority of these could possibly give a significant radiation dose in the long term if they were to be accidentally swallowed or inhaled, the chances of encountering, and of swallowing or inhaling such a particle are considered to be very low.

We have asked the Health Protection Agency (HPA - the principal advisory body in the UK for radiation risks) about the health implications for the public of the radioactive objects that had been found and recovered, and we have commissioned them to carry out a detailed assessment of risks. Their report on this work has recently been published and is available at <http://www.hpa.org.uk/>.

Their advice remains that:

No special precautionary actions are required at this time to limit access to or use of the beaches. However, monitoring and retrieval should be continued - with emphasis on frequented areas.

The HPA continues to be kept informed as new information emerges, and has agreed to keep its advice under review in light of new information.

We are continuing to work on identifying the precise origin of these contaminated objects, and to assess Sellafield Ltd's arrangements for preventing further releases of radioactively contaminated solids into the environment. This work is increasingly showing that:

- there are no on-going discharges of significantly active particles into the environment;
- the finds to date are related to past events and incidents at Sellafield that occurred 25-40 years ago.

Further detail on the monitoring data compiled so far, and a map of the locations of the finds, can be obtained from Sellafield Ltd –

<http://www.sellafieldsites.com/about-us/environment-health-safety--quality/environment/particles-in-the-environment>

What next?

In November 2010 we held a multi-agency meeting, to gather the views of a number of partner agencies and organisations (including HPA, the Food Standards Agency, local authorities, and the independent expert Committee on Medical Aspects of Radiation in the Environment). Their views are being taken into account in agreeing the forward work programme, which will:

- continue to focus on beach monitoring, and to consider how it can be improved even further – including carrying out monitoring of the seabed, and carrying out focused assessments to better understand how particle populations are changing with time;
- continue to investigate potential sources of the finds;
- ensure that best techniques are used to control existing site operations so that releases of particles are prevented or minimised;
- undertake detailed laboratory analysis aimed at, where possible, further improving understanding of the source, nature, hazard, composition and radioactive content of the finds;
- update the recently published HPA risk assessment taking into account more recent beach monitoring data.

For 2011/12, Sellafield Ltd has proposed a reduction in beach area to be monitored, from 250 Ha to 150 Ha, reflecting the low risks that the HPA report has indicated. We are currently considering whether this reduced programme will be sufficient to meet the objectives of the beach monitoring work, and also whether this change could free up some resources which might be better targeted on developing techniques to monitor the seabed.

The Environment Agency will continue to focus on inspecting and auditing Sellafield Ltd's arrangements for ensuring that potential releases of particles are adequately prevented or minimised, and we will provide oversight to ensure that the wider work programme is delivered effectively by Sellafield Ltd.

We will also maintain our role in co-ordinating independent assessment of the risks that particles present to the public and the environment, and in providing the public and relevant partner organisations (such as local councils) with information and advice.

Our work in this area continues to be supported by contributions from a number of partner organisations, including the Health Protection Agency (HPA), and the Food Standards Agency (FSA). We will continue to work closely with these and other relevant interested parties and agencies as appropriate, and will keep the implications of all types of environmental monitoring results under review.

Getting in touch with us

If you need any more information please contact Stuart Page, Nuclear Regulator, in our Nuclear Regulation Group. Email nrgnorth@environment-agency.gov.uk or call our National Customer Contact Centre on 08708 506 506 (Mon-Fri, 8am - 6pm).

The Food Standards Agency can be contacted on 020 7276 8750, or the Health Protection Agency (Centre for Radiation, Chemical and Environmental Hazards) on 01235 822742.