



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

Technology Information	
Area	4 and 6
Title	Use of in-situ monitoring systems for long term groundwater monitoring, base line studies and contaminant plume migration
Submitted by	UK National Nuclear Laboratory (NNL)
<p>1. Overview of Technologies (features, specification, functions, owners, etc.)</p> <p>NNL have, for many years, deployed in-situ real time data collection and telemetry to provide long-term time series data sets. These data sets have proved invaluable in the development and refinement of conceptual models, mapping the development of groundwater contaminant plumes and providing early warnings of changes in groundwater chemistry which may indicate the development of a new migration pathway or the onset of a new leak.</p> <div style="display: flex; justify-content: space-around;">   </div> <p>The deployment of real time data collection techniques provides several key benefits over the more traditional approach of groundwater sampling and laboratory analysis:</p> <ul style="list-style-type: none"> • Data is recorded at intervals of several seconds and so provides an immediate warning of changes to groundwater chemistry/ leaks in real time, rather than waiting for weeks for laboratory data. • The comprehensive data set allows time series trends to be observed in both the short and long terms. • Short duration changes e.g. tidal influences can be detected and incorporated into the interpretation of data. • Telemetry allows the data to be reviewed remotely, resulting in significant cost and time savings, more frequent review of the data and importantly once installed, a potential 	

significant decrease in worker dose.

- Long term deployment experience has demonstrated the reliability of the data loggers and the ability to continue collecting data over a number of years with minimal maintenance.

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

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

Examples of successfully deployed in-situ groundwater monitoring systems installed by NNL include:

- Monitoring of ground and surface water parameters on and around the UK's Low Level Waste Repository situated on the west coast of Cumbria.
- Real time monitoring of river and groundwater levels in the Rivers Calder and Ehen and surrounding land at the Sellafield site in Cumbria.
- Leak detection monitoring systems around liquid storage and buried waste facilities on the Sellafield site in Cumbria.
- Pre disposal base line groundwater quality data collection on the Radiana waste disposal site in Bulgaria.

- Challenges

- Others (referential information on patent if any)

【Areas of Technologies Requested】

- (1) Accumulation of contaminated water (Storage Tanks, etc.)
- (2) Treatment of contaminated water (Tritium, etc.)
- (3) Removal of radioactive materials from the seawater in the harbor
- (4) Management of contaminated water inside the buildings
- (5) Management measures to block groundwater from flowing into the site
- (6) Understanding the groundwater flow