

Nuclear Free Local Authorities **RADIOACTIVE WASTE POLICY**

Briefing No. 30 – Deep waste site options

Prepared for NFLA member authorities, October 2011

Submission of the Nuclear Free Local Authorities to the DECC Consultation on “Managing Radioactive Waste Safely: Desk Based Identification and Assessment of Potential Candidate Sites for Geological Disposal”.

i. Overview

This briefing provides NFLA member authorities with the official submission of the Nuclear Free Local Authorities to the UK Department of Energy and Climate Change’s consultation on the various issues around identifying potential sites for the management of radioactive waste deep underground, once a host community has submitted a formal interest to the Government to participate in this voluntarist process. It has been produced by the NFLA Policy Advisor Pete Roche on behalf of the NFLA Steering Committee. It was submitted in late September 2011.

1. Introduction

This consultation sets out a framework for how Potential Candidate Sites for a “geological disposal facility” (GDF) could be identified from an area once a decision to participate has been made by the local authorities concerned. The framework aims to enable a nationally consistent, high level approach across all areas for which there is a decision to participate. But it is clear that West Cumbria is the only area where a decision to participate might be made in the foreseeable future.

Consulting on siting at this stage is premature to say the least. There nowhere near enough information available about what would be involved in a dump.¹ The Managing Radioactive Waste process is flawed and is heading for a situation where the decision-making bodies (the three Cumbrian Councils) will be able to impose a dump on a local community. And the siting consultation mentions nothing about interests beyond the local community – but a dump could ruin a site of world significance, the Lake District National park.

2. The Inventory

The consultation document says the Government sees no case for having more than one geological disposal facility, if one facility can be developed to provide suitable, safe containment for the radioactive wastes that need to be managed.

The Government needs to explain how this can be squared with the Environment Agency’s (EA) limit on the risk that may be caused by the burial of radioactive wastes of 10^{-6} (i.e. one in a million). (2) It is not clear yet what the radioactive waste inventory for a disposal site will

¹ NFLA prefers the term “nuclear waste dump” to “nuclear waste disposal”. The usual dictionary definition of disposal is “to get rid of” which is, of course, in the context of the bio & geospheres is impossible. The very fact that burial of radioactive wastes is expected to meet certain risk estimates indicates that radioactivity is expected to leak from the dump and return to the surface subjecting inhabitants on the surface to a radiation dose.

be, but the Nuclear Decommissioning Authority (NDA) Disposability Assessment Report for waste arising from new European Pressurised Water Reactor (EPR) states:

“...a risk of 5.3×10^{-7} per year for the lifetime arisings of a fleet of six EPR reactors each generating a lifetime total of 900 canisters is calculated” (3)

This is more than half the total risk of 10^{-6} allowable for a GDF. Clearly if there were to be more than 12 new reactors producing spent fuel to be added to the legacy waste inventory, a single dump would exceed the risk targets set by the EA. The Government’s Fixed Unit Price consultation accepted that a second GDF for new build waste might be required “as a result of the new build programme becoming very large”. (4)

3. Pre-mature Process

In March 2010 Nuclear Waste Advisory Associates produced a register of 101 outstanding scientific and technical issues which will need to be resolved before a robust safety case for a GDF can even begin to be made. (5) The NDA’s Radioactive Waste Management Directorate (RWMD) responded to this register earlier this year. (6)

The comments made by RWMD illustrate why this process is premature and indicate the full breadth of work that is still required. RWMD says that, of the 101 issues 54 are being addressed, and 31 will be addressed at some point in the future; only 16 are regarded as not requiring further work. Some of the comments are listed below. (The numbers refer to the number in the NWAA’s list of 101 issues)

6. *The need to allow the release of hydrogen gas which is contrary to the need for “barriers”.*

“...we would agree that the potential over-pressurisation of the disposal facility due to the build-up of gas, which is likely to be mainly hydrogen, needs to be addressed.”

7. *Lack of clarity as to whether hydrogen pressure will open fractures and result in “fast pathways”;*

“...we would agree that this needs further work”.

8. *The interaction of processes that would lead to hydrogen release is not understood.*

This “is an issue that is being investigated ... interactions are complicated and require better understanding”.

9. *The extent of the “carbonation □ reaction between carbon-14 and cement;*

“This is subject to ongoing work ...”

10. *The extent of the formation of radioactive methane (CH₄) gas;*

“We have a programme of work to improve our understanding ...”

12. *Resolution of gas issues and their incorporation into site selection considerations.*

“We agree that this requires further work”.

17. The development of a methodology for moving from a generic to a site-specific safety case;

“We agree that we need to develop a methodology for moving from a generic to a site specific safety case”

18. Resolution of uncertainties in flow prediction

“We recognise that resolution of uncertainties in flow prediction would have to be achieved ...”

22. Current predictions of gas/groundwater flow may not be adequate;

“We agree that there is a need to improve confidence in the up-scaling of gas/water two phase flow properties in models at large scales...”

23 The impact of the Excavation Damage Zones (EDZ) on gas/water flow is uncertain.

“The impact of the Excavation Damage Zone (EDZ) on gas/water flow is a topic that we need to understand”.

32. Inadequate research exists on ILW wasteform lifetimes;

“Our research programme is currently investigating wasteforms for those wastes such as reactive metals that seems most likely to affect package durability”

39. Particular problems due to new data on copper corrosion have arisen;

“When decisions are made on waste canister materials we will ... reflect uncertainties concerning their behaviour in safety assessments”.

40. The impact of steel corrosion products on repository performance needs further work.

“We would review the need for further research in this area if we were to select a disposal concept where bentonite clay and steel engineered barriers would be in contact”.

44. The chemical mechanical and flow behaviour of clay would be affected by the high temperature of high level waste.

“The effect of elevated temperatures on the properties of clay materials is something we need to understand”.

45. The behaviour of clay is difficult to quantify;

“...we would need to understand any remaining uncertainties about its behaviour and reflect these in safety assessments”.

67. Techniques for sampling and analysing colloids require further development;

“The concentration and characteristics of colloids in groundwater is an issue that will require consideration within the safety case and we agree that reliable techniques are needed for their sampling and analysis”.

68. Much colloid work has been restricted to experimentation with uranium, resulting in considerable research gaps as far as other radionuclides are concerned;

“We are currently reviewing the need for further work on colloids ...”

69. The interaction between colloids, microbes and radionuclides has not been well researched;

“The interaction between colloids, microbes and radionuclides will be an issue for the safety case”

76. Decomposition products of paper can cause a significant increase in radionuclide solubility;

“We have identified some aspects of this process where further information would be valuable ...”

4. Radioactive Waste Management Directorate (RWMD) Issues

In August RWMD published a document on its approach to “Issues Management”, setting out how it will develop its own “issues register”, and develop a process to communicate and report on these issues. (7) There will be another NDA document coming out in October with further discussions at the Geological Disposal Implementation Board (GDIB) after that. RWMD says it will be setting up a website and is trying hard to make relevant scientific references on each of the issues available. RWMD says it sees the need for discussions with all sorts of stakeholders on the issues.

Unfortunately, there has so far been almost no discussion about how ordinary communities including those likely to be directly impacted by a nuclear dump can be expected to engage with these scientific and technical issues. The NFLA would favour the establishment of an independent group of experts, funded by a nuclear waste fund set up by waste producers to assist communities in understanding all of these issues in a similar way to the Swedish MKG group which has been established by Swedish environment groups. (8)

5. Geological Issues

The NWAA Issues Register and the RWMD’s Issues do not cover geological issues as such. Yet a debate about the suitability of the rock in West Cumbria is ongoing, and will be confusing for the communities involved. Professor David Smythe, Emeritus Professor of Geophysics at Glasgow University contends that a deep nuclear waste repository should not be sited in West Cumbria. His latest letter to the West Cumbria Partnership in response to a critique by Dr J Dearlove was sent on 16th September 2011. (9) Prof. Smythe concludes that the Government, NDA and local authorities should not be proceeding with Stage 4 of the process – desk-based studies in participating areas, because of the insuperable difficulties which are evident as a result of the geology. At the very least the independent group of experts proposed in Section 4 above should be asked to give communities in West Cumbria a view on this.

6. Potential Candidate Sites

Paragraph 5.3 of the consultation document states that:

“Identification of Potential Candidate Sites will involve consideration of the local features and characteristics which could influence where a facility might be sited. For example, certain conservation areas or protected sites, depending on the nature of their protection, could be considered as either exclusion criteria or as a constraint on the identification of Potential Candidate Sites.”

This paragraph is far too general, and as such is virtually meaningless. Does it mean the Lake District National Park area would be ruled out for surface and/or sub-surface facilities? Would Sites of Special Scientific Interest be ruled out? What about Areas of Outstanding Natural Beauty? It is the NFLA view that National Parks should be ruled out for both above ground and underground facilities.

The consultation sets out a proposed framework for the identification of Potential Candidate Sites. Once potentially suitable surface areas and host rocks have been identified potential host communities, or groups of potential host communities, should start to become apparent. This means relatively small communities such as a town or village. The Community Siting Partnership is then supposed to engage with representatives of these areas. Whilst the document says this engagement could result in revisions to the local criteria or their application, it doesn't say that if the community is totally opposed to the idea of a waste dump in their area that they have a right to a veto if, for example, Cumbria County Council wants to press on regardless. This means we could end up with the situation whereby the decision-making bodies are able to impose a dump on a local community against its will.

7. Potential Candidate Sites - criteria

The criteria used to identify Potential Candidate Sites would, according to the Consultation document, be those set out in the White Paper which was derived from the International Atomic Energy Agency (IAEA) Guidance and those set out by the Committee on Radioactive Waste Management (CoRWM). They are:

- geological setting;
- potential impact on people;
- potential impact on the natural environment and landscape;
- effect on local socio-economic conditions;
- transport and infrastructure provision;
- cost, timing and ease of implementation.

Local communities may have additional considerations which they would like to be taken into account in the identification of Candidate Sites. A Multi-Criteria Decision Analysis would be used to assess the Potential Candidate Sites. This will involve the NDA working with the Community Siting Partnership to decide on the weighting to be given to each criterion.

If communities are to make a well-informed decision this needs to involve an independent group of experts as mentioned in Section 4 above with the NDA taking much more of a back seat than suggested here.

It is noteworthy, for instance that Professor Smythe says:

“National and international criteria for choosing a suitable waste repository are in agreement that the geology should be simple and predictable; the site should be located in a region with low hydraulic gradients.”

And yet Dr Dearlove appears to agree with Prof. Smythe about the complexity of the geology and resulting groundwater flow in Cumbria, yet the area has not be ruled out. It is

difficult to see how local community representatives can be expected to score, for example, the “geological setting” in a MADA analysis without further independent expert advice. Scoring the “potential impact on people” requires having some degree of confidence in the Generic Safety Case and that a reasonably accurate site specific safety case can be made. This would require answers to the questions raised in section 3 above, for example.

8. NFLA response to official consultation questions

On the basis of this overview, the NFLA’s official response to the questions in this consultation is as follows:

1. Do you agree with the proposed process to identify Potential Candidate Sites? If not, why not?

This consultation is pre-mature.

2. Is there anything that could be included to improve the proposed process to identify Potential Candidate Sites, bearing in mind that physical site investigations will not start until later in the process?

Radioactive waste producers should establish a fund, as is the case in Sweden, to allow for the use of independent experts by communities considering volunteering to host a nuclear dump and for national interest groups.

3. Do you agree with the proposal to use local and national criteria to identify Potential Candidate Sites? If not, why not?

The criteria listed are vague and far too general to give any indication of how the process might be implemented. NFLA would have expected, for example, that National Parks would be ruled out.

4. Do you agree with the proposed criteria for identifying Potential Candidate Sites? If not, why not?

While geology clearly needs to feature in any list of criteria it is not clear, if the criteria are derived from the International Atomic Energy Agency (IAEA) Guidance and those set out by the Committee on Radioactive Waste Management (CoRWM), why Cumbria has not already been ruled out given its complex geology.

5. Do you feel a multi-criteria decision analysis (MCDA) should be used to assess Potential Candidate Sites? If not, why not, and what approach do you think should be used?

It is difficult to see how local community representatives can be expected to score, for example, the “geological setting” in a MADA analysis without further independent expert advice. Scoring the “potential impact on people” requires having some degree of confidence in the Generic Safety Case and confidence that a reasonably accurate site specific safety case can be made. This would require answers to the questions raised in section 3 above, for example.

9. Conclusions

DECC appears to be in a huge hurry to get a deep disposal facility in the only place that has volunteered - Cumbria. But this siting consultation is clearly premature – the public has

nowhere near enough evidence about what would be involved in a dump. The MRWS process is flawed - the decision-making bodies (the three Councils) could impose a dump on a local community. And the siting consultation mentions nothing about interests beyond the local community – but a dump would ruin a site of world significance, the Lake District National park.

10. References

- (1) Managing Radioactive Waste Safely: Desk Based Identification and Assessment of Potential Candidate Sites for Geological Disposal. DECC June 2011
<http://www.decc.gov.uk/assets/decc/11/consultation/mrws-siting/2064-mrws-identification-siting-condoc.pdf>
- (2) Environment Agency (February 2009) Geological Disposal Facilities on Land for Solid Radioactive Wastes: Guidance on Requirements for Authorisation, page 46 para 6.3.10
<http://publications.environment-agency.gov.uk/pdf/GEHO0209BPJM-e-e.pdf>
- (3) NDA (22nd Jan 2010) Generic Design Assessment: Disposability Assessment for wastes and spent fuel arising from operation of the UK EPR. Part 1 Main Report. para 5.4 page 97.
- (4) DECC (March 2010) Consultation on a Methodology to Determine a Fixed Unit Price for Waste Disposal and Updated Cost Estimates for Nuclear Decommissioning, Waste Management and Waste Disposal. Paras 1.16 and 3.3.46
http://www.decc.gov.uk/assets/decc/Consultations/nuclearfixedunitprice/1_20100324145948_e_@@_ConsultationonFixedUnitPricemethodologyandupdatedcostestimates.pdf
- (5) See <http://www.nuclearwasteadvisory.co.uk/wp-content/uploads/2011/06/NWAA-ISSUES-REGISTER-COMMENTARY.pdf>
- (6) See <http://www.nuclearwasteadvisory.co.uk/docs/425/>
- (7) See <http://www.nda.gov.uk/documents/upload/Geological-Disposal-RWMD-approach-to-issues-management-August-2011.pdf>
- (8) See <http://www.mkg.se/en/the-swedish-ngo-office-for-nuclear-waste-review-mkg>
- (9) See <http://www.nuclearwasteadvisory.co.uk/docs/scientific-docs/prof-smythes-response-to-dr-dearlove/>
- (10) Why a deep nuclear waste repository should not be sited in Cumbria: a geological review, Professor David Smythe 12th April 2011.
<http://davidsmythe.org/nuclear/Unsuitability%20of%20Cumbria%2012April2011%20plus%20figs.pdf>