



be applied only after a scientific evaluation of the available risk data. **The Communication describes two outputs from this risk assessment that are necessary to justify recourse to the Precautionary Principle:**

- 1: identify potentially negative effects resulting from the product or activity, and/or
  - 2: the available scientific data must be so insufficient, inconclusive, or imprecise as to make it impossible to "determine with sufficient certainty the risk in question." (*Ref: European Commission, Communication for the Commission on the Precautionary Principle (2000), Mossman & Marchant: Precautionary Principle & Radiation Protection*)
- F: The Campaign concluded that, as the result of A to D above, and under the "Guidances" issued regarding the Precautionary Principle, the 2013 data set was inadequate to the task of providing scientific data for the assessment of radiological impacts to the inhabitants and users/stakeholders of the south Wales inshore waters and coastal zone.

*In response to this critique, EDF and the NRW then brought forward the outcomes of a 2009 vibro-core sampling campaign.*

## **The 2009 vibro-core Survey:**

The campaign has reviewed the 2009 survey and concludes as follows:

- A: The vibro-core investigation recovered 5 core samples down to depths between 2.16 metres and 4.8 metres. Cores were then sub-divided into 17 x 1 metre sections and analysed.
- B: Analysis demonstrated that the 5 vibro-core samples from the surface to 1 metre depth, held the maximum concentrations of the three man-made radio-nuclides, Cs 137, Co60 and Am 241.
- C: Analysis demonstrated that the 5 vibro-core samples from the lowest/deepest sections of the cores consistently held minimum concentrations of man-made radioactivity.
- D: Analysis demonstrated that the majority of the lowest sections of the cores held higher concentrations of natural radioactivity (*13 of 20 analyses*).

## **The 2017 Survey** (Cefas Environment Report RL 05/17)

- A: An additional survey, carried out in May 2017, took 12 sediment grab samples from the area of proposed dredging.
- B: Sediment samples "were taken from approximately the top 2 cms of sediment surface".
- C: Three man-made radio-nuclides were analysed for: positive results for man-made radioactivity were recorded in all samples.

## The table below sets out the outcomes of the three surveys:

Parameters	2009 Core study	2013 surface samples	2017 surface samples
<b>Depths</b>	surface to 1 metre	0 to 5cms	0 to "approx 2cms"
<b>Sample numbers</b>	5	17	12
<b>Average total</b>	27 Bq/Kg	23.02 Bq/Kg	17.4 Bq/Kg
<b>Cs, Co and Am</b>			
<b>Aggregated (man-made) rads per 300,000 tonnes</b>	8,100,000,000 Bqs (8.1 Billion Bqs)	6,906,000,000 Bqs (6.9 Billion Bqs)	5,220,000,000 Bqs (5.22 Billion Bqs)
<b>Total collective dose</b>	not given	0.035manSV/year	0.035manSV/year
<b>derived total dose: members of the public</b>	not given	1.6 microSv/year	1:9 microSv/year
<b>Derived total dose: dredger crew</b>	not given	4.8 microSv/year	5.8 microSv/year

(calculations based on "conservative estimates" provided by the Surveys)

All surveys carried out using high purity Ge gamma spectrometry

## From the results in the above table, the Campaign concludes that:

- 1:** Across the three surveys, the sample depth values are highly dis-similar (0 to 2 cms, 0 to 5cms, ) 0 to 100 cms);
- 2:** Across the three surveys, the sample numbers are highly dis-similar (5, 17, 12);
- 3:** Across the three surveys, the average radioactivity concentrations are highly dis-similar (27 Bq/Kg, 23.02 Bq/Kg, 17.4 Bq/Kg); *35% variation between maximum and minimum*;
- 4:** Across the three surveys, the aggregated radioactivity results (per 300,000 tonnes) are highly dis-similar (8.1 billion Bqs, 6.9 billion Bqs, 5.2 billion Bqs); *35% variation between maximum and minimum*;
- 5:** Across the two surveys for which individual (public) dose estimates are given, the results are dis-similar (1.6 microSv/year, 1.9 microSv/year); *15% difference*);
- 6:** Across the two surveys for which dredger crew dose estimates are given, the results are dis-similar (4.8 microSv/year, 5.8 microSv/year); *17% difference*);
- 7:** Survey findings conclusively demonstrate that the "top metre" samples (2009 core sample study) hold higher concentrations of man-made radioactivity than both the 0 to 5cms (2013) samples and the 0 to 2 cms (2017) samples.

