

John Arthur comments on the Guidance "Providing information on Geology" which sets out how the information will be assembled and presented for the second part of National Screening

I have pondered long and hard about the RWM Screening Consultation document and append my detailed observations as an attachment. Now, having spoken to Simon, I appreciate that the September 8th document is a lead-up to creating specific regional overviews for potential host communities. Therefore, unless some sections are to be used "as is" in the "Community Documents", my detailed editorial suggestions may not be relevant.

RWM issued four overarching requests on specific topics as a template for response and I attempt to reply to these:

To what extent do you think our proposed approach to providing national-scale existing information about geology relevant to long-term safety is appropriate? Over the many years of my career, and especially since my involvement with Dounreay and Sellafield investigations, I have been dismayed by the level of ignorance of the general public (and my non-geological friends) about geology, its lateral variability and its local potential instability (usually an engineering issue). We (you) now have an amazing opportunity to educate the public in geological matters which will engage many not previously involved. Your approach is appropriate.

The proposed sources of information are summarised below. To what extent do you think that these sources are appropriate and sufficient for this exercise? In view of the possible extension of GDF siting into coastal waters the Screening Reports for those regions with a coast should include reference to the adjacent BGS 1:250,000 Offshore Map(s) and the BGS UK Offshore Regional Report(s). Whilst BGS GB3D fence diagram model will be useful to your compilation I do not believe it suitable for general public use - maps are better.

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? The use of the existing BGS Regional Guide areas is appropriate but Area numbering should be consistent with published guides to avoid confusion. Variable geology within two areas may benefit from sub-dividing (or issuing separate guides) for Northern England (into east and west) and handling the complex Northwest Wales and Pembrokeshire separately from Central and Southern areas. All coastal regions should include a 20km offshore strip of geology.

Do you have any other views on the matters presented in the draft Guidance? You need to be warm and enthusiastic and above all clear in what is being proposed to a non-specialist Host Community. The September document leaves me concerned, partly because of its layout and need for a more focused opening on what is the overall purpose. The proposed regional guides may not be "user friendly" unless the content is re-ordered.

Thank you for allowing me to offer an opinion on the Host Community Geological Screening approach; I hope you find my comments useful and remain prepared to be involved in the future.

Regards, John

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Section numbers are as in the September 2015 document – RWM text in black JCRA comment in red.

1.1 It is not intended to be able to definitively rule all areas as either suitable or unsuitable. Why “all” areas?

1.2 Geological disposal involves isolating radioactive waste from the surface environment by placing it deep underground and containing the radioactivity so that it does not cause harm to people at the surface now or in the future.

1.3 By providing existing, relevant information across the various regions of the UK we will have a national resource to help inform early discussions with communities about the potential suitability of the local subsurface to host a GDF.

2 – Background Information about geological disposal i.e. Context : Will this be upgraded and used in the document released to potential host communities? If so please note:

2.5 There is a large range of potentially suitable geological environments for geological disposal in the UK.

Figure 1 The slide is too busy and could be presented more simply for general public

Figure 2 The blue material in the High Heat Waste drawing is not labelled.

Figure 3 Caption requires editorial correction

2.14 The process for developing a GDF involves assessing its performance and demonstrating its compliance with all relevant safety requirements prior to commencement of construction.

3 – Guidance (following up-date by IRP – to be amended and further modified following this consultation)

3.1 It will provide authoritative information for England, Wales and Northern Ireland... – needs clarification with respect to paragraph 2.8 (and possibly 3.7)

Table 1 Item 1 – How geology is related to this is not clear; Item 2 - Geological constraints on movements of ground water are not likely to be evident to the layman; Item 3 – Is this to imply that the geology will constrain the movements of any such gases?

3.8 Our proposed approach aims to provide descriptions of geology at a regional scale and we will indicate the prospects for long-term safety for the locality of a candidate community.

Table 2 – Natural Processes - Extent of past glaciations, and future climate change

3.11 See my comments below under 3.31

3.13 This is preferable to the “fence diagrams” being proposed for the BGS GB3D model and mentioned in several places; however a description of the model might be appropriate

3.15 Evaporite rocks.....They are weak and creep easily so that open cracks cannot be sustained. The use of the word “creep” implies instability to the layman; better to use “mold under long term pressure”

3.16 We propose to use geological columns for each region... This is the first mention of “regions”. Perhaps it should be introduced in 3.14 (or earlier) with reference to the BGS regional guides rather than currently in 3.34.

3.17 The principal information sources used to construct “Rock Type” maps referred to in 3.13 and 3.21 will be the BGS.....

3.18constructed and for a safety case to be made. However as a single GDF is not a Government requirement, volumes of rock....

3.22 Also see comment under 3.31 below

2.28 ...mapsbelow a depth of 100m that are exploited today or have been exploited in the past. Past mining at shallower level will also affect the stability of the ground mass above any proposed GDF through which tunnelling will take place

3.31 In that a 20km offshore zone along the coast is to be included in the potential host rock consideration, the BGS 1:250,000 marine solid maps and the Offshore Regional Reports 1 -10 should be included as a reference; will there be any access to Hydrocarbon and Windfarm operator coastal projects within this zone?

3.33the key characteristics of the geological environment of the region.... See 3.16 above

3.24 As indicated above this reference is much too late in the document.

3.35 Which attributes?

3.36 How will they be made available?

Table 3: Rock Type “....showing the geological depositional sequence of rocks present.....”

Natural Processes “..past ice cover....” Will the non-specialist realise the significance of this? Is this hinted at in A2.4?

Figure 4: If the public are to be encouraged to go to the Regional Guides it might avoid confusion if the same BGS numbers as used for each published region (understanding that BGS areas 4, 5 and 6 are not in the remit). Also would there not be some (geological) sense in dividing Northern England into East and West (with Isle of Man in latter), retaining the north and south division of Wales and including Pembrokeshire in the former!! (as geology is similarly more complex in the north and south west of Wales)

Appendices

A2.3 “...we can show that the water there today has been there for tens of thousands of years at least. These types of rock have potential as a host rock for building a GDF – but what happens when a cavity is created within such rocks – is not the water then able to flow INTO the proposed facility?

A2.7 “.... Faults and folds may sometimes result in geological environments with variable and unpredictable lateral physical properties and groundwater flow.”

A2.8 “Groundwater transport of radioactive and other toxic materials is / affected by the rate of movement of the water and the route it takes to return to the surface. Favourable characteristics with respect to groundwater for GDF design are slow groundwater movement and long / travel paths between the GDF and the surface so that any radioactivity is further reduced by radioactive decay.

A2.10 “...in the event of future sea level change, erosion, earthquakes, regional uplift or the growth and retreat of ice sheets and glaciers.”

John Arthur, Top-Hole Site Studies 3/12/15

