

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? Please give your reasons.

It is flawed but it is what there is to work with. The information base is not continuous drawing as it does from mining, boreholes and areas of the UK where such activities have taken place and can't adequately cover ground water. Long term safety needs also to take into consideration the unsuitable aspects of the underground environment which then need to be avoided - aspects such as complex geology, faults, seismic areas and underground water courses. The CoRWM (CoRWM 1) consultation covered what was then considered to be the nuclear waste inventory ie the "legacy" radioactive wastes. It pointed to the need for a new separate consultation process if it was intended to add the additional wastes arising from any following nuclear new build programme. While it has been alleged that these would only add 16 per cent to the existing inventory on nuclear waste in terms of bulk this is not the case with respect to its radioactivity and the higher temperatures involved. NDA must be clear about what is meant by the 'nuclear waste inventory' when talking to the public and what would be involved in the construction of one (or 2) repository(ies).

Question 2: To what extent do you think that the proposed national information sources are appropriate and sufficient for this exercise? Please give your reasons.

They are limited - as outlined above. Four problems need to be addressed. 1. The problem of heat dissipation from continuing radioactive sources 2. The problem of needing to seal containers so that water cannot access them but release the build up of gases - surely a priority in the associated research programme 3. The potential for accidental or deliberate access at some future point 4. The issue of plutonium already produced

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?

England, Wales and Northern Ireland has been divided into 13 geological regions. The outputs will include regional maps of: • The distribution of potential host rocks at 200 – 1000m depth; • Regional maps showing major faults, fault zones and areas of folded rocks with complex properties; • Regional maps showing locations of boreholes and mineralised or thermal springs; • A national map of recent seismicity; • A national map showing the extent of past glaciation; • A regional map of historic and contemporary exploitation of metal ores, industrial minerals, coal+hydrocarbons. It should also be noted that although the surface facilities of any GDF would be located on land, the underground facilities could extend to offshore. Screening will, therefore, consider the geological environment up to 20km offshore. Once such preliminaries have been done on a regional basis there needs to be a map illustrating which areas are, or are not, suitable. There is a need to avoid wasting time during this process and it would be unwise to accept a response from a community to host a GD from what would be essentially considered an unsuitable place.

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

Information is key as is building trust and confidence in the process. - there needs to be room for critical voices in order to ensure that the decisions taken are the best they can be and as happened in Sweden and Finland. While I welcome the setting up of the Independent Review Panel it does not appear to have included that "critical voice" drawn as it is largely from those who have worked or are working in the industry. - the workshop I attended in

Brighton on October 7th included an introduction to the rock types and the objective that RWM needs to find a host rock which has a stable geological setting and low permeability. There are three rock types, from the point of view of how groundwater would behave, which could meet these requirements: (1) Higher Strength Rocks, which can include igneous rocks, metamorphic rocks and some types of sedimentary rocks (2) Lower Strength Rocks which are clay rich and sufficiently ductile that they don't sustain open fractures; (3) Bodies of Rock Salt which provide a completely dry environment. There needs to be something in the screening which indicates where the aquifers are and at approximately what depth. However, I understand that just because there is an aquifer in the top 2-300 metres below the surface this does not mean that there couldn't be a suitable host rock several hundred metres below that. (A GDF would need to be located between 200 and 1,000 metres deep underground covering an area of some 10 to 20 km²) but better knowledge of where the water is is required. At the workshop, the facilitators pointed out that although there will need to be judgments made the key thing would be that people would be aware where those judgments are made and the public would be able to have access to the information upon which those interpretations are based. This requires a strong element dedicated to Knowledge Transfer and a commitment throughout to making information accessible and easy to follow. Any criteria used in making such judgments need to be open and transparent.

- the book, *Uncertainty Underground, Yucca Mountain and the Nation's High-Level Nuclear waste* edited by Allison M. Macfarlane and Rodney C. Ewing (MIT, 2006) represents an excellent way to address the issues and which would need, if undertaken in the UK, to have a Non-Technical version published alongside it. While the US has now dropped Yucca Mountain the book began as an academic study to review the then current situation. They sought to answer 3 questions: - What do we know - What don't we know - How long and how much would it take to find the answers? This should be a fundamental output involving a range of disciplines thus providing a baseline by which people could establish a shared understanding of the issues ie technical and non-technical people. There should be a parallel website which reflects this text and progress being made. Clearly the NDA and EA endeavour to make their work transparent and accessible. I'm talking about a specific public website.
- at Port Hope in Canada, the local community was facing problems arising from uranium tailings and the need to deal with them and they set up an independent group of scientists which the community retains and pays and who they then rely on to "translate" the scientific research. The mayor, Linda Keen said that the group was like gold dust in the process. Even when they had bad news to transmit which was not going to be popular they were listened to and their presence reduced the number of questions the local community felt they needed to ask. The local community felt that they could rely on the group throughout the process.
- the difficult and tricky issue of passing on the latest understanding both internally and externally. It is the case in a review of its successes in the 10 years from 1988, FOE staff overlooked the RCF PI cos the current staffing had not been present at the time of the inquiry.....I'm just citing this as an example and that was a matter of losing an understanding in only a decade. and, from: Environment Agency (EA, 2011): Geophysical surveying techniques to characterise a site for a deep geological disposal facility: A review of recent developments and NDA's proposals and that was only a matter of a decade. *RWMD should embed the possible use of time-lapse geophysical surveys into its generic approach by first considering the role they could play throughout the development of a GDF. RWMD should identify any requirement for specific time-lapse geophysical surveys as early as possible after the selection of potential sites so that each survey in the sequence can be planned and integrated into the programme of site works. *We recognise that RWMD's present study is generic, and we expect RWMD to build in as much flexibility as practically possible when it reviews the terms of the generic site characterisation programme or develops a site specific programme. *RWMD's site characterisation programme should ensure that geophysical surveys precede and inform any bore-hole drilling, unless the technical requirements of a specific site dictate otherwise. The geophysical and borehole investigations should be fully integrated to optimise the detail, accuracy and coverage of the geological model. *RWMD should develop and test the data management system and any

visualisation and interpretation software in operational mode using typical data sets before they are used in a site characterisation project. This will test the functionality of the system and software, and help to train operatives. *RWMD should monitor the latest practical developments in geophysical techniques, and seek opportunities to incorporate relevant research and development into their programme.

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Do you agree to your responses to this consultation being published?

Yes

