



[Form 2 (to be reported to Committee on Countermeasures for Contaminated Water Treatment and to be disclosed to public)]

Technology Information	
Area	3 (Select the number from "Areas of Technologies Requested")
Title	3A Carry out combined physical, chemical and radiometric inventory assessment for the contamination of the harbour waters and materials in contact with the harbour water.
Submitted by	eco-atomic consultants Ltd
1. Overview of Technologies (features, specification, functions, owners, etc.) The correct selection of techniques to deal with the contamination of the harbour water and the design of the equipment will require detailed information about the location, chemical form and quantity of all radioisotopes present at levels substantially above background levels. It is likely that a substantial inventory of radioisotopes is already adsorbed onto particulate, mud and silt in contact with the seawater. Further inventories of radioisotopes are likely to have been absorbed by biological materials in contact with the seawater. In many cases, the process of adsorption and absorption will be reversible such that cleaning of the seawater would only lead to their re-release to re-contaminate the seawater. Representative samples of seawater and all of the muds, silts, flora, fauna and any other materials in contact with the seawater should be analysed by separation into constituents (e.g. using filtration to collect solids from seawater samples) and chemical analysis as well as radiometric means to establish the likely chemical form of any radioisotopes present and any association between the isotopes and solids or chemical species dissolved in the seawater (e.g. are any of the isotopes bound in organic molecules). Together with estimates of the quantities of each of the materials this will allow an estimate of the inventory of each radionuclide to be made as a first step in selecting, justifying and designing the treatment process to be used.	

2. Notes (Please provide following information if possible.)

- *Technology readiness level (including cases of application, not limited to nuclear industry, time line for application)*

Such an approach was used to characterise the wastes for decontamination and decommissioning at the Dounreay Prototype Reactor.

- *Challenges*

The approach requires a high level of expertise in chemistry, radiometric analysis and physical chemistry to successfully characterise the different materials. A multi-disciplinary team with a research background is likely to be most successful. The team should work in conjunction with process designers who have a good understanding of the fundamentals of separation processes including adsorption and other reversible equilibrium processes.

- *Others (referential information on patent if any)*