

CoRWM Response to the National Geological Screening Guidance Consultation.

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 overall approach is largely appropriate, and the consultation justifies this proposed approach. However, we recognise a number of potential issues that will require consideration in production of the outputs from the guidance.

- 1.1 The low spatial resolution of many of the resources that are proposed to be used (maps at 1:500000 to 1:1500000 scales) inevitably means that the spatial resolution of the screening process will be quite coarse. The Committee understands the reasons for this and feels it is the correct approach (indeed probably the only practical approach) but cautions that expectations of screening among the wider public have been raised, and it is very likely that outputs of screening will not meet these expectations. Whilst we consider that both the White Paper and this consultation document attempt to maintain expectations at a realistic level, the limitations of this screening process will need to be emphasised wherever possible. It is critical that the key objective of providing geological information relevant to long-term safety is emphasised in all literature and outputs arising from the Guidance.
- 1.2 The committee feels that it is vital to set discussions of geology in an appropriate safety context, and supports the way in which the consultation document does so. However, the proposed approach should consider the inclusion of positive as well as negative geological attributes, in order to minimize the risk of the National Geological Screening process being seen as a 'screening out' exercise. Perhaps more importantly, given the objective of providing geological information, the inclusion of positive attributes and their description in the output narratives will result in the dissemination of a wider range of geological information to informed communities. An example of a positive attribute could be the presence of overlying or surrounding rock units with favourable sorption properties.
- 1.3 Whilst the approach and relations between sources of information, attributes and outputs are well explained and understandable in conceptual form, the process would be improved by the production and publication at an early stage, and certainly prior to publication of the Regional reports and national and regional maps, of an example output: effectively a 'dry-run', 'dummy-run' or 'trial-run' on an area or region that would not otherwise be included in the NGS outputs. CoRWM have previously made suggestions along these lines to RWM: *"CORWM suggested it is important to trial implementation of the proposed screening guidance and geological attribute analysis before publication. These trials could be presented as examples of implementation within the guidance."* (CoRWM-RWM meeting 24th November 2014).

CoRWM maintains its view that the provision of trial output from application of the NGS to a 'dry-run' region on which appropriate information is available to the BGS (e.g. based on its extensive international portfolio of mapping work) but which is not within the geographical remit of the NGS will be of benefit in enabling the public to gain a better understanding of what to expect.

This applies in particular to the communication of geological uncertainty. Uncertainty in geologic information and the interpretation, meaning, and relevance of uncertainty is difficult to communicate within the scientific community, let alone with the public. Whilst we understand RWM intends to communicate uncertainty in the narratives, a few examples of the significance of both data (e.g. surface –based and borehole measurements in 3D) and model or conceptual (e.g. planar versus curvilinear boundaries, transitional versus sharp contacts, lateral uniformity versus concept-dependent lateral variations in units) uncertainties could be very helpful to illustrate their impacts and hence why 'screening' is about the provision of information rather than about setting 'in' and 'out' criteria. These examples should be visual, for example variants of maps consistent with available data for the trial or 'dry-run' region / area referred to in the previous paragraph. This types of analysis and presentation is not unusual in geological prediction and exploration; indeed it is an important part of testing the resilience of models and interpretations and identifying information needs.

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?

2.1 These are appropriate and relevant sources of relevant national scale information.

However, as noted in our response 1.1 to Question 1 there is a need to explain the consequent limitations of the screening outputs. This explanation should accompany all narratives and be noted on explanatory notes to maps, where those are produced (see our response to Question 3 below).

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?

3.1 The proposed outputs are consistent with the intent of the White Paper, and are in general appropriate given the detail and quality of information available. However, they are not all of equivalent status in terms of screening, in or out, nor in terms of their practical relevance to safety. For example, seismicity in the UK is arguably trivial or irrelevant in terms of the safety of a GDF at depths of 500 metres or more. Whilst a map of UK seismicity may appear exciting, or indeed alarming, it is of only minor or tangential use in practical safety arguments. It may be useful, for the purposes of managing expectations of screening, to explain and emphasise the hierarchy in attributes through the structure and design of the narratives, as described in 3.2 below.

3.2 RWM has explicitly stated that some attributes would be used for screening out areas (most notable example: absence of sufficient volumes of one or more of the three primary rock types). RWM has also stated the remaining attributes articulated, described and listed in the Guidance will *not* be used for screening out areas. These very important differences could be reinforced by presenting these sets of attributes separately, for example in separate narrative volumes for each region or separate chapters in the regional narratives. As an example, RWM could commission BGS to present, in each regional narrative, a chapter entitled '*Geological Attributes Used for Screening Out Areas*' and a second entitled '*Geological Attributes Related to the Safety of a GDF*'. CoRWM considers that it is critical to convey the latter information in a manner which makes clear it cannot be applied to screen areas out prior to any discussion of the potential to develop a defensible safety case given further information.

3.3 Uncertainty is acknowledged as a key and difficult issue, which in the case of a GDF is an issue magnified by the lack of data at depth. CoRWM notes that RWM has been careful to point this out. However, as maps by their very nature give an impression of certainty in the eyes of many people, it would be very helpful to present data uncertainty visually on maps and create alternative interpretations (multiple maps or representations embedded, for example, in narratives) of the same data based on the differing views of subject matter experts (i.e. an elicitation exercise). This could in principle form part of the 'Trial Output' described in response 1.3 above. Communicating uncertainty remains a major problem to address in the eventual outputs, in whatever form they emerge.

4. Do you have any other views on the matters presented in the draft Guidance?

CoRWM has no further views to communicate at this stage. We look forward to engaging with RWM on its analysis of the consultation responses and its further development of the NGS Guidance and NGS process in the light of those responses.

