

A Note by the British Geological Survey and Nirex on the Suitability of UK Geology for Siting a Repository for Radioactive Waste

In 1986 the BGS undertook a study that identified approximately 30 % of Great Britain as potentially suitable to host a repository for intermediate-level radioactive waste. In response to queries from CoRWM, Nirex has commissioned the BGS to review this work and to provide an updated assessment, based on current understanding, for all the higher activity wastes being considered by CoRWM. Based on its geoscientific databases and the expertise of its specialist staff, the BGS is confident that it should be possible to identify areas of the UK in which geologically suitable sites for the disposal of radioactive waste could be found following a detailed evaluation programme, and subsequently confirmed by in-depth site characterisation activities.

The BGS has reviewed the characteristics of existing ILW/LLW disposal concepts and the geological factors relating to packaged HLW/spent fuel (KBS-3 concept) and believes that the geological conditions that would be suitable for the former will also be appropriate for the isolation of the latter. The biggest difference between the wastes is that the latter are heat generating but we do not believe that the amount of heat generated, especially after an extended period of active management (of order 50 years, for example), is a major issue and that a repository can be designed to minimise the impact of the thermal input.

It is planned that this analysis will be published as a report to Nirex later in 2006 following an appropriate level of peer review. Nevertheless, it can be concluded that rather more than the previously determined 30% proportion of the UK land mass would provide a potentially suitable geological setting for a repository.

A variety of different rock types in a number of geological situations offer potentially suitable repository host rocks. These vary from low permeability 'hard' rocks through potentially plastic clays to halite/anhydrite beds. The 'constructability' of the different rock types varies greatly: their responses to the excavation of a repository will be different and there will be different issues relating to the rock type and the depth of excavation. While these may place constraints on the design of a repository, the BGS believes that engineered solutions will be available to overcome these issues in all of the geological environments considered. Therefore the proportion of the UK land mass that would be geologically suitable in terms of the long-term isolation and containment of radionuclides would not be significantly reduced for a phased repository option that incorporated a period of reversibility of up to hundreds of years.

Clearly, the geological options for the safe long-term management of higher activity radioactive wastes in the UK are varied and in total represent a sufficiently high proportion of the UK land mass so as not to be prohibitively restrictive. This conclusion is not affected by consideration of a phased geological repository that provides for an extended period of reversibility.

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