

Mr Bruce Cairns
Managing Radioactive Waste Safely
Office for Nuclear Development
Department of Energy and Climate Change
3 Whitehall Place
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Dear Mr Cairns

As you are aware, a meeting was held at the Royal Society on 26 November 2013 to discuss the Department of Energy and Climate Change (DECC) consultation on a new process for siting a Geological Disposal Facility (GDF). The consultation included proposals for peer review of technical information in the new process, possibly involving experts from learned societies, such as the Royal Society. Appendix 1 is a summary of recommendations and concerns. This letter highlight the key issues identified at the meeting that should underpin an effective and well framed siting process.

One of the perennial problems of the long history of UK failure to develop a strategy for disposal of radioactive waste has been the lack of clarity about the roles, responsibilities and accountability of the different organisations involved, leading to lack of public trust in the process. Clarity about roles and responsibilities will ensure that decision making is transparent, accountable and that possible conflicts of interest are avoided. A major challenge is how to increase the public visibility and trustworthiness of these organisations both nationally and locally, especially of the regulators. The Office for Nuclear Regulation (ONR) and Environment Agency (EA) have a role to play not only during the planning process (once a suitable site has been found) but from the outset of the siting process, including details of how they are to act in the public interest to ensure risks are managed to acceptable levels. It may be naive to suppose that potential volunteer communities would be content with the initial evaluation of a site as showing 'reasonable prospects' (as suggested in the consultation document). Communities may be likely to ask if the geology is suitable and safe.

There is a problem of geography because the area being considered for a GDF may not lie entirely within a single administrative entity. Consultative partnerships may be necessary between adjacent authorities, which might also be appropriate even if a postulated GDF lay entirely within one administrative district. Not only volunteer communities but other affected communities also have an interest in the siting process not least due to the transport of radioactive material to the GDF.

The consultation document sets out a proposal for peer review of technical information in the new siting process. The meaning of 'peer review' needs to be clarified when used in different places and in different contexts in the consultation document. Providing advice to local communities is not the same as providing technical peer review.

It is important that communities have access to credible and independent advice about GDF proposals. A new advisory body is not necessary. As an existing body, the Committee on Radioactive Waste Management (CoRWM) is well placed to play this advisory role, although it would need an expanded remit and enhanced funding to do so. If CoRWM's expertise is not able to cover a specific request, these could always be re-directed to other suitable bodies that do have such expertise, and who may be able to identify suitable experts. These bodies include learned societies, such as the Geological Society, and national academies, such as the Royal Society, Royal Academy of Engineering and British Academy, and are well placed to identify suitable UK and international experts who would be involved in their individual capacities. The British Academy is particularly important for the identification of relevant social science expertise.

The capacity of the key organisations to manage all the aspects of the new siting process will require a significant shift in the use of resources to carry out effective public engagement and the communication of relevant science and policy. There is a critical need for high quality communication of science at all stages of the siting process so that the evidence base and uncertainties are explained clearly and accurately to decision makers, the public and non-expert audiences. The way in which advice is provided requires careful consideration. Simply providing written responses by experts to community requests are rarely effective. More personal and deliberative interactions are necessary. Professional science communicators should be involved in making technical reports accessible and intelligible to non-expert audiences.

As set out in the consultation document, the siting process appears to be too linear. Past experience in the UK and other countries suggests that progress is often disjointed and the siting process needs to be re-formulated and revisited from time to time. Maintaining flexibility even at relatively late stage is important with the potential to re-engage nationally if necessary. Crucially, a well-supported national campaign will be needed throughout all stages. The process as set out in the consultation document appears unrealistic.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Geoffrey Boulton'. The signature is fluid and cursive, with a large initial 'G' and 'B'.

Professor Geoffrey Boulton FRS
Chairman, Royal Society Working Group on radioactive waste management

CC

Professor David Mackay FRS, Chief Scientific Adviser, Department of Energy and Climate Change

Appendix 1 A new process for the siting of a geological disposal facility: meeting summary

A meeting was held at the Royal Society on 26 November 2013 to discuss the Department of Energy and Climate Change (DECC) consultation on a new process for siting a Geological Disposal Facility (GDF) for nuclear waste.¹ Attendees included government officials, Fellows and staff from learned societies and other independent experts (an attendee list is included at the end of this document).

The meeting did not directly answer the specific questions posed by DECC in its consultation document. Instead, the meeting aimed to:

- gain a clearer understanding about the proposed changes to the siting process for a GDF;
- consider the staging of technical input in the new siting process, especially in the light of international experience;
- consider proposals for peer review of technical information in the new process, possibly involving a new role for the Committee on Radioactive Waste Management (CoRWM), experts from learned societies or even the creation of a new independent body.

This document summarises the key issues identified at the meeting that should underpin an effective and well framed siting process.

1 Clarity on roles and responsibilities

One of the issues in the chequered history of nuclear waste disposal has been a problem of institutions and their roles and responsibilities. There must be clarity about the roles and responsibilities of the different organisations involved at all stages of the siting process (see table below). Clarity on roles and responsibilities will ensure decision making is transparent, accountable and possible conflicts of interest are avoided. For example, it has been unclear whether it was the responsibility of DECC as the government organisation or the Nuclear Decommissioning Authority (NDA) as the developer to initiate and actively engage local communities about the siting process. A challenge is how to increase the public visibility and trustworthiness of these organisations, especially the regulators (see section 3), nationally and locally.

Organisation	Role and responsibility
Parliament	Passes legislation, setting out the powers of relevant bodies
Government	Sets out the policy for the siting process within this legal framework
Developer	Implements this policy by creating proposals for a GDF

¹ (DECC 2013) *Review of the siting process for a Geological Disposal Facility*
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/239237/Consultation_Review_of_the_siting_process_for_a_GDF_FINAL.pdf

Local community	Community volunteering as a potential GDF site and exercising the right of withdrawal from the siting process.
Affected community	Community beyond a volunteer community, affected for example by frequent transport of radioactive waste to a GDF
Wider public	Those beyond volunteer and affected communities with an interest in radioactive waste management and a GDF
Regulator e.g. Office of Nuclear Regulation and Environment Agency	Acts on behalf of the public interest when assessing the health, safety, environmental and security aspects of the developer's proposals

2 Increasing the visibility of the regulators

The Office for Nuclear Regulation (ONR) and the Environment Agency (EA) have roles to play not only during the planning process (once a suitable site has been found) but also in the preceding siting process, with which they should be engaged from the outset. The ONR and EA should not make judgements on the suitability of potential areas during this stage (which could prejudice their later regulatory roles) but rather act to increase awareness, particularly by the local community of the regulatory process for a GDF, including details of the nuclear site licence and environmental permits.

2.1 *From geology to safety case*

Geology is not the only aspect of the safety case that ONR will assess. The concept of a safety case and its application needs to feature more prominently in the siting process and be better communicated. Given its precise, technical meaning, the safety case could be presented at the outset in terms of a much broader awareness of the role of ONR and EA to act in the public interest to effectively manage risks to acceptable levels and of their long-term role as advocates of safety and radiological protection on behalf of society.

3 Re- prioritising resources

The capacity of the key organisations to deliver the new siting process will require a significant shift in the use of resources. For NDA, this will mean a shift away from being predominantly a highly technical organisation to one with greater capacity to deliver effective engagement and science and policy communication (see section 7).

4 Carefully defining the local community

4.1 *Possible tensions between local and national decision making*

The government is considering classifying the GDF as Nationally Significant Infrastructure (NSI). Other types of Nationally Significant Infrastructure do not involve a local community's right to withdraw. Such a change could lead local communities to mistakenly assume they could lose the right to withdraw during the siting process of a GDF. A *Nationally* Significant Infrastructure also suggests that the value and opportunity for local decision making would be undermined. If made an NSI, the right to withdraw should be enshrined in legislation.

4.2 *The local community*

There is a problem of geography in that the area being considered for a GDF may not lie entirely within the administrative entity. Consultative partnerships may be necessary between adjacent authorities, which might also be appropriate even if a postulated GDF lay entirely within one administrative district. There were reservations about decisions being made through local referenda. Referenda are non-deliberative and can be a poor guide for what a community might conclude if the issue had been debated more deeply.

4.3 *The affected community*

The siting process is not only the concern of a local volunteering community but also of 'affected communities'. They also have an interest in the siting process, not least due to the frequent transport of radioactive materials across their territory.

There is a problem of geography in that the area being considered for a repository may not lie entirely within a single administrative entity. There may therefore need to be consultative partnerships between adjacent authorities, which might also be appropriate even if a postulated repository lay entirely within one administrative district. This should be an issue for Government policy.

5 **Clarity on the meaning of peer review**

The consultation document sets out a proposal for peer review of technical information in the new siting process. The meaning of 'peer review' needs to be clarified when used in different places and in different contexts in the consultation document.

- *'Technical statements (made by bodies such as UK Govt, RWMD, or campaigning organisations) could be independently verified and peer reviewed'*. At whose request would a peer review take place? Or would a peer review group sit in judgement on any statement on which they wished to comment? Peer review tends to take place in a formalised environment. The intention behind this statement and the circumstances in which peer review would be invoked needs to be clarified.
- *'A pool of peer reviewers who could be called on by potential volunteer communities for advice'*. Providing advice to local communities is not the same as providing technical peer review. The process for 'independent advice' suggested below (in section 6) would be more appropriate for this purpose rather than 'peer review'.
- *'A detailed, independently scrutinised and peer reviewed geological report, made available during the 'learning phase' of the siting process' and intended to indicate whether there are reasonable prospects of any particular setting being suitable for a GDF'*. 'Reasonable prospects' does not imply the need for a deep and extended peer review but a summary review likely to be based on broad geological considerations that could well command a consensus amongst professional geologists.
- *'Recognising that there will still be considerable uncertainty in many aspects of the subsurface, there would be significant use of independent technical peer review and scrutiny throughout this process'*. Highly rigorous peer review during the focusing stage will be crucial. The independent advice function referred to below (in section 6) will be necessary to

ensure that technical issues, their significance and uncertainties and the results of peer review are understood by the volunteer communities.

5.1 Peer review pre- vs post-publication

Peer review as a part of the normal scientific process conventionally refers to pre-publication review. The most powerful form of peer review however is that applied by interested scientists after work has been published and which can lead to its refutation. If post-publication peer review were to reveal serious errors in the technical analyses, it could de-rail the whole siting process. One option would be to fund a phase of intense and detailed peer review of reports together with all the supporting data and metadata so that analyses could be re-run prior to final acceptance of reports as definitive statements. Such thorough, high quality peer review is costly and these costs must be factored in when planning technical and science communication strategies.

5.2 Widening the pool of experts

Many analyses of radioactive waste disposal proposals have in the past been undertaken by a relatively closed group of experts that specialise in consulting for radioactive waste disposal projects. It would be important that peer review is undertaken by a wider group of experts.

6 A need for independent advice

It is important that local communities as well as the other organisations involved (see table in section 1) have access to credible and independent advice about GDF proposals. It is important that it is clear what advice is being sought, by whom and how it will be used. Advisers cannot take the role of decision makers. The developer should be the first recourse for communities and decision makers seeking information. Both the developer and regulator should ensure that they are as accessible and open as possible to community requests for information. It is probable however that interested parties will doubt the independence of the developer. They should all therefore be free to seek independent advice from other sources.

6.1 A new role for CoRWM

A new advisory body is not necessary. As an existing body, CoRWM is well placed to play this advisory role, although its remit would need to expand and funding increased. The Royal Society reaffirms its long held view that CoRWM has an important public engagement role to play: CoRWM will 'need to be independent and to have public engagement and education capabilities, as these will remain crucial attributes of strategy development as the process moves to site selection and implementation'.²

Given CoRWM's expertise and terms of reference, requests for advice could always be directed to other suitable bodies, according to their expertise. These bodies include learned societies, such as the Geological Society, and national academies, such as the Royal Society, Royal Academy of Engineering and British Academy. The latter's expertise in social science is particularly important.

² Royal Society (2006) *The long-term management of radioactive waste: the work of the Committee on Radioactive Waste Management*.
http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/publications/2006/8341.pdf

These bodies are well placed to identify suitable UK and international experts who might be involved in their individual capacities.

6.2 *Providing technical advice effectively*

The way in which this advice is provided requires careful consideration. Simply providing written responses by experts to community requests are not always effective. More personal and deliberative interactions are necessary to ensure community requests are well framed; that experts appreciate community concerns and understand the nature of the community's request; and that the expert response is appropriate. A purely technical report is of little value if the local community that requests advice does not fully understand its significance. CoRWM's experience demonstrates the real value of face to face interaction with local stakeholders in terms of developing trust. Such engagement is however expensive and time-consuming, but a potentially vital part of the siting process. The need for effective advice implies a significant re-balance in the deployment of resources.

7 **The importance of science communication**

There is a critical need for high quality communication of science at all stages of the siting process so that the evidence base and uncertainties are explained clearly and accurately to decision makers, the public and non-expert audiences. For example, the safety case is an important technical concept (see section 2.1), however a more accessible way to communicate issues to do with health and environmental issues must be found that avoid technical jargon. For technical reports that need to be highly accessible and intelligible to non-expert audiences, professional science communicators should be involved. However, not all reports need to be accessible to non-expert audiences. Nonetheless, these reports still need to be accessible and intelligible to a wide set of technical audiences given the multidisciplinary character of radioactive waste management.

8 **Other assumptions that should be questioned**

8.1 *The siting process will not be linear*

As set out in the consultation document, the siting process appears to be too linear. For example, the intention that a 'national campaign' should be completed in the first year implies that progress will be linear and, once completed, that such a programme would not need to be repeated. Past experience in the UK and other countries suggests that progress is often disjointed and the siting process needs to be frequently re-formulated and revisited (for example, in a case where a sole remaining volunteer community decides to withdraw at a late stage). Maintaining flexibility even at a relatively late stage is important, with the potential to re-engage nationally if necessary. Crucially, a well-supported national campaign will be needed throughout all stages. The proposal set out in the consultation document appears unrealistic.

8.2 *Characterising the UK's inventory of spent fuel and high level wastes*

The consultation document focuses on the volume of the inventory. However, a safety case for a GDF will also concern the levels and types of radioactive waste. When discussing the UK

inventory with interested parties, the uncertainties brought about by changing technical and strategic drivers should be acknowledged through a variety of possible future inventory scenarios.

8.3 *More than one GDF may be necessary*

The consultation document implies that only one GDF will be required. The option for multiple GDFs should be kept open, especially if the safety case of a single site is not able to accommodate all the UK's inventory of spent fuel.

Further consideration is needed about the retrievability of wastes from a GDF, and whether the UK's spent fuel should be considered as a resource for future fuel rather than only as waste.

8.4 *Primary interest of communities in their geology*

It may be naive to suppose that potential volunteer communities would be content with the initial evaluation of a site as showing 'reasonable prospects' (see section 5 above). Communities will want to know about their reasonable prospects at the outset when DECC launches the siting process and they are considering expressing interest in the process. Communities may be likely to ask if the geology is suitable and safe. There is scepticism that generalised reports of regional geology would be of great interest to possible communities and that the issue of suitability can be avoided at an early stage. Communities may want advice about specific areas, at a local rather than regional scale, and at the earliest stage.

Contact

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Meeting attendees

<i>Royal Society</i>	
1.	Professor Geoffrey Boulton FRS, University of Edinburgh
2.	Ben Koppelman, Senior Policy Adviser, Science Policy Centre
3.	Chloe McIvor, Press Officer
4.	Rachael Kemp, Intern, Science Policy Centre
5.	Professor Steve Sparks FRS, University of Bristol
<i>Royal Academy of Engineering</i>	
6.	Dr Alan Walker, Senior Policy Adviser, Royal Academy of Engineering
<i>Committee on Radioactive Waste Management (CoRWM)</i>	
7.	Professor Laurence Williams FEng, Chair, CoRWM
<i>Geological Society</i>	
8.	Mr Nic Bilham, Head, Strategy and External Relations, Geological Society
9.	Mr Edmund Nickless, Executive Secretary, Geological Society
<i>Government</i>	
10.	Mr Adam Dawson, Radioactive Waste Management Directorate, Nuclear Decommissioning

	Authority (NDA)
11.	Mr Bruce Cairns, Managing Radioactive Waste Safely (MRWS), Office for Nuclear Development, Department of Energy and Climate Change (DECC)
12.	Dr Chris Darby, Head of Energy and Earth Resources, Government Office of Science
13.	Dr Jane Dennett-Thorpe, Office of the Chief Scientific Adviser, DECC
14.	Mr Peter McDonald, Head, Site Selection, RWMD, NDA
	<i>Others</i>
15.	Professor Neil Chapman, Chairman, Technical Advisory Panel, RWMD
16.	Ms Ann McCall, Vice President UK, SKB International
17.	Professor Gordon MacKerron, Director, Science and Technology Policy Research, University of Sussex