

Project: Sea to Land Transfer of Anthropogenic Radionuclides to the North Wales Coast
Client: Welsh Assembly Government

The Challenge

The Welsh Assembly Government required the quantification of the transfer of radionuclides on the North Wales coastline and to update previous assessments of doses to the public on the North Wales coastline as a result of sea-to-land transfer.

The Solution

The success of this investigation relied on the combination of a well planned field campaign, designed between Westlakes and the Welsh Assembly, and the intelligent application of atmospheric and aquatic dispersion models.



Area of North Wales visited during sea-to-land transfer study

Field Sampling

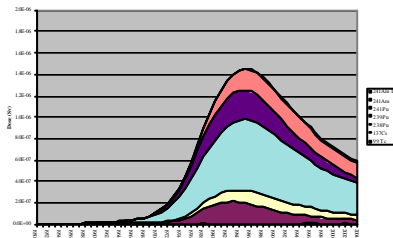
- Consisted of the collection of soil samples from ten inland transects (58 soil samples) and air particulates on air filters from three High Volume Air Samplers, deployed for 6 months, along the northern coast of Wales.

Radiochemical Analysis

- The analysis of the field samples for ^{99}Tc , ^{137}Cs , ^{238}Pu , $^{239,240}\text{Pu}$ and ^{241}Am was performed on soil, sediment and air particulate samples. Chloride analysis was also performed on the air filters as Cl^- is a good indicator of the sea-to-land transfer process.

Modelling

- The WSC model MEAD was used to predict seawater concentrations of radionuclides in the North Wales coastline between 1952 and 2004.
- An atmospheric dispersion model was applied to the sea-to-land transfer process occurring in North Wales in order to predict radionuclide deposition rates.
- Modelling calculations were performed to predict the radiological impact of the sea-to-land transfer pathway to members of the public in North Wales from 1952 to 2004.



CED by radionuclide due to sea to land transfer between 1950 and 2004 for critical group adults in North Wales.

The Benefits

- This project provided an up to date radiological assessment of the transfer of radionuclides from sea to land in the coastal area of North Wales.
- The maximum annual Committed Effective Dose (CED) calculated was $1.46 \mu\text{Sv y}^{-1}$ to adult members of the critical group in 1985. Current CED values for 2004 were calculated to be $0.59 \mu\text{Sv y}^{-1}$. These values are very low compared to the limit for the UK public from controlled radiation sources of $1000 \mu\text{Sv y}^{-1}$.
- This investigation has demonstrated that there are no significant health risks on the North Wales coastline from the transfer of radionuclides from sea to land.