

Question 1 TO WHAT EXTENT DO YOU THINK OUR PROPOSED APPROACH TO PROVIDING NATIONAL-SCALE EXISTING INFORMATION ABOUT GEOLOGY RELEVANT TO LONG-TERM SAFETY IS APPROPRIATE?

THE APPROACH IS NOT RELEVANT TO LONG TERM GEOLOGICAL SAFETY

Evidence: Geological Screening Guidance, APPENDIX 2 GEOLOGICAL ATTRIBUTES

A2.6 Rock Type A2.7 Rock structure,

The Guidance document states *"The attributes we have chosen to provide information on:"* Yet there is no evidence to support these selected rock type or rock structure attributes, which gives the impression they are simply chosen for expediency rather than *"Demonstrating an understanding of these features"* which is *"important for building confidence in safety"*

To further confuse this geological selection issue Professor Yardley now employed by Radioactive Waste Management (RWM) has over the last couple of years changed his preference for clay to crystalline rock.

In particular, we note that evaporite beds are now included in the suitable host rock category. Evaporites are water soluble and therefore CANNOT be classed as impermeable which is a prerequisite attribute for the host rock. In addition, evaporite beds in the UK will include halite. The salinity levels in such a host rock will severely compromise any engineered barrier systems.

Evidence:

Source:World Nuclear News 30/01/2015

In January 2013 Professor Yardley joined Stuart Haszeldine and Bruce Mckirdy from RWM to give evidence to the Cumbrian MPs. At the time Professor Yardley was at Leeds University, and not yet employed by RWM.

The transcript of the meeting Lines 168-212 are particularly relevant where Professor Yardley effectively admits that clay is preferable to crystalline rock when being questioned by Rory Stewart.

Evidence:

http://www.geos.ed.ac.uk/homes/rsh/Cumbrian_MP_Fact_finding_session_with_experts_note_of_session_verbal_discussion_10_January_2013_PUBLISHED.pdf

In addition an extract from an email written by Professor Yardley on 16th January 2013 (email can be forwarded) referring to that meeting with the MPs, confirms his views at the time.

Evidence: Email extract: C) Cumbria is not the ideal place to site a repository. D) It is only possible to site a repository with the support of the local community. At present, there is no sign of another community coming forward, although if the right one did, for example over a clay site in the east of England, that would be an excellent thing.

It is in shifting a scientific position such as this that shatters public confidence is knowing that over a period of 20-30 years, during which a GDF will be sited and built, the changing views of our scientists over these critical safety aspects will be found to be seriously lacking.

There is also a question in why the RWM is not excluding parts of the UK based on 'reasonable geological doubt' or 'environmental protection'. For example why would RWM revisit an area (in Northern England) which a previous Secretary of State ruled out on reasons of safety?

Equally why would host rock types and rock structures change with no evidence given?

Professor Yardley's change of position on geology simply serves to add to public safety concerns.

If the evidence above is insufficient for RWM to consider revisit the Guidance document, the following evidence shows a member of the Independent Review Panel (IRP) holds similar views and concerns.

Evidence: IRP Comment, Comment 11, National Geological Screening Guidance: Providing information on geology, RWM Response to Independent Review Panel Comments on the draft National Geological Screening Guidance, September 2015

"Given that RWM appears to place a high level of importance on the concept of describing three host rock types, it is regarded as unacceptable that the descriptions of them in the Screening Guidance Document differ from those in one of the key references cited, namely the Generic Environmental Safety Case. The reason why RWM have chosen to use these three "illustrative geological settings" as a significant part of the National Geological Screening Guidance is not explained in the Guidance Document.

RWM should explain their thinking in using these illustrative geological settings in their screening

guidance, and also provide an explanation of why they have chosen to change the descriptions of these host rock types in their Screening Guidance from those that they defined in their Generic Environmental Safety Case”.

RWM should be asked to explain why they have adopted a very different approach for the utilisation of the three host rock types in the screening process and why they have ignored the results of the Environment Agency Report.

Question 2 THE PROPOSED SOURCES OF INFORMATION ARE SUMMARISED BELOW. TO WHAT EXTENT DO YOU THINK THAT THESE SOURCES ARE APPROPRIATE AND SUFFICIENT FOR THIS EXERCISE?

THE SOURCES ARE INCOMPLETE AND FAULTED AND ARE NOT SUFFICIENT FOR THIS EXERCISE.

In the National Geological screening Guidance document, September 2015, only 3 generic (host) rock types at the depths of a GDF-

- higher strength rocks,
- lower strength sedimentary rocks,
- evaporite rocks

No evidence is given within the guidance document as to why these 3 rock types are chosen, and why the 9 Environment Agency geological environment types identified within England and Wales are ignored. Unlike the EA science based document (see evidence below), the Guidance document fails to provide a good clear summarisation of the different geological characteristics of all plausible repository host environments in England and Wales. It is incorrect to give the impression only 3 host rock types exist “based on UK geology” as is stated in *section 3.15, page 13 of the Guidance document.*

Evidence: Environment Agency, using science to create a batter place, Technical issues associated with deep repositories for radioactive waste in different geological environments, Better regulation science programme- Science report: SC060054/SR1, Executive Summary, Page iv

“Nine geological environments were identified:

- *Environment 1 – Hard fractured rock to surface.*
- *Environment 2 – Hard fractured rock overlain by relatively high-permeability sedimentary rocks in which advective transport dominates.*
- *Environment 3 – Hard fractured rock overlain by a sedimentary rock sequence containing at least one significant low-permeability formation in which diffusion dominates solute transport.*
- *Environment 4 – Evaporite host rock.*
- *Environment 5 – Siliceous host rock.*
- *Environment 6 – Indurated mudrock host rock.*
- *Environment 7 – Plastic clay host rock.*
- *Environment 8 – Carbonate host rock.*
- *Environment 9 – Non-evaporitic rock with hypersaline groundwater.*

The precise classification of the environments was less important than making sure that the characteristics of all plausible repository host environments in England and Wales were considered.”

Evidence: Geological Disposal, An introduction to the generic Disposal System Safety Case, December 2010. Within this document it clearly states the 3 host rock types (also mentioned in the Guidance document) are “**example** host rock”. See page 18, Geological Disposal: Summary of generic designs and Geological Disposal: Generic disposal facility designs.

With reference to Table 2 Geological attributes

We note that no reference is made to topology which is a major determinant of groundwater flow.

Evidence:

“At the start of the project members of Quintessa’s project team and Environment Agency staff attended an internal project meeting to define an initial list of geological environments. Meeting participants used their extensive geological knowledge to identify geological environments that illustrated all the main hydrogeological settings, large-scale geological structural features (such as sedimentary basins, areas of high relief and so on) and lithological variations occurring in England and Wales.

Source: Environment Agency Better regulation science programme Science report: SC060054/SR1

Question 3 TO WHAT EXTENT DO YOU AGREE OR DISAGREE WITH THE PROPOSED FORM OF THE OUTPUTS FROM GEOLOGICAL SCREENING? WHAT ADDITIONAL OUTPUTS WOULD YOU FIND USEFUL?

WE DISAGREE WITH THE PROPOSED FORM OF THE OUTPUTS AS THEY WILL BE INCOMPLETE OR FAULTED BASED ON THE EVIDENCE GIVEN IN QUESTIONS 1 AND 2.

Question 4 DO YOU HAVE ANY OTHER VIEWS ON THE MATTERS PRESENTED IN THE DRAFT GUIDANCE?

Based on the answers given in Questions 1-3 The Guidance document is faulted and lacking in geological evidence in particular regarding Rock Types and Rock Structure and does not build confidence in its consideration of safety.

It would seem logical to work with the Head of Science Environment Agency to ensure all national geological aspects are properly covered in a revised National Geological Screening Guidance document.

**Above Derwent Parish Council
December 2015**

