

PARTICLES BRIEFING

1. BACKGROUND

Fragments of irradiated nuclear fuel (known as particles) were discharged to the sea as a result of practices in reprocessing during the 1960s and 70s.

Following extensive studies the most hazardous particles were found to be located close to an old liquid effluent discharge point on the seabed. Their disintegration is the source of smaller, less hazardous particles detected on local beaches since the early 1980s.

The discovery of particles on the seabed in the late 1990s led to an extensive programme of research and consultation to identify the best practicable environmental option to deal with the issue. This identified the targeted retrieval of particles from the area of seabed where the highest activity particles had been found, and where the particle population density is at its highest, with on-shore monitoring specifically at Dounreay foreshore and Sandside beach, as the preferred way forward.

1.1 Independent advice

The programme of work was guided by an independent expert body – Dounreay Particles Advisory Group (DPAG) which changed to Particles Retrieval Advisory Group (Dounreay) in May 2009. DPAG, in its Third report defined particles as:

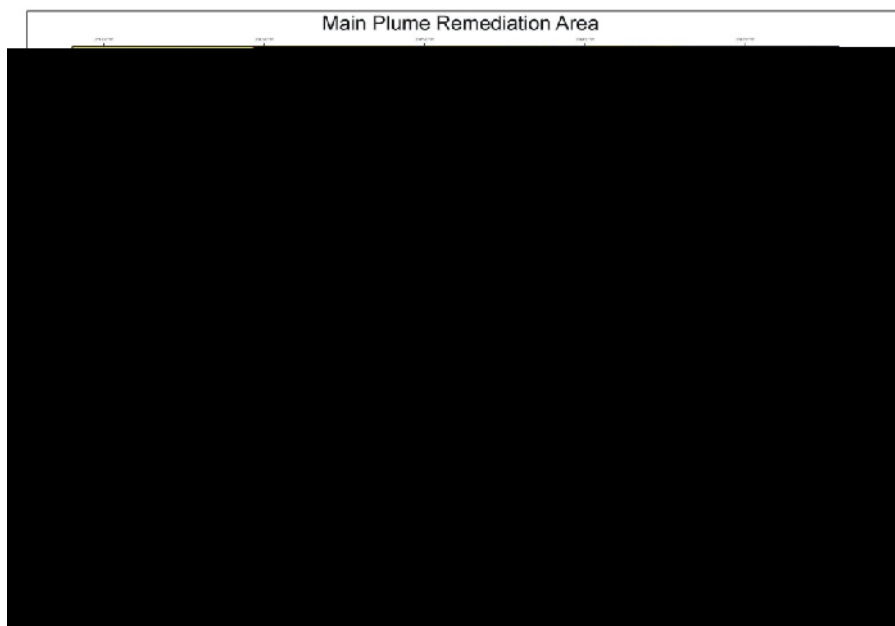
Dounreay Particles Advisory Group (DPAG) – classification of particles

<i>Significant</i>	Caesium 137 activity greater than 1,000,000 Bq	Likely to cause serious ulceration (visible after 1-2 weeks). This may take several weeks to heal along with the associated risk of infection which might require medical treatment.
		Would require a minimum of 7 hours stationary contact with the skin to have any discernable effect. Indeed, time

DPAG's successor, PRAG(D) is in the process of producing their final report. Recommendations from this report will be discussed with SEPA and a way forward agreed.

1.2 Off-shore monitoring and retrieval

Off-shore clean-up started in August 2008, targeted at a 60-hectare area of seabed known as the "plume". The development of detection equipment with retrieval capability allowed the seabed to be systematically covered, retrieving particles when detected. This work continued each summer through 2012. In total 2184 particles have been removed from the seabed. Of these 411 were deemed 'significant' in terms of their potential health effects.



1.3 Effects of off-shore remediation on beaches

The on-shore monitoring programme continues today.

The effectiveness of the off-shore remediation should be reflected in the arrival rate and activity of particles on local beaches. The Dounreay foreshore, being closest to the area where the offshore work took place, could be expected to be the first area to see a change. On-shore monitoring will be required over a number of years in order to identify any trends in arrival rates and activity.

1.4 On-shore monitoring and retrieval

Beach monitoring has taken place since 1983 along 25 km of the coastline, centered mainly on the Dounreay Foreshore and the public beach at Sandside. Other local beaches from Melvich to Thurso have been regularly checked during this time.

Monitoring was, and continues to be, regulated by the Scottish Environment Protection Agency. It is specified in the formal Authorisation granted by SEPA to Dounreay Site Restoration Ltd under the Radioactive Substances Act 1993. DSRL adheres to the criteria. Additional, enhanced monitoring is carried out with the agreement of SEPA.

1.5 Statutory on-shore monitoring

The information below summarises the current monitoring regime as set out by SEPA.

Beach	Area	Frequency
Sandside Bay	All sandy areas that can be accessed to low water.	Monthly.
Sandside Bay	Accessible sandy areas which do not permit vehicle access including North beach, harbour, sandy areas below Fresgoe House, bands of sand Northeast of the beach below the public lavatories and the sandy areas North of Isauld Burn	Monthly.
Sandside Bay	Strandline that can be access by vehicle.	Fortnightly.
Thurso Bay	All sandy areas that can be accessed to low water.	Three times per year.
Scrabster Bay	All sandy areas that can be accessed to low water	Three times per year
Crosskirk Bay	All accessible sandy areas to low water.	Six times per year.
Brim's Ness	All Accessible sandy areas to low water.	Six times per year.
Dounreay East Foreshore	All accessible sandy areas to low water.	Fortnightly (except during period 1 May to 31 August).

Dounreay West Foreshore	All accessible sandy areas to low water	Fortnightly (except during period 1 May to 31 August)
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* Low water means as reasonably as practicable to low water springs, but at least to neap low water.

2. CURRENT

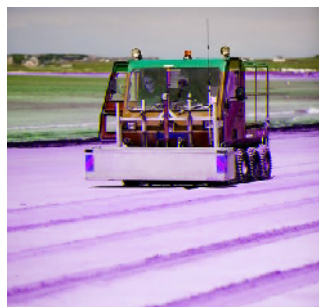
2.1 Off-shore particle retrieval

All of the data from off-shore recovery operations have been reported to PRAG(D). The data is being analysed and a final report will be issued. Currently DSRL have no plans for any further off-shore operations however this will be reviewed once the PRAG(D) report is available.

2.2 The Effluent discharge system

As the Old Liquid Effluent System is no longer considered an ongoing source of particles, PRAG(D) and SEPA accepted that there was no urgency to seal the system. It was further considered that rather than deal with the old and the new systems separately they should be dealt with together. Work is currently being undertaken to identify options for the closure of both the Old and New Liquid Effluent Discharge Systems.

2.3 Monitoring of beaches



The statutory beach monitoring programme continues as per the SEPA Authorisation requirements.

2.3.1 Dounreay Foreshore 2013 particle retrieval

	No of Particles	Max Activity (Bq)	Min Activity (Bq)	Mean Activity (Bq)	Total Activity (Bq)
2013	5	1.2E+05	1.5E+04	4.3E+04	8.7E+06
Total	289	2.0E+08	6.7E+01	5.0E+06	1.4E+09

2.3.2 Sandside Beach 2013 particle retrieval

	No of Particles	Max Activity (Bq)	Min Activity (Bq)	Mean Activity (Bq)	Total Activity (Bq)
2013*	8	1.2E+05	1.5E+04	4.3E+04	3.4E+05
Total	228	5.0E+05	3.2E+02	5.9E+04	1.3E+07

* The status of the unusual particle recovered on 14 February 2013 is expected to be clarified with publication of the PRAG(D) report.

2.3.3 Other beaches

No particles were recovered from any other beach in 2013. A review was carried out of the additional surveys performed over and above the requirements of the RSA and the decision was made to cease these surveys. This decision was communicated to SEPA and local stakeholders.

2.3.4 Future Beach Monitoring

DSRL have applied for a new Authorisation under the Radioactive Substances Act for the disposal of solid, liquid and gaseous radioactive wastes. The new Authorisation will include detailed requirements for the monitoring of local beaches. These requirements may differ from those currently extant.