

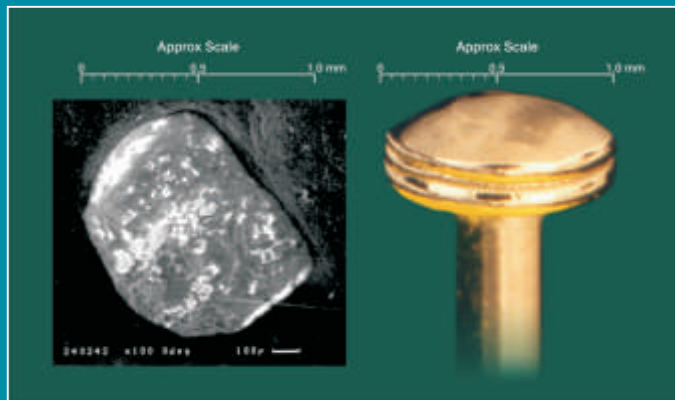
Monitoring of Beaches near Dounreay



Introduction

During historic fuel reprocessing operations associated with the research programme at Dounreay, particles were released into the environment, mainly via the active liquid drainage system.

Since 1983, over 1,400 fragments of irradiated nuclear fuel and irradiated steel, referred to as 'particles', have been found in the marine and coastal environment outside the Dounreay site.



This picture illustrates the size of a typical particle found on Sandside beach in relation to the size of a pin head.

What are particles?

Particles are small fragments of irradiated material, similar in size to a grain of sand.

They were created during the mechanical and chemical phases of reprocessing irradiated fuel at Dounreay when it was a nuclear research facility.

The reprocessing plants closed in the 1990s and are now being decommissioned.

What happened to them?

Particles were discharged into the sea via the active discharge pipeline and some were lost into the other drains as a result of operational standards in the early years of the site.

How many were discharged?

Estimates of the total number are uncertain and may never been known.

The Dounreay Particles Advisory Group (DPAG) concludes that a large proportion have been buried in sediment or may have physically broken up to become smaller particles which have been predominantly transported north-eastwards from the site.

DPAG is an independent body set up by UKAEA and the Scottish Environment Protection Agency (SEPA) in May 2000 to provide independent scientific advice. DPAG, in its Third Report, estimated that about 1,000 significant, 1000 relevant and 3000 minor particles remain within the main plume offshore from Dounreay.

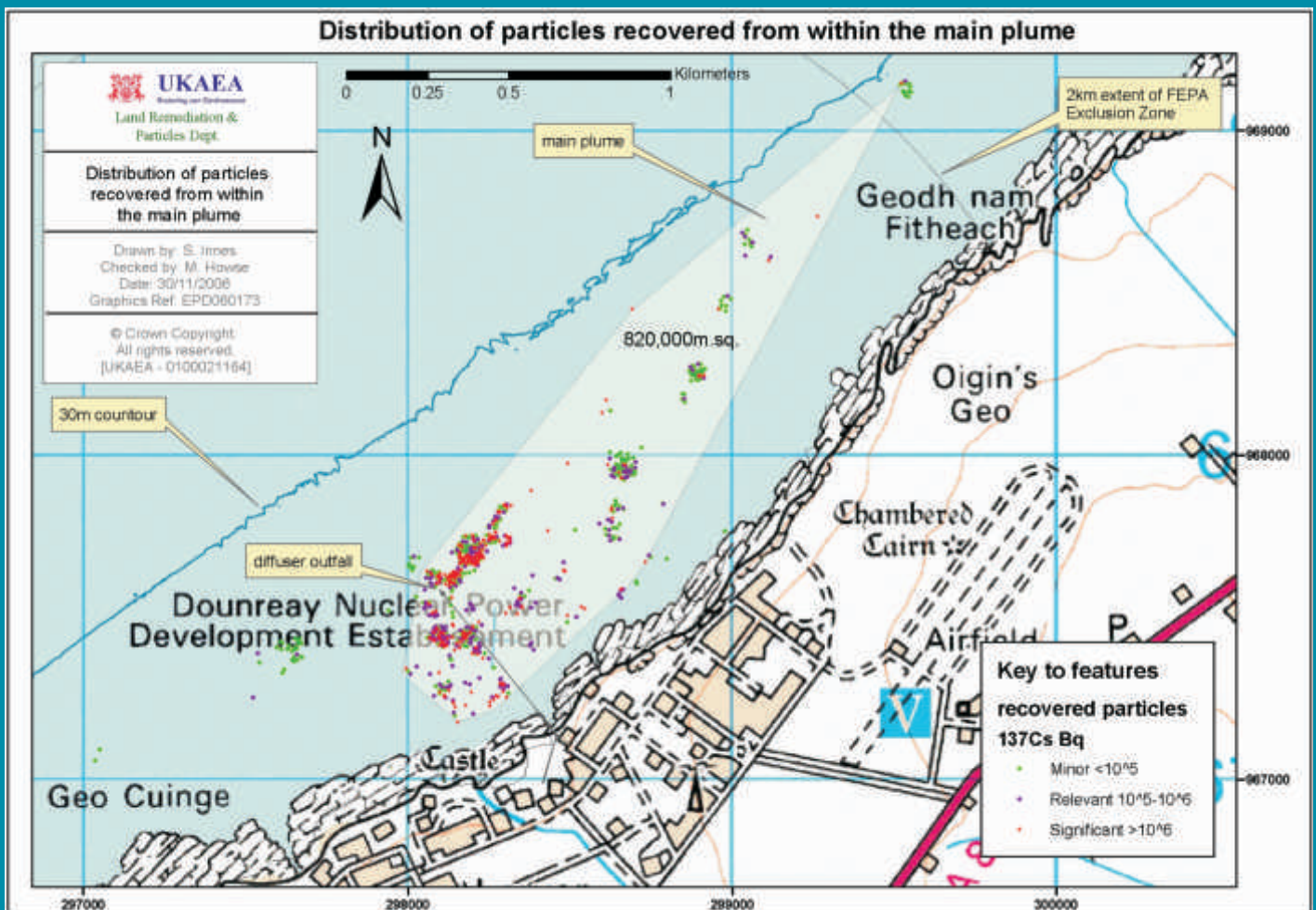
DPAG's Third Report classified particles as:

Significant:	Caesium-137 activity greater than 10^6 Becquerels (Bq) (1,000,000 Bq)
Relevant:	Caesium-137 activity between 10^5 and 10^6 Bq (100,000 and 1,000,000 Bq)
Minor:	Caesium-137 activity less than 10^5 Bq (100,000 Bq)

Where are they now?

Particles detected from the liquid effluent pipeline mixed with sand and were deposited on the seabed.

Larger, more active particles seem to have remained close to the discharge point with smaller, less active particles, being transported to the east and west.



How dangerous are they?

It depends on their size.

As a rule of thumb, the smallest particles, in size and activity, are the least hazardous (minor) and the largest ones the most hazardous (significant).

Are the beaches safe to use?

DPAG considered the work carried out by the Health Protection Agency and concluded that only significant particles pose a realistic potential hazard to members of the public.

To date particles found on publicly accessible beaches have been in the minor and relevant category and there is an extremely small possibility of a member of the public coming into contact with a particle; if they did so, no adverse health effects would be expected. The beaches continue to be open to the public.

A programme of monitoring regulated by SEPA reduces the risk further through the detection and removal of particles. It also provides re-assurance that significant particles are not present at these beaches.

Where are the larger particles?

Significant particles have been found on the seabed near Dounreay and on the adjoining foreshore, where access by the public is limited.

A fishing ban within 2 km of the discharge point is currently in place.

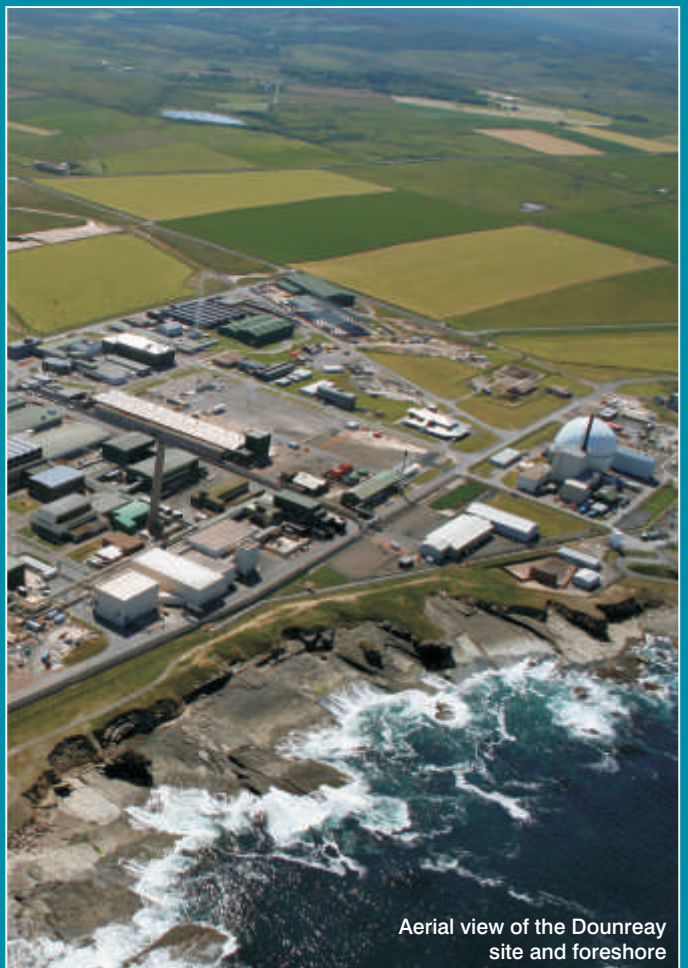
What would happen to me if I swallowed a particle?

Everyone gets varying doses of radioactivity every day from the sun, rocks, medical treatment, weapons fall-out, authorised discharges from nuclear facilities, etc.

In the unlikely event of swallowing a lower activity particle (minor or relevant) and if the particle remained stationary against the gut wall for 6 hours, ulceration may be caused that would repair naturally. A particle in the significant category could induce more serious radiation effects.

Particles, of the activity found on local beaches, would need to be in direct, static contact with the skin for at least 7 hours to cause any observable effect, such as reddening of the skin.

A typical beach monitoring machine



Aerial view of the Dounreay site and foreshore

What is being done about this pollution?

Following an extensive review of the available information, test & trials, independent reports and stakeholder feedback the Dounreay site has now developed a management strategy to target and recover the significant and relevant particles from the seabed and to continue to recover particles from beaches.

The removal of most of the higher activity particles from the seabed is likely to considerably reduce the number of particles arriving on-shore.

For independent information visit:

- Scottish Environment Protection Agency: www.sepa.org.uk
- Committee on Medical aspects of Radiation in the Environment: www.comare.org.uk
- Dounreay Particles Advisory Group: www.sepa.org.uk/dpag
- Health Protection Agency: www.hpa.org.uk
- Food Standards Agency: www.food.gov.uk

Where can I get more information?

visit:

dounreay.com

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Telephone: 01847 806080 or email: communications@dounreay.com

