How is the Nuclear Decommissioning Authority (NDA) analysing the geology of potential waste repositories?

David Smythe
January 2011

This slideshow analyses the NDA document:

Geological Disposal. Steps towards implementation.

(NDA, March 2010) in a Cumbrian context.

You might expect geology to comprise a large portion of this document. Not so: Chapter 4 deals with the geology in two and a half pages, out of a total of 65 pages of text.

The approach is to:

"define a limited number of generic geological settings, encompassing typical, potentially suitable UK geologies".

The geological settings are defined by *host rocks* and *cover rocks* as shown in the table 4.1, reproduced in the next slide:

NDA table 4.1

		Host Rocks: Higher strength rocks	Host Rocks: Lower strength Sedimentary rocks	Host Rocks: Evaporites
Cover rocks	Host rocks to surface	Possible	Possible	Not possible
	Sedimentary cover rocks	Possible	Possible	Possible

0646-02-NDA

Let us analyse the information content of the above table.

The two entries in the middle column say the same thing – sediments all the way from top to bottom. So there are only four distinct 'Possible' table entries. The table appears to have been devised by someone with poor logical faculties and negligible geological expertise.

Replacing 'higher strength rocks' by Basement, which is a valid and familiar term in the UK context, and 'lower strength sedimentary rocks' by Sediments, the table can be expressed more succinctly by a simple list:

- **Basement from repository depth to the surface**
- **Sediments from repository depth to the surface**
- **Sediments over basement**
- **Sediments over evaporite**

We can contract the list further, putting host rock first:

- **Any rock from repository depth to the surface**
- **Basement under sediment(-ary cover) i.e. BUSC**
- **Evaporites under sediments**

provided only that the host rock (underlined above) is ‘suitable’,

- which should go without saying.

Next, we omit evaporites, since they are not relevant to West Cumbria.

Contracting the list further, we obtain:

- **Any suitable host rock**
  - whether covered or not by sediments

The phrase referring to the cover rocks is superfluous, so we end up with:

NDA table 4.1, analysed:

Any suitable host rock

In conclusion, once we omit the special case of evaporites, because they are not relevant to West Cumbria, the NDA definition of '*generic geological settings'* is telling us precisely NOTHING. The information content of the NDA analysis is essentially zero.

The NDA is taking the geological aspects of repository search backwards by about 40 years, to the era when only the host rock was considered. What lies '*Before, behind, between, above, below*' is of no significance.

This is poor science in the service of short-term political ends.

Apologies to John Donne for misuse of his poetry