

Laboratory to field scale relationships in the assessment of the potential for monitored natural attenuation of contaminants in groundwater

R&D Technical Summary P2-245/TS

This project was carried out by ABB Ltd, with the aim of producing a short technical report that would provide a literature review of hydrogeological and geochemical parameters that are often measured in laboratory analyses and then extrapolated to field scale. The emphasis of the study was on those parameters normally of concern when dealing with Monitored Natural Attenuation (MNA) of groundwater. These parameters include:

- abiotic (chemical) degradation
- biodegradation
- cation exchange capacity
- Henry's Law constant and vapour pressure
- hydraulic conductivity
- leaching/leachate tests
- microbial activity determination
- sorption

MNA normally relies on site-specific data, much of which will be obtained from site samples or measurements made in-situ. However, laboratory measurement may be appropriate or more practical for certain parameters. Examples include, data on processes which are affected by highly variable *in situ* conditions; when data gathering from the field is not technically possible; when there is a need to differentiate the relative contributions of individual processes (it may be important to distinguish between relative contributions of processes in order to understand the contaminant attenuation mechanism and focus resources to appropriate data collection). Laboratory data can also be used to provide additional supporting evidence for hypotheses generated from field datasets.

To assist in the utilisation of laboratory data for MNA assessment in the UK, the report provides "rules of thumb" for scale-up. These approaches were generated from the review undertaken for the report and include more general advice on considerations when reviewing the appropriateness of laboratory specific generated data. The study concludes that site-field data be employed wherever possible and

laboratory lines of evidence are applied only where necessary to achieve an appropriate level of confidence in the overall assessment.

This R&D Technical Summary relates to information from R&D Project P2-245 (Umbrella Project P2-169) reported in detail in the following output:

R&D Technical Report P2-245/TR
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