

# UK & Ireland Nuclear Free Local Authorities Secretariat

Nuclear Policy Unit, c/o Policy, Partnerships & Research,  
Level 5, Town Hall Extension, Manchester, M60 2LA  
Chair: Councillor Norman McDonald Secretary: Sean Morris  
Tel: 0161 234 3244

Email: [s.morris4@manchester.gov.uk](mailto:s.morris4@manchester.gov.uk)

Website: <http://www.nuclearpolicy.info>



National Geological Screening Consultation  
Radioactive Waste Management  
Building 587  
Curie Avenue  
Harwell, Didcot OX11 0RH

1<sup>st</sup> December 2015

By email: [NGSconsultation@nda.gov.uk](mailto:NGSconsultation@nda.gov.uk)

Dear RWM NGS Consultation Team,

## **NFLA submission to the Radioactive Waste Management Ltd (RWM) consultation on its National Geological Screening Guidance**

I attach with this letter the official submission of the UK & Ireland Nuclear Free Local Authorities (NFLA) to the Radioactive Waste Management Ltd's (RWM) consultation on its National Geological Screening Guidance. The NFLA is content for its submission to be made public as required, and has placed an adapted response of this submission on its own website.

For your information, NFLA is a local authority group made up of Councils from England, Scotland, Wales, Northern Ireland and the Republic of Ireland. It raises legitimate concerns over all aspects of nuclear policy in order to assist local government in meeting its commitment to sustainable development, energy policy development, environmental protection and public safety. Further details on its remit can be found at its website <http://www.nuclearpolicy.info> or by contacting the NFLA Secretariat using the details at the top of this letter.

### **1. Introduction**

NFLA notes that RWM is planning to assemble existing relevant information about geology across the various regions of England, Wales and Northern Ireland so that it will have available a national resource to help inform early discussions with communities about their potential suitability to host a deep underground radioactive waste facility it calls a 'Geological Disposal Facility' (GDF).

NFLA also notes RWM is seeking views on this proposal, and how the information can be presented to the public. The proposals now being presented by RWM are in effect the draft National Geological Screening (NGS) Guidance. (1)

NFLA notes that RWM is seeking views on four specific topics:

- its proposed approach to national geological screening
- the sources of information it plans to use
- the form in which it plans to present information relevant to long-term safety so it is useful to a general audience
- any other matters stakeholders consider relevant to this exercise

NFLA staff and members have attended a number of public consultation workshops that have been held across the country – specifically the workshop held at the DECC NGO Forum and the workshop held within the NuLEAF (Nuclear Legacy Advisory Forum) Steering Committee meeting.

(2)

## 2. Background

NFLA's response to individual consultation questions are noted in Section 7 below. It is important though to give some background to the NFLA's views as noted in Sections 2 – 6.

### ***The failure of the previous process in Cumbria -***

In June 2008 the Government published a White Paper called "*Managing Radioactive Waste Safely (MRWS): A Framework for Geological Disposal*". (3) Communities across the country were invited to talk to them about potentially hosting a site that would ultimately become a GDF. Allerdale Borough Council, Copeland Borough Council and Cumbria County Council were the only authorities to volunteer and agreed to discuss the possibility of a search for a site in West Cumbria. The West Cumbria Managing Radioactive Waste Safely Partnership (4) was set up by the Councils "*to ensure that a wide range of community interests were involved in the discussions.*"

The Partnership's final report was published on 16th August 2012. (5) Then on 30th January 2013 Cumbria County Council rejected plans to undertake preliminary work on finding a site for an underground radioactive waste dump in Allerdale and Copeland. This rejection left the UK once again without a plan for dealing with its nuclear waste legacy, let alone waste from proposed new reactors. (6)

Although a few areas had been ruled out by the British Geological Survey (BGS) as geologically unsuitable (7) most of Cumbria was thought to be potentially suitable by RWM Ltd. One geologist, Dr Jeremy Dearlove, acting as a consultant to the West Cumbria Partnership, suggested that Eskdale in the South West Lakes and Silloth in the North Lakes area might be suitable, but neither should be regarded as particularly promising. (8) However, Professor Stuart Haszeldine of Edinburgh University, and Emeritus Prof David Smythe of Glasgow University, explained that more than enough information already existed to exclude possible sites in Allerdale and Copeland, (9) because of the areas geological complexity (it is a subsided volcano with many extra faults); there would be an upward flow of groundwater past the waste, heading to the surface; and the water is chemically "oxidized" – which makes uranium soluble.

On the other hand, Professor Neil Hyatt of Sheffield University told Radio 4's 'You and Yours' that what is required is very simple geology. He argued that a sufficient volume of rock was needed, of appropriate rock type, with an absence of major faults and really slow moving groundwater at the facility depth, so it has a long return time to the environment. (10)

RWM Ltd states that the "*geological barrier has an important role in providing safety in the very long term*" [emphasis added]. (11) Cumbria Trust (CT) argues that this downplays the role of geology – its role is vital. (12) CT says that since all 'engineered solutions' will fail on geological timescales – **only the best geological solutions should be considered**. It must inevitably follow that a national search for the optimum location for a GDF should be undertaken before seeking community support for such an undertaking. (13)

The NFLA has previously called for a national debate about ***whether the objective is to look for the best available geology for the job or whether to use mediocre geology and rely more heavily on engineered barriers. The NFLA contends that there should be a national debate to resolve this issue before embarking on a National Geological Screening Exercise.*** (14)

The Department of Energy and Climate Change (DECC) argues that:

*"There is a large range of potentially suitable geological settings in the UK (e.g. the Environment Agency have identified 9 potentially suitable generic settings). Due to this wide range, it is difficult to define simple high level criteria which could be applied effectively at a national level. Different sites will have different potential advantages, and the engineered elements can be tailored to these. It will not be possible to say, in advance of any work being carried out, that one is 'better' than another."* (15)

Yet, in the NFLA's view, it was clear in the West Cumbria Managing Radioactive Waste Safely Partnership Report that the Nuclear Decommissioning Authority's (NDA) Radioactive Waste

Management Directorate (RWMD) (the precursor body to RWM Ltd.) was only looking for a site which was "sufficiently good". RWMD's view was that *"although characterising and demonstrating safety is more challenging for a comparatively complex site [as sites in West Cumbria would be geologically speaking] than for a simpler site this does not prevent complex sites from being considered"*. (16)

In July 2014 the Government published a renewed process for siting a Geological Disposal Facility. The Implementing Geological Disposal White Paper outlined an approach based on working with interested communities, beginning with two years of initial actions overseen by Government and intended to address issues raised by the public and stakeholders. (17)

### **3. The Current Consultation**

NFLA notes that the current consultation is only about bringing together existing relevant information to help inform early discussions with communities about their potential suitability to host a GDF. It will not rule all areas as suitable or unsuitable, but it is possible that it might rule out some areas. What it will not necessarily do is provide communities with answers to questions about whether a particular site is exemplary or only just sufficiently good.

NFLA notes and welcomes the establishment of an Independent Review Panel (IRP). This was set up by the Geological Society of London on behalf of the Department of Energy and Climate Change (DECC) to assess the draft national geological screening guidance developed by RWM. The panel looked at whether the guidance is geologically and technically sound; can be applied using existing geological information; and provides a basis for assessing the prospects for developing a long-term safety case in a range of geological settings to accommodate the UK inventory of higher activity waste. Later in the process, the panel will assess whether the guidance has been applied accurately and consistently, and in a manner likely to engender public confidence.

The IRP held a meeting with RWM to discuss the draft guidance on 23rd June at the British Academy in London. This meeting was held in public. The NFLA Secretary attended the meeting. (18)

At the meeting Dr David Lowry of the Nuclear Waste Advisory Associates questioned the nature of the "independent" panel. Of the seven members of the panel one person has worked at Dounreay and Drigg and reviewed the Swedish and Finnish repository programmes; another person has worked at Fulbeck – a potential site looked at by Nirex, as well as Sellafield, Dounreay and the NDA; another person worked with the Swedish Council for nuclear waste; a fourth person worked with NDA and Grimsel which is a Swiss Research Laboratory on nuclear waste and another person had worked with the Nuclear Waste Management Organisation of Canada. Dr Lowry asked, given that many of the panellists have connections with the nuclear industry, how the panellists were chosen from the vast range of potential geologists.

The Geological Society responded by pointing out that the chair of the panel, Chris Hawksworth, does not have any experience of working in radioactive waste matters but has relevant geoscientific expertise. The panel overall required a mix of experience and expertise. NFLA will monitor the work of the IRP and hopes it will provide a true and independent rigorous review of the RWM screening process. NFLA would like to have seen more geologists chosen who are independent of the nuclear industry.

### **4. National Geological Screening Guidance**

NFLA notes that the screening guidance comprises:

- The safety requirements to which the geological environment contributes.
- Geological attributes that are relevant to meeting these safety requirements
- Sources of existing geological information relevant to understanding these attributes.
- A description of the outputs that will be produced based on this existing geological information.

Bruce Yardley, the RWM Geologist, explained at the IRP meeting that RWM needs to find a host rock that 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:

- (i) Higher Strength Rocks, which can include igneous rocks<sup>xi</sup>, metamorphic rocks<sup>xii</sup> and some types of sedimentary rocks<sup>xiii</sup>.
- (i) Lower Strength Rocks which are clay rich and sufficiently ductile that they don't sustain open fractures;
- (ii) Bodies of Rock Salt which provide a completely dry environment.

There are many rocks that would not fit into the category of host rock type. So this screening exercise will rule out some areas as unsuitable.

When it comes to screening for the three potentially suitable rock types there are problems with all three.

For the Higher Strength Rocks, these have low porosity and very little water contained in them, so very little water moves through them. Water that does move tends to move along fractures rather than the matrix of the rock. So permeability is related to the number of fractures. But there is very little data about where these fractures actually are, since field measurements have not been made over most of the UK. RWM will use what it calls "*expert judgement*" to decide which areas to include on its map of higher strength rocks which have some chance of providing a suitable host rock. But a programme of boreholes will be required to confirm whether a particular area is suitable or not. Such a programme might be reasonable for a small number of potential sites, but it is not something that can be achieved easily on a national scale.

For Lower Strength Rocks; these have low permeability; water flows through by diffusion but this happens extremely slowly. "Expert judgement" will be needed here too because sometimes these rocks occur in formations which are interleaved with other sedimentary rocks. Judgement will be required to decide whether a particular body of rock meets the low permeability requirement and is laterally extensive enough.

Finally, bodies of rock salt which provide a completely dry environment - no-one has any real knowledge of where the thick bodies of rock salt are; only where geological formations that are likely to contain them are.

There will also be something in the screening which indicates where the aquifers are and at approximately what depth. However, just because there is an aquifer in the top 2-300 metres doesn't mean there couldn't be a suitable host rock several hundred metres below that. (NFLA notes that a GDF would be between 200 and 1,000 metres deep and cover an area of 10 to 20 square kilometres).

RWM was keen to point out that although there will need to be judgements made, the key thing is that people are aware where those judgements are made and the public will be able to have access to the information upon which those interpretations are based. The IRP will be involved in the process and be able to express a view on the validity of the judgements that are made. In discussion John Black of the IRP pointed out that the public is bound to think that the expert judgements are manipulated so that the areas chosen can be manipulated. So he suggests making the criteria more publicly available. NFLA supports Mr Black's comments.

## 5. Outputs

NFLA notes that England, Wales and Northern Ireland have been divided into 13 geological regions. The outputs will include regional maps of:

---

<sup>xi</sup> **Igneous rock** is formed through the cooling and solidification of magma or lava.

<sup>xii</sup> **Metamorphic rocks** arise from the transformation of existing rock types, through heat or pressure.

<sup>xiii</sup> **Sedimentary rocks** are formed from **sediments** that have settled at the bottom of a lake, sea or ocean, and have been compressed over millions of years. The sediment comes from eroded **rocks** carried there by rivers or ice, and from the skeletons of sea creatures.

- 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 and hydrocarbons.

NFLA also note with some concern 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.

## 6. Right of Withdrawal

The geological screening will produce maps of the three potentially suitable rock types. NFLA is concerned that areas of hard rock may have too many fractures; areas of lower strength rock may not be extensive enough and possible areas of rock salt may turn out not to exist. So if a local authority or community with an area of rock designated as potentially suitable, decides to volunteer, it will not know for certain whether or not it does contain a site suitable for a GDF. Nor will it know whether any suitable sites are considered to be good sites or whether they are considered only just adequate.

In the NFLA's view, the 2014 White Paper is unclear about when the right to withdraw will be removed. A Community Representation Working Group is expected to provide *"greater clarity around the point at which a test of public support might be considered appropriate, and the method by which such a test could be carried out."* The right to withdraw would end after a positive result from a test of public support. (19) The White Paper says:

*"Once the developer is satisfied that it has sufficient information to demonstrate that a site is suitable then, subject to a test of public support then the granting of development consent and the approval of the independent regulators, construction of a GDF could proceed."*

NFLA believes that it is the community, surely, that needs to be convinced that there is sufficient information to demonstrate that a site is suitable, not the developer. And the right to withdraw needs to remain in place until such time as sufficient information is available. The Right to Withdraw must remain in place until after boreholes and geological investigations have been completed.

Earlier this year the Department of Energy and Climate Change held a consultation on Working with Communities. (20) The Cumbria Trust Response to this consultation called for only areas with "good" geology to be eligible to volunteer to host a GDF. The Trust's concerns were encapsulated in the following statement:

*"Conflicting information from representatives of RWM is already evident. In a radio broadcast on Radio Cumbria (18.8.15) we were being assured that volunteer host communities will have the right to withdraw right up to late in the process whilst the previous day it was reported in the national press that another representative had stated: 'Whilst the opinions of local communities would be taken into account he accepted that ultimately the Secretary of State now had the power to override communities'". (21)*

In the NFLA's view the situation with regard to the Right to Withdrawal needs to be clarified.

## 7. NFLA Response to Specific Consultation Questions

**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?**



The Nuclear Free Local Authorities (NFLA) rejects the idea that nuclear waste can be "disposed of". It believes that there are considerable uncertainties in making a safety case to bury nuclear waste in a deep repository. Any safety case will rely on computer models of extremely complex, geological, chemical, biological and physical environments. Any slight miscalculation or misunderstanding about how thousands of difference factors are interacting could mean that the rate of leakage turns out to be much faster than expected. If the waste has been irretrievably buried, the problem of radionuclides leaking at a faster rate than expected will not be possible to rectify.

NFLA believes the previous process failed partly because it ignored most of the recommendations of the 2006 Committee on Radioactive Waste Management (CoRWM). In particular that there should be an intensified programme of research and development into the long-term safety of geological disposal, as well as research on a robust programme of interim storage. There are currently too many uncertainties about how packaged nuclear waste will behave underground.

The MRWS process also failed because it did not start with a debate about whether the Government should be looking for the most suitable geology for radioactive waste disposal. Experience from Cumbria suggests that the public wants to see the best geological barriers **AND** engineered barriers, not simply adequate or poor geology with a greater reliance on engineered barriers.

The Geological Screening process will produce a huge amount of information, but it is not clear how non-experts, such as councillors and local authority officials, will be able to make an assessment of that information. There needs to be some discussion, and independent assessment about which geologies have the potential to provide THE BEST geology. Communities and local authorities will need funding to help them obtain independent advice, and help them to interpret the information made available.

**Question 2: To what extent do you think that these sources (of information) are appropriate and sufficient for this exercise?**

The point is that communities and local authorities will need a source of independent advice in order to interpret this information. They will need to examine whether or not they accept the "*expert judgement*" used to decide to include certain areas. It is clear that there is nowhere near enough information on geology currently available to be able to say anything more than the areas mapped may be potentially able to host a GDF. Local authorities and communities need an assurance that should they volunteer, a right to withdraw will remain until they are in a position to obtain an independent assessment of boreholes and other detailed geological investigations.

**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?**

No comment.

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

A worked example of a notional Region would have been helpful, so that any community or local authority which may be considering volunteering can see what kind of judgements they are going to have to make and how much independent advice they are going to have to seek.

What is required for a GDF is very simple geology; a sufficient volume of rock, of appropriate rock type, with an absence of major faults and really slow moving groundwater at the facility depth. Cumbria is an area of complex geology with many faults and yet RWM and Government insisted it included areas which might potentially be suitable. As a result of the complex geology, after the process in Cumbria failed there were calls for a national search for the optimum location for a GDF to be undertaken before seeking community support for such an undertaking. DECC claims that different sites have different potential advantages, but the engineered elements can be tailored to these. It will not be possible to say, in advance of any work being carried out, that one site is 'better' than another.

It is not clear to the NFLA that this geological screening exercise will resolve this difference of opinion between those that want to search for an optimal location and those that want to rely on engineered barriers to account for any geological shortcomings.

## 8. Overall NFLA conclusions to the consultation

NFLA stresses four key points to RWM in its concluding comments to the consultation:

- Experience from Cumbria suggests that the public wants to see the best geological barriers AND engineered barriers, not simply adequate or poor geology with a greater reliance on engineered barriers.
- The Geological Screening process will produce a huge amount of information, but it is not clear how non-experts, such as councillors and local authority officials, will be able to make an assessment of that information. Funding needs to be available to help them obtain independent advice to interpret the information made available.
- Local authorities and communities need an assurance that should they volunteer, a right to withdraw will remain until they are in a position to obtain an independent assessment of boreholes and other detailed geological investigations.
- There needs to be much more discussion about how and when public opinion will be tested. Any test should be carried out after an independent assessment of boreholes and detailed geological investigations has been published.

If you have any queries with any of the points made in this submission please contact the NFLA Secretary using the email or phone contacts at the top of this letter.

Yours sincerely,



Sean Morris  
NFLA Secretary

On behalf of the NFLA Steering Committee with the full approval of the NFLA SC Chair

---

## 9. References to the NFLA Briefing

- (1) NDA 8<sup>th</sup> Sept 2015 <http://www.nda.gov.uk/rwm/national-geological-screening/consultation/>
- (2) See <https://www.surveymonkey.com/r/D6VBZTX>
- (3) Managing Radioactive Waste Safely White Paper: A Framework for Implementing Geological Disposal, DEFRA etc. June 2008  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/228903/7386.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228903/7386.pdf)
- (4) See <http://www.westcumbriamrws.org.uk/page/83/Introduction.htm>
- (5) Final Report of the West Cumbria Managing Radioactive Waste Safely Partnership, August 2012  
<http://www.westcumbriamrws.org.uk/page/83/Introduction.htm>
- (6) See "Cumbria Dump Plan Dumped" nuClear News No.47  
<http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo47.pdf>
- (7) See map on page 7 here: [http://www.westcumbriamrws.org.uk/documents/115-BGS\\_non-technical\\_summary.pdf](http://www.westcumbriamrws.org.uk/documents/115-BGS_non-technical_summary.pdf)
- (8) Dr Dearlove's review of consultation submissions on geology, 18<sup>th</sup> June 2012  
[http://www.westcumbriamrws.org.uk/documents/285-Review\\_of\\_Consultation\\_Submissions\\_on\\_Geology\\_by\\_FWS\\_Consultants\\_Ltd\\_18\\_June\\_2012.pdf](http://www.westcumbriamrws.org.uk/documents/285-Review_of_Consultation_Submissions_on_Geology_by_FWS_Consultants_Ltd_18_June_2012.pdf)
- (9) University of Edinburgh, School of Geo Sciences, 7th September 2012  
[http://www.geos.ed.ac.uk/homes/rsh/Allerdale\\_and\\_Copeland.html](http://www.geos.ed.ac.uk/homes/rsh/Allerdale_and_Copeland.html)

- (10) Cumbria Trust 31<sup>st</sup> July 2014 <https://cumbriatrust.wordpress.com/2014/07/31/prof-neil-hyatt-sheffield-university-tells-bbc-radio-4-you-and-yours-listeners-for-a-gdf-we-need-the-geology-to-be-very-simple/>
- (11) Consultation document para 1.2
- (12) Cumbria Trust 1<sup>st</sup> Oct 2015 <https://cumbriatrust.wordpress.com/2015/10/01/the-search-for-a-radioactive-waste-site-is-taking-a-step-forward/>
- (13) Cumbria Trust November 2013 <https://cumbriatrust.wordpress.com/cumbria-trusts-response/>
- (14) Review of the Siting Process for a Geological Disposal Facility – Final response by the NFLA Secretariat to the UK Government DECC, December 2013 Consultation  
[http://www.nuclearpolicy.info/docs/radwaste/Rad\\_Waste\\_Brfq\\_45\\_MRWS\\_GDF\\_Siting\\_Final\\_Response.pdf](http://www.nuclearpolicy.info/docs/radwaste/Rad_Waste_Brfq_45_MRWS_GDF_Siting_Final_Response.pdf)
- (15) Review of the Siting Process for a Geological Disposal Facility, DECC September 2013  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/239237/Consultation\\_Review\\_of\\_the\\_siting\\_process\\_for\\_a\\_GDF\\_FINAL.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/239237/Consultation_Review_of_the_siting_process_for_a_GDF_FINAL.pdf)
- (16) The Final Report of the West Cumbria Managing Radioactive Waste Safely Partnership, August 2012 <http://www.westcumbriamrws.org.uk/images/final-report.pdf>
- (17) Implementing Geological Disposal July 2014  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/332890/GDF\\_White\\_Paper\\_FINAL.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332890/GDF_White_Paper_FINAL.pdf) for the No2NuclearPower view on this White Paper see nuClear News No.65  
<http://www.no2nuclearpower.org.uk/nuclearnews/NuClearNewsNo65.pdf>
- (18) NDA - <http://www.nda.gov.uk/2015/06/meeting-with-the-independent-review-panel/>
- (19) See Implementing Geological Disposal Annual Report April 2014 to March 2015  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/444407/Implementing\\_Geological\\_Disposal\\_Annual\\_Report\\_14-15.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/444407/Implementing_Geological_Disposal_Annual_Report_14-15.pdf)
- (20) Implementing Geological Disposal: Working with Communities, DECC July 2015  
<https://www.gov.uk/government/consultations/implementing-geological-disposal-working-with-communities>
- (21) Cumbria Trust 14th Sept 2015 <https://cumbriatrust.wordpress.com/2015/09/14/decc-implementing-geological-disposal/>