



## NFLA Radioactive Waste Policy Briefing Number 71: UK and Welsh Government consultations on radioactive waste policy

Prepared for NFLA member authorities, April 2018

### i. Implementing 'Geological Disposal' in England and Wales

This NFLA Radioactive Waste Policy Briefing seeks to provide an overview to three consultations that look to move forward the UK and Welsh Government's strong support for a deep underground radioactive waste policy. The NFLA Secretariat has put together an overview and critique of the consultations, some important additional background on geological screening and the Swedish Environmental Court's recent ruling in copper canisters, and a suggested model response to the consultation questions.

The UK Government has launched two consultations on proposals to develop a "Geological Disposal Facility" (GDF), which NFLA note is the Government's term for a deep underground radioactive waste repository, for managing high and intermediate-level nuclear waste. (1) The first consultation seeks views on how communities should be engaged in a siting process for a GDF (2) The policy proposals being consulted on here apply to England and Northern Ireland only but anyone from across the UK can respond.

Responses to this are requested by **19<sup>th</sup> April**

Email to: [GDF-WWC@beis.gov.uk](mailto:GDF-WWC@beis.gov.uk)

Write to: GDF Team, 3rd Floor, Victoria, 1 Victoria Street, London, SW1H 0ET

The second consultation is on a draft National Policy Statement (NPS) for a GDF which is intended to provide the framework for the Planning Inspectorate and the Secretary of State to examine and make decisions on development consent applications for geological disposal infrastructure in England. (3) National Policy Statements set out the need for particular Nationally Significant Infrastructure Projects (NSIPs), and are required, under the Planning Act 2008, to undergo a period of public consultation before they are published. This consultation applies to residents of England and Northern Ireland. (4)

Responses to this consultation are also requested by **19<sup>th</sup> April** to:

By e-mail: [GDFlanduseplanning@beis.gov.uk](mailto:GDFlanduseplanning@beis.gov.uk)

Or write to the same address as above.

There is a third consultation being run by the Welsh Government in parallel on its policy for proposed arrangements for engaging with communities in Wales in relation to the development of a GDF. This is a distinct process reflecting the unique characteristics of a siting process in Wales, including the different planning and local government systems and the Welsh language. (5)

Responses by **20<sup>th</sup> April** (NB extra day)

Complete and return to [EQR@gov.wales](mailto:EQR@gov.wales)

Or Complete and return to:

Environmental Quality & Regulation,  
Cathays Park, Cardiff, CF10 3NQ

## 1. Background

On 30<sup>th</sup> January 2013, Cumbria County Council rejected the Government's plans to undertake preliminary work on a deep underground radioactive waste repository. The county, and its western district councils Allerdale and Copeland, were the only local authorities in the UK still involved in feasibility studies for a £12bn - £19bn disposal facility. So the rejection left the UK, once again, without a plan for dealing with its nuclear waste legacy, let alone waste from proposed new reactors.

In July 2014 the UK Government published a renewed process for siting a Geological Disposal Facility (GDF) – the 'Implementing Geological Disposal' White Paper. (6) This set out an approach based on working with communities in England and Northern Ireland that are willing to participate in the siting process for a geological disposal facility. The White Paper explained that certain 'Initial Actions' would have to happen before formal discussions between communities interested in hosting a GDF and the delivery body Radioactive Waste Management Limited (RWM) could take place. (7)

These 'Initial Actions' included:

- Development of a process of Working with Communities, including Community Engagement, Community Representation, Community Investment and the Test of Public Support; and
- The establishment of a policy framework for planning decisions in England; and
- A National Geological Screening Exercise.

There is more information on the National Geological Screening Exercise in Annexe One.

## 2. Working with Communities - Community Investment Fund

Communities in England, Wales and Northern Ireland are to be offered up to £1m a year to volunteer to host an underground nuclear waste disposal facility for thousands of years. The 'financial incentive' is one way the government hopes to encourage communities to volunteer after previous efforts failed in 2013 when Cumbria County Council rejected the project. The payments would rise to up to £2.5m annually as deep investigative boreholes are drilled. (8) *The Times* says over 20 years this could add up to £42m - £1 million a year for about five years, rising to £2.5 million a year for 10-15 years while boreholes were drilled to investigate whether the geology was suitable. (9)

On the other hand, paragraph 4.61 of the Consultation Document uses the phrase "up to" £1m and "up to" £2.5m. Local Authorities will need more certainty about how the exact level of so-called "community investment funding" is to be decided. Paragraph 4.69 says "*community investment funding, could be used to focus on issues or themes that may increase the ability of local businesses and members of the community to benefit from a geological disposal facility development.*" This seems a bit odd as any money invested would be wasted if the area decided not to go ahead with a GDF or the area proves unsuitable. This type of investment should surely be a job for the "Additional Investment" discussed below.

## 3. Additional Investment

Paragraph 4.62 says "*the Government will provide additional investment to the community that hosts a geological disposal facility, to help to maximise the significant economic benefits that are inherent in hosting a nationally significant infrastructure project. This additional investment will be significant – comparable to other, international geological disposal facility projects, and capable of generating intergenerational benefits specific to the community that hosts a geological disposal facility. This is in addition to any agreements between the delivery body and communities to mitigate impacts during construction, and the engagement funding provided by the delivery body to facilitate community engagement in the siting process.*"

But no details are given, and no idea of the amount which might be available. Councillor Tim Knowles, who chaired the search process in Cumbria, known as the West Cumbria Managing Radioactive Waste Safely Partnership, has highlighted the government's history of underfunding Cumbria's infrastructure, so that promises of substantial community benefits were treated with

understandable scepticism during the last process. This was one of the main reasons that Cumbria County Council decided to withdraw from the previous process. (10)

#### **4. The Role of County Councils**

In the Foreword to “Working with Communities”, UK Energy Minister Richard Harrington says:

*“Previous attempts to find a site for geological disposal have not been successful [they] were not able to secure and sustain the necessary level of local support. These experiences illustrate the complexity of the challenge in working with a host community on the siting of such an important facility. The approach we are consulting on in this document builds on the lessons of previous attempts, as well as positive international examples.”*

He goes on to say *“that an open and transparent site selection process that engages constructively with willing communities provides a more robust basis for success. Similar waste disposal programmes based on these key principles are making good progress in countries like Finland, Sweden and France.”*

The consultation says all local representative bodies, including all levels of local government (including the principal local authorities; county councils, unitary authorities and district councils) will need to have a voice in this process.

However, the proposals appear to weaken the power of county councils making it harder for them to prevent a community from agreeing to host the GDF. The consultation document says the final decision will be subject to a “test of public support”, which could be a local referendum. The right to vote in the referendum could be restricted to a small area around the proposed site. The decision on holding a referendum would be taken by a “community partnership” involving representatives from councils, businesses and community groups. (11)

It is proposed that a Community Partnership would be formed from organisations identified during formative engagement as important to the local area. The Community Partnership should also involve members from the delivery body. Members of the Community Partnership will be responsible for sharing information between the community and the delivery body and entering into dialogue with people more widely in the community about a geological disposal facility.

Local Authorities will be concerned that a Potential Host Community (PHC) may be too small, both geographically and in terms of population numbers. The consultation document seems to suggest that a PHC could exclude many people within the same local authority area who have a clear interest in whether the project goes ahead or not. Paragraph 4.18 says a PHC may only be several electoral wards. Furthermore, these ward areas could be contained within one District, County, Combined Authority or Unitary authority or could cross more than one.

NFLA represent the views of the hundreds of miles of ‘affected’ communities along road and rail routes from radioactive waste stores, to any centralised repository. Are these communities going to be ignored? Why does the Government believe people living in these communities with multiple loads of radioactive materials coming past where they live for many decades do not deserve significant financial compensation too? (12)

#### **5. Expressing an Interest**

Local authorities may also be concerned about the idea that anyone can express an interest in initiating a search for a suitable site for a GDF. Paragraph 4.23 discusses this, but does not make it very clear how this would work. It would be unfortunate if the Ministry of Defence or Forestry Commission, or a private landowner, for example, was able to drag a community into a 20 year process against its better judgement.

## 6. Right of Withdrawal

The local NGO *Cumbria Trust* says it has serious concerns about the right of withdrawal in the new consultation. It appears that areas which volunteer are potentially trapped within the process for up to 20 years. For all the talk of volunteers having a continuous right of withdrawal, the document paints a much darker picture of potential coercion and a supposed partnership where the real power rests with one party. Paragraph 5.8, for instance seems to suggest that even though a Community Partnership may include parish councillors and other community representatives, once the process has started, they will be powerless to withdraw if the local authority decides it wishes to continue. There could be a partnership of around 12 people, where the 2 or 3 representatives of the local authority can overrule the other 9 or 10 members and force the partnership to continue against their will. To the NFLA this does not sound like a fair, equitable and effective partnership.

Para 4.87 says there will only be one opportunity for a test of public support in each PHC. During the last MRWS process, there were **several** tests of public support before moving to the next stage to ensure that the public view was being represented. This time there could be a process which potentially lasts for 20 years and during that time only one test of public support is allowed, and that controlled by a potentially supportive local authority. This appears to be intended to take place at the end of the 20 year siting process. So once a local authority has volunteered, the community are in effect locked-in for 20 years if the local authority wishes to continue. During that time there is potential for very significant blight which may damage businesses, particularly those which rely on image such as tourism, and it may make some properties unsaleable. It is clearly unworkable for there to be a single test of public support over such a long period.

***It appears that this process has been designed to be easy to enter and extremely difficult to leave.*** Communities need to exercise extreme caution before volunteering. (13)

## 7. Third Party Expert Views

The UK Government says it “*will ensure that communities will be able to access third party expert views on contested and unresolved technical and/or scientific issues once communities are constructively engaged. There will be an agreed process whereby third party expert views can be accessed from Learned Societies, as was committed to in the 2014 White Paper. The delivery body will produce guidance to help communities understand when and how they can access the process for third party expert views.*”

To say the least, this is unclear. Obviously communities need to be able to access the views of third party experts of their own choosing, and not be restricted to Learned Societies.

Interestingly, the former chair of the previous West Cumbria Managing Radioactive Waste Safely process, Councillor Tim Knowles, no longer supports the idea of geological disposal of nuclear waste in Cumbria. He appears to be of the view that Cumbria does not have suitable geology, and that there are much better sites elsewhere in the country. Councillor Knowles suggested that near surface secure interim storage (similar to the Scottish Government’s preferred option, and one which NFLA is broadly supportive of) may be a better solution and that this could be under the Sellafield site. The key difference between this and a GDF, is that these facilities are retrievable stores, typically around 30 metres below the surface, with a lifespan of 100-200 years, rather than deep permanent disposal sites, so geology is much less important. (14)

## 8. National Policy Statement

The second UK Government consultation is on a draft National Policy Statement (NPS) for Geological Disposal Infrastructure which is intended to provide the framework for the Planning Inspectorate and the Secretary of State to examine and make decisions on development consent applications for geological disposal infrastructure in England. (15) National Policy Statements set out the need for particular Nationally Significant Infrastructure Projects (NSIPs), and are required, under the Planning Act 2008, to undergo a period of public consultation before they are published. This consultation applies to residents of England and Northern Ireland. (16)

The draft NPS document is intended to set out the need for nationally significant infrastructure projects related to the geological disposal of higher activity radioactive waste in England. It also provides planning guidance for promoters of such projects, and for the Planning Inspectorate and Secretary of State in their consideration of applications. (17)

## 9. The 'Need' for a GDF

In the view of the NFLA, the first paragraph of the Executive Summary of the consultation document (18) is highly contentious. It says: "*There is a need for a permanent disposal solution for higher activity radioactive waste from a wide range of activities, including: waste from 60 years of nuclear generation and waste from new nuclear power stations; as well as waste from medical treatments, research, and defence activities. The government policy for geological disposal of this waste is based on an independent review by the Committee on Radioactive Waste Management (CoRWM).*"

The Government says the Committee on Radioactive Waste Management (CoRWM) recommended geological disposal as the best available option. But CoRWM also made important recommendations which have been completely ignored by the Government. It said, for instance that its "*...recommendations are directed to existing and committed waste arisings ... the political and ethical issues raised by the creation of more wastes are quite different from those relating to committed – and therefore unavoidable –wastes*". (19)

And in September 2007 CoRWM said: "*To justify creating new spent fuel from an ethical point of view, there must be a management solution that is ethically sound, not just least bad. ... In short, a solution that is ethically acceptable for dealing with existing spent fuel is not necessarily a solution that would be ethically acceptable for dealing with new or changed materials.*" (20)

## 10. New Nuclear Reactors

The Draft NPS says the Government believes there is an urgent need for new electricity generation, including new nuclear power, for the UK to meet its climate change objectives:

*"It is Government policy that new nuclear power should be able to contribute as much as possible to the UK's need for new capacity. New nuclear power stations will help to ensure a diverse mix of technology and fuel sources, which will increase the resilience of the UK's energy supply."*

The NFLA strongly dispute this (see NFLA's New Nuclear Monitor No.52 in particular) (21). It argues that given existing energy efficiency measures and the growing deployment of cheaper renewable energy, the alternatives are more effective. In short, the draft NPS on Geological Disposal is based on a false premise – there is no "need" for new nuclear power stations. Energy efficiency has already reduced electricity consumption by 30% compared with what it was expected to be in 2017 at the time that Hinkley Point C was first mooted, and the reductions are expected to continue.

According to Radioactive Waste Management Ltd, the radioactivity from existing waste (i.e. not including new reactors) is expected to be 4.8 million terabecquerels (TBq) in the year 2200. The waste inventory in 2200 after a 16GW programme of new reactors would be around 27.3 million TBq – **almost a six-fold increase. Potential host local authorities have no way of knowing how much waste they are volunteering to accept.** (22) The proposed 16GW nuclear programme could be followed by another generation of reactors or a string of Small Modular Reactors. And there will be questions over how much say will be given to adjacent local authorities impacted by waste being transported to a GDF.

So, in CoRWM's view, whilst it might be necessary to search for a more permanent management solution for existing nuclear waste, it is not ethically sound, in the words of one former CoRWM member "*to compound the problem by a new-build programme that will result in vastly increased radioactivity from spent fuel and other highly radioactive wastes ...*" (23)

The most important immediate step required is to stop producing any more radioactive waste as soon as possible.

## 11. Need already demonstrated?

The draft NPS sets out the need to manage higher activity radioactive waste in the long term through the development of a GDF. The Secretary of State will assess applications for a proposed GDF on the basis that need has been demonstrated. It states that:

*“The development of geological disposal infrastructure is essential because it provides the best available practical means of ensuring the long-term safety and security of higher activity radioactive waste.”* (24)

The Government argues that the requirement for human monitoring, maintenance, rebuilding and repackaging and the constant protection from natural processes, environmental changes, and malicious attack means that it does not consider long-term storage to be a permanent solution. Higher activity radioactive waste needs to be isolated from people and the surface environment for periods of time that are very long in comparison with human lifespans but are short on geological timescales. It believes there is an ethical imperative to progress with the disposal of radioactive waste. As one of the generations that has benefitted from medical treatments, research, electricity and defence activities that have all produced radioactive waste, the UK Government believes it is the responsibility of this generation to dispose of this waste. Indefinite storage would represent a burden for future generations. There would be a significant cost associated with the safe and secure storage of higher activity radioactive waste. In addition, for the long time periods for which waste is radioactive, there would be wider on-going risks and responsibilities associated with surface storage (e.g. from terrorism or the impacts of climate change).

Those in favour of a GDF generally argue that the current generation have a responsibility to future generations to deal with the issue of nuclear waste it (and previous generations of the past 60 years) have created now, rather than leaving it for them to clean up. But geological disposal does not claim to be able to isolate waste from the environment forever as one might expect. It relies on delaying its return to the surface for as long as possible. The International Atomic Energy Agency (IAEA) says the goal is to avoid *“undue exposure to radiation of humans or the environment”* and keeping any potential hazard to human health *“acceptably low”* over required periods of time. (25) The industry relies on being able to predict the stability of the geological and hydro-geological conditions over very long time-scales – millions of years – in order to be able to prove that radiation doses to humans in the distant future will be kept acceptably low. It is questionable whether our scientific understanding is sufficiently advanced to be able to predict the complex interactions going on in an underground nuclear waste dump and the impact on human health or the environment that far into the future.

Those opposed to a GDF argue that it would be better to leave future generations with a choice about what to do with nuclear waste rather than bequeathing a fait accompli which could turn out to be a leaking repository.

Prof Andrew Blowers, former member of CoRWM, writing in a letter to the Guardian said: *“In 1976, Lord Flowers pronounced that there should be no further commitment to nuclear energy unless it could be demonstrated that long-lived highly radioactive wastes could be safely contained for the indefinite future. Ever since, efforts to find a suitable site for a geological disposal facility have been rejected by communities. There is, therefore, little evidence to support the government’s claim that “it is satisfied that effective arrangements will exist to manage and dispose of the waste that will be produced from new nuclear power stations”. Deep disposal may be the eventual long-term solution but **demonstrating a safety case, finding suitable geology and a willing community are tough challenges and likely to take a long time.** The search for a disposal site diverts attention from the real solution for the foreseeable future, which is to ensure the safe and secure management of the unavoidable legacy wastes that have to be managed. It is perverse to compound the problem by a new-build programme that will result in vastly increased radioactivity from spent fuel and other highly radioactive wastes which will have to be stored indefinitely at vulnerable sites scattered around our coasts. A new-build programme would create an unmanageable and intolerable burden on communities into the far future. **To suggest that a repository is the solution is in the realm of fantasy.**”* (26) (Emphasis added)

The Nuclear Waste Advisory Associates (NWAA) has produced a list of 100 issues which will need to be resolved before a safety case can begin to be demonstrated. (27) One of these issues – copper corrosion – is dealt with in detail in Annexe Two after a recent court case in Sweden.

Another important group of issues covered in the NWAA Issues Register concerns the large quantity of hydrogen gas likely to be produced by a disposal facility. Although this gas would not be radioactive, it would present a problem due to the large volumes involved and the resultant need to provide a release pathway in order to avoid a build-up of pressure. Such a release pathway would necessarily also provide an escape route for radionuclides. The provision of such an “escape route” is contrary to the notion of a disposal facility as a sequence of “barriers”. Despite the fact that the hydrogen problem has been recognised for over twenty years, it is still not clear whether a hydrogen “over-pressure” would lead to the opening of fractures and the resultant creation of fast migration pathways. Gas release would be determined by the interaction of a number of different processes. Although these processes are understood on an individual basis, their interaction is not.

RWM Ltd says this depends on the design of the engineered system and the characteristics of the surrounding rock. But this will be investigated at a later stage in the programme when potential candidate sites have been identified. (28)

In other words, one of the most intractable problems associated with deep geological disposal of waste cannot, according to RWM, be investigated further until they have a site. To NFLA, this is unacceptable. The pressure to go-ahead, once a site has been selected, whatever the results of research on gas transport of radionuclides, would be immense.

## 12. Conclusion

In NFLA’s view the search for a GDF site diverts attention from the real problem for the immediate future, which is to ensure the safe and secure management of the unavoidable legacy wastes that the civil and military nuclear industry has already created. When the Cumbrian MRWS Partnership was investigating proposals to search for a GDF in Cumbria (up to January 2013) a GDF was not expected to be ready to receive waste until around 2040. This date must surely now have moved to 2045. It is expected to take 90 years to emplace existing waste in a GDF. So there will be nuclear waste around for the next century even without a new nuclear programme. Much of the bulky waste will not even arise until reactors start being dismantled around 2080. This gives plenty of time to carry out further research into alternative management options and to resolve some of the outstanding problems associated with deep underground disposal in an open and transparent way.

In the words of Professor Andy Blowers:

***“It is perverse to compound the problem by a new-build programme that will result in vastly increased radioactivity from spent fuel and other highly radioactive wastes which will have to be stored indefinitely at vulnerable sites scattered around our coasts. A new-build programme would create an unmanageable and intolerable burden on communities into the far future.”***

**The most important immediate step required is to stop producing any more waste as soon as possible.**

## 13. Welsh Government Consultation

The Welsh consultation covers:

- arrangements for engaging with communities which may wish to enter discussions,
- how the boundaries of the potential host community might be defined,
- how community investment funding should be distributed,
- access by a community in discussions to independent third party expert views,
- how and when a community’s right to withdraw from discussions should operate,
- how and when to test public support to ensure that a community is willing to host a GDF.

NFLA welcomes the clear statement that, regardless of the approach to planning, the GDF development can only go ahead within a willing host community where there has been agreement through a Test of Support.

Paragraph 14 of the consultation document makes clear the Welsh Government's support for building new nuclear power stations at existing sites in Wales, such as Wylfa Newydd. It says that waste and new build waste will need management and eventual disposal, but legacy waste represents by far the largest proportion, over 85% by volume, of the overall inventory for disposal. Yet NFLA Radioactive Waste Management Briefing No.70 argues that volume is not the correct measure to use to assess the likely impact of wastes and spent fuel from a new reactor programme, in terms of its management and disposal. The 'high burn-up fuel' which Wylfa Newydd is expected to use will be much more radioactive than the spent fuel produced by existing reactors like Heysham 1 and 2. So rather than using volume as a yardstick, the Bq amounts of radioactivity in the waste, (which in turn affects how much space will be required in a GDF), is a much more appropriate way of measuring the impact of nuclear waste from new reactors. According to Radioactive Waste Management (RWM) Ltd, the radioactivity from existing waste (i.e. not including new reactors) is expected to be 4,770,000 terabecquerels (TBq) in the year 2200. Wylfa Newydd will generate an estimated 3,801,938TBq over its lifetime. This is about 80% of the radioactivity in existing nuclear wastes. (29)

The Welsh Government says it has carefully considered the BEIS proposals and considers that they are compatible with the needs of communities in Wales, subject to specific arrangements to reflect the different circumstances in Wales. The proposals set out in this consultation for engaging with potential host communities in Wales therefore reflect the proposals in the consultation paper issued by BEIS.

Proposals for Community Investment and Additional Investment are the same in the Welsh Consultation Document as they are in the UK document. Interestingly the word "detriments" does not appear in the UK document, but there is a section on page 11 of the Welsh document with the sub-heading "potential detriments". There is also a section in the Welsh document on radiological issues whereas the UK document focusses much more on the role of regulators.

As far as the English NPS consultation is concerned the Welsh document leaves the situation open ended saying:

*"The planning arrangements in Wales differ to those in England, and further consideration will need to be given to the planning issues affecting the potential siting of a GDF in Wales. The planning responsibility for determining applications for a GDF is devolved and the principal instrument of planning legislation governing the consenting regime for a GDF is the Town and Country Planning Act 1990. In England it is the Planning Act 2008. This does not impact upon the Welsh Government's position that geological disposal can only be delivered on the basis of voluntary partnership with a willing host community or communities."*

It continues:

*"[The] largest infrastructure planning applications in Wales [are] called "developments of national significance (DNS)". It is anticipated that periodic evaluation of the DNS process will be undertaken. This evaluation will include keeping under review the projects which qualify as DNS and the relevant thresholds that may be applicable. ... The Welsh Government therefore considers that a GDF would be a major project and would need to be considered potentially as a DNS. The Welsh Government will not take any decisions about this until it has put forward specific and detailed proposals for consultation, and subsequently considered the results of that consultation."*

The geological screening exercise (see annexe one) has included Wales.

Figure 3 in the UK consultation document which gives a summary of the proposed community engagement within the overall siting process – is included on page 19 of the Welsh document indicating the similarity between the English and Welsh proposals.



The arrangements for Formative Engagement; Engagement Funding; Community Engagement and Community Partnership appear to be broadly similar across the two documents.

The Welsh Government is proposing to use Community Council areas, rather than ward boundaries to define Potential Host Communities. This may lead to a Host Community being established that is too small, both geographically and in terms of the local population. This approach may exclude many people with a clear interest in the proposal. In a similar way to the UK proposals these proposals appear to weaken the power of county councils making it harder for them to prevent a community from agreeing to host the GDF.

The comments above on the Working with Communities consultation are also relevant to any responses to the Welsh consultation.

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## Annexe One – Geological Screening

### 1. Background

The July 2014 'Implementing Geological Disposal' White Paper (1) explained that certain 'Initial Actions' would have to happen before formal discussions between communities interested in hosting a GDF and the delivery body Radioactive Waste Management Limited (RWM) could take place. (2)

These 'Initial Actions' included:

- A National Geological Screening exercise;
- The establishment of a policy framework for planning decisions in England; and
- Development of a process of Working with Communities, including Community Engagement, Community Representation, Community Investment and the Test of Public Support.

RWM has brought together existing geological information across the whole of England, Wales and Northern Ireland. This will give a picture of what's under our feet, which is relevant to the long-term safety of a Geological Disposal Facility (GDF). The study has applied the National Geological Screening – Final Guidance which was published in April 2016 following expert independent review and public consultation. The geological information for 13 British Geological Survey regions is available in an accessible format showing a high-level summary of each region's potential to host a GDF. More detailed knowledge will be needed to identify locations that would definitely be suitable. This study will provide useful information for RWM conversations with any local community that shows an interest in the GDF programme. (3)

Although a few areas in Cumbria had been ruled out by the British Geological Survey (BGS) as geologically unsuitable in RWM's view most of Cumbria was potentially suitable. (4) 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) was only looking for a site which was "*sufficiently good*". RWMD's view was that "*although characterizing and demonstrating safety is more challenging for a comparatively complex site [like sites in West Cumbria] than for a simpler site this does not prevent complex sites from being considered*". (5)

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. (6) Professor Stuart Haszeldine of Edinburgh University, and Emeritus Prof David Smythe of Glasgow University, described Allerdale and Copeland as geologically complex. In their view there is already more than enough information to rule out the area. (7) The geologist, Dr Jeremy Dearlove, acting as a consultant to the West Cumbria Managing Radioactive Waste Safely 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)

Unlike RWM, the local campaign group, Cumbria Trust (CT), argues that since all '*engineered solutions*' will fail on geological timescales, only the best geological solutions should be considered. (9) There needs to be 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.

## **2. Government Response to CoRWM**

CoRWM's Annual Report 2016/17 expressed concern that there could be significant potential for the National Geological Screening Narratives and the Technical Information Reports (TIRs) to be misunderstood and possibly misused by those opposed to a GDF.

The Committee recommended that:

*"Part 1 of RWM's National Geological Screening output should comprise the British Geological Survey's Technical Information Reports; Part 2 should show the relationship of this information to the safety of a GDF and Part 3 should contain information on areas that have been screened out from further consideration."* (11)

The Government has now published its response to CoRWM's Annual Report. (10) There were no great surprises in the response, but there is a little more information on the public outputs expected from the national geological screening exercise.

The Government response said:

*"The National Geological Screening outputs will not definitively rule all areas as either 'suitable' or 'unsuitable'. At the simplest level there will be plain English summaries of the geological information for each region, illustrated with maps showing areas that may include volumes of appropriate lower strength sedimentary rocks (e.g. clay), higher strength rock (e.g. granite) or evaporate rocks (e.g. salt) at the appropriate depths for a Geological Disposal Facility (GDF). These will be accompanied by more detailed regional and sub-regional reports that explain the relationship of the basic geological information to the safety of a GDF in each area. These will also be supported by short, explanatory video clips intended to explain technical terms for non-geologists."*

Radioactive Waste Management (RWM) has indicated that these guides are likely to be published with a suite of other relevant information when they relaunch the siting process.

The Nuclear Free Local Authorities (NFLA) has continued to call 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 this should have taken place before embarking on a National Geological Screening Exercise.

For more information see:

[http://nuclearpolicy.info/docs/radwaste/Rad\\_Waste\\_Brfg\\_60\\_RWM\\_Geological\\_Screening\\_Process.pdf](http://nuclearpolicy.info/docs/radwaste/Rad_Waste_Brfg_60_RWM_Geological_Screening_Process.pdf)

RWM's response is that they need to assess how each barrier performs individually and how they work together as a system. They consider all the pathways by which radioactivity could be released from a GDF and return to the surface environment, through:

- transport in groundwater that flows through the GDF,
- transport in gases generated by the waste,
- human intrusion into a GDF.

See the National Geological Screening Guidance -

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/510678/ngs-guidance.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/510678/ngs-guidance.pdf)

The Guidance identifies geological attributes that are relevant to meeting the safety requirements under five geological topics: rock type, rock structure, groundwater, natural processes and resources. The Guidance lists geological attributes and how they relate to the safety requirements.

Cumbria Trust (CT) argues that RWM downplays the role of geology – its role is vital because 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. (12)

As things stand it is hard not to read the National Geological Screening Guidance as a search for simply adequate geology.

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## Annexe Two: The Copper Corrosion Conundrum

### 1. Background

The Swedish Environmental Court has recently rejected the Swedish Nuclear Waste Company SKB's license application for a final repository for spent nuclear fuel in Forsmark, Sweden. This is a significant triumph for safety and the environment – and for the Swedish NGO Office for Nuclear Waste Review (MKG), the Swedish Society for Nature Conservation (SSNC), and critical scientists. Now it is up to the Swedish government to make a final decision.

The Environmental Court took into consideration viewpoints from all parties in the case, including scientists who have raised concerns about disposing spent nuclear fuel in copper canisters. During the legal proceedings, the Swedish NGO Office for Nuclear Waste Review (MKG) and the Swedish Society for Nature Conservation (SSNC) presented the shortcomings of this method of disposal. For many years, the environmental organisations have been arguing that the Nuclear Waste Company SKB need to listen to critical scientists, and investigate alternative disposal methods, especially the possibility of developing a very deep boreholes disposal system. (1)

Johan Swahn, Director at MKG said:

*“Several independent researchers have criticized both the applied method and the selected site. There is a solid documentation base for the Environmental Court's decision. It is hard to believe the Swedish Government's conclusions will be any different from the Court's.”*

MKG has made an unofficial translation into English of the Environmental Court opinion. (2)

The court said no to the application because it considered that there were problems with the copper canister that had to be resolved now and not later. The translation shows the courts judicial argumentation and why it decided not to accept the regulator's – the Swedish Radiation Safety Authority's (SSM's) - opinion that the problems with the integrity of the copper canister were not serious and could likely be solved at a later stage in the decision-making process. The court is quite clear in its statement and argumentation:

*“The Land and Environmental Court finds that the environmental impact assessment meets the requirements of the Environmental Code and can therefore be approved. All in all, the investigation meets the high standards set out in the Environmental Code, **except in one respect, the safety of the canister.**”* (Emphasis added)

*“The investigation shows that there are uncertainties, or risks, regarding how much certain forms of corrosion and other processes can impair the ability of the canister to contain the nuclear waste in the long term. Overall, these uncertainties about the canister are significant and have not been fully taken into account in the conclusions of SKB's safety analysis. The Land and Environmental Court considers that there is some leeway for accepting further uncertainties. The uncertainties surrounding certain forms of corrosion and other processes are, however, of such gravity that the Court cannot, based on SKB's safety analysis, conclude that the risk criterion in the Radiation Safety Authority's regulations has been met. In the context of the comprehensive risk assessment required by the Environmental Code, the documentation presented to date **does not provide sufficient support for concluding that the final repository will be safe in the long term.**”* (Emphasis added)

The court says that the application is only permissible if the nuclear waste company SKB:

*“...produces evidence that the repository in the long term will meet the requirements of the Environmental Code, despite remaining uncertainties regarding how the protective capability of the canister may be affected by: a. corrosion due to reactions in oxygen-free water; b. pit corrosion due to reaction with sulphide, including the contribution of the sauna effect to pit corrosion; c. stress corrosion due to reaction with sulphide, including the contribution of the sauna effect to stress corrosion; d. hydrogen embrittlement; e. radioactive radiation impact on pit corrosion, stress corrosion and hydrogen embrittlement.”*

The main difference between the court's and the regulator's decision-making was that the court decided to rely on a multitude of scientific sources and information and not only on the material provided by SKB. It had also been uncovered that the main corrosion expert at SSM did not want to say yes to the application at this time that may have influenced the court's decision-making. In fact there appear to have been many dissenting voices in the regulator despite the regulator's claim in the court that a united SSM stood behind its opinion.

The court underlines in its opinion that the Environmental Code requires that the repository should be shown to be safe at this stage in the decision-making process, i.e. before the government has its say. The court says that some uncertainties will always remain but it sees the possible copper canister problems as so serious that it is not clear that the regulator's limits for release of radioactivity can be met. This is a reason to say no to the project unless it can be shown that the copper canister will work as intended. The copper canister has to provide isolation from the radioactivity in the spent nuclear fuel to humans and the environment for very long time-scales.

It is still unclear how the process will proceed. The community of Östhammar has cancelled the referendum on the repository, as there will be no question from the government in the near future. The government has set up a working group of civil servants to manage the government's handling of the opinions delivered by the court and SSM. SKB has said that it is preparing documentation for the government to show that there are no problems with the canister. Whether the government thinks this will be enough remains to be seen. This is likely not what the court had in mind. The government would be wise to make a much broader review of the issue. There is a need for a thorough judicial review on the governmental level in order to override the court's opinion. Otherwise the government's decision may not survive an appeal to the Supreme Administrative Court

There are eminent corrosion experts who believe that copper is a bad choice as a canister material. There is also increasing experimental evidence that this is the case. The court's decision shows the importance of democratic and open governance in environmental decision-making. It is important that the continued decision-making regarding the Swedish repository for spent nuclear is transparent and multi-faceted. (3)

## 2. Copper Canisters

The canister has to enclose the nuclear waste for a very long; it is the final repository's primary safety function. The canister has a 50 mm thick copper shell with an insert of cast iron. The canister must withstand corrosion and mechanical stress.

The investigation on the capability of the canister is extensive and involves complex technical and scientific issues. These include groundwater chemistry, corrosion processes, as well as creep and hydrogen embrittlement (this latter affects the mechanical strength of the canister). However, the parties taking part in the court proceedings disagreed on several issues crucial to the final repository's long-term security.

The Land and Environmental Court considered the following uncertainties regarding the canister to be most important in the continued risk assessment:

- **General corrosion** due to reaction in oxygen-free water. The parties have different views on scientific issues surrounding this kind of corrosion. The Court found that there is considerable uncertainty on this topic that has not been taken account of in SKB's safety analysis.
- **Local corrosion** in the form of pit corrosion due to reaction with sulphide. The Court found that there is significant uncertainty regarding pit-corrosion due to reaction with sulphide. This uncertainty has not been included in the safety analysis. In addition, there is uncertainty about the sauna effect, which may have an amplifying effect on pit corrosion.
- **Local corrosion** in the form of stress corrosion due to reaction with sulphide. The Court found that there is significant uncertainty regarding stress corrosion due to reaction with sulphide. This uncertainty has not been included in the safety analysis. In addition, there is uncertainty about the sauna effect, which may have an amplifying effect on stress corrosion.



- **Hydrogen embrittlement** is a process that affects the mechanical strength of the canister. The Court found that significant uncertainty regarding hydrogen embrittlement remains. This uncertainty has not been taken account of in the safety analysis.
- **The effect of ionizing radiation** on pit corrosion, stress corrosion and hydrogen embrittlement. There is significant uncertainty regarding ionizing radiation impact on pit corrosion, stress corrosion and hydrogen sprays. This uncertainty has been included to a limited extent in the safety assessment.

Meanwhile, the UK's National Nuclear Laboratory (NNL) is to carry out an expert peer review of a Canadian research programme on microbiologically influenced corrosion of canisters that will be used to dispose of used nuclear fuel. The NNL has been contracted by Canada's National Waste Management Organisation (NWMO) to review its work on the potential for corrosion of the copper-clad canisters. The NWMO is responsible for designing and implementing the safe, long-term management of Canada's used nuclear fuel under a plan known as Adaptive Phased Management. This requires used fuel to be contained and isolated in a deep geological repository, with a comprehensive process to select an informed and willing host for the project.

The used fuel will be isolated from the environment using a series of engineered barriers. Fuel elements comprise ceramic fuel pellets, which are themselves highly durable, contained inside corrosion-resistant zircaloy tubes to make fuel elements. Bundles of fuel elements are placed into large, durable copper-coated steel containers which are designed to contain and isolate used nuclear fuel in a deep geological repository, essentially indefinitely. The canisters will be placed in so-called "buffer boxes" containing by bentonite clay, providing a fourth barrier.

World Nuclear News reports that although copper is highly resistant to corrosion, under anoxic conditions – that is, where no oxygen is present – sulphate-reducing bacteria have the potential to produce sulphide, which can lead to microbiologically induced corrosion (MIC) of copper. Waste management organisations and regulators therefore need to understand the levels of sulphide that will be present in a geological disposal facility, to understand its potential to migrate to the canister surface and the potential for it to cause copper corrosion, the NNL said.

The NWMO has been actively developing computer models that will be used to evaluate the potential for MIC once a disposal site has been selected, and has selected the NNL to carry out a peer review of its work because of the UK laboratory's expertise in the biogeochemical processes that could affect repository performance and in developing computer modelling techniques that simulate the effects of sulphate-reducing bacteria. The work is linked closely with NNL's participation in the European Commission Horizon-2020 MIND (Microbiology in Nuclear waste Disposal) project.

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## NFLA's model response to consultation questions

## UK Government radioactive policy consultation on identifying communities

**1. Do you agree with this approach of identifying communities? Do you have any other suggestions that we should consider?**

The focus of this consultation is solely on finding a site for a geological repository. In the NFLA's view, this is, at best, premature. Given the uncertainties surrounding the implementation of geological disposal, there needs to be a focus on the safe and secure management of wastes in robust interim stores, not just for the period awaiting the opening of a GDF, but also because of a risk of delay or failure in the repository programme. The possibility that storage might be required for the long term or even indefinitely needs to be considered. The NFLA believes the Government should instead be consulting on strategies for interim storage and the implications new nuclear reactors will have for long term storage, including the need to find appropriate and secure locations for spent fuel stores into the far future.

In our view the UK Government should be looking at a system more like the one proposed by the Scottish Government.

CoRWM was clear – the deep 'disposal' of radioactive waste is far from a proven technology. It recommended an intensified programme of research and development into the long-term safety of geological disposal, but also a robust programme of interim storage.

The Nuclear Waste Advisory Associates (NWAA) has produced a list of 100 issues which will need to be resolved before a safety case can begin to be demonstrated. (1) As things stand it is currently not possible to demonstrate with any scientific credibility that radiation doses to people from a GDF would be at an acceptably low level into the far distant future. There are simply too many uncertainties about how packaged nuclear waste will behave underground.

For instance, it is possible that radioactive carbon in methane could breach acceptable dose limits on the surface after that repository has been closed for just 40 years. (2) Large quantities of hydrogen gas are likely to be produced by a disposal facility. Although this gas would not be radioactive, it would present a problem due to the large volumes involved and the resultant need to provide a release pathway in order to avoid a build-up of pressure. Such a release pathway would necessarily also provide an escape route for radionuclides. The provision of such an "escape route" is contrary to the notion of a disposal facility as a sequence of "barriers". Despite the fact that the hydrogen problem has been recognised for over twenty years, it is still not clear whether a hydrogen "over-pressure" would lead to the opening of fractures and the resultant creation of fast migration pathways. Gas release would be determined by the interaction of a number of different processes. Although these processes are understood on an individual basis, their interaction is not.

RWM Ltd says this depends on the design of the engineered system and the characteristics of the surrounding rock. But this will be investigated at a later stage in the programme when potential candidate sites have been identified. (3) Surely this is back to front and we should be carrying out research to discover what the characteristics of a site which could best deal with these gas problems would be, and then looking for such a site.

Another example comes from Sweden where the Environmental Court has recently rejected the Nuclear Waste Company SKB's license application for a final repository for spent nuclear fuel in Forsmark, Sweden. The court said no to the application because it considered that there were problems with the copper canister that had to be resolved now and not later. The court says that some uncertainties will always remain but it sees the possible copper canister problems as so serious that it is not clear that the regulator's limits for release of radioactivity can be met. (4)

Former CoRWM member, Professor Andy Blowers has pointed out that there is little evidence to support the government's claim that effective arrangements will exist to manage and dispose of nuclear waste: "*demonstrating a safety case, finding suitable geology and a willing community are*



*tough challenges and likely to take a long time. The search for a disposal site diverts attention from the real solution for the foreseeable future, which is to ensure the safe and secure management of the unavoidable legacy wastes that have to be managed ...To suggest that a repository is the solution is in the realm of fantasy.” (5)*

There needs to be much more work done before we consider moving ahead with a Geological Disposal Facility. But in the meantime the first step must be to stop producing nuclear waste as soon as possible. CoRWM has said that “...*a solution that is ethically acceptable for dealing with existing spent fuel is not necessarily a solution that would be ethically acceptable for dealing with new or changed materials.” (6)*

**2. Do you agree with the approach of formative engagement? Do you support the use of a formative engagement team to carry out information gathering activities? Are there any other approaches we should consider?**

In NFLA’s view moving now to an approach of formative engagement would be putting the cart before the horse. NFLA continues to call 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 such a debate should have taken place before embarking on a National Geological Screening Exercise. During such a debate RWM could put forward its view was that “*although characterising and demonstrating safety is more challenging for a comparatively complex site [like sites in West Cumbria] than for a simpler site this does not prevent complex sites from being considered”.* (7)

The alternative view that what is required is very simple geology with an absence of major faults and really slow-moving groundwater could also be discussed. (8)

An extensive consultative exercise, along the lines of the CoRWM process prior to 2006, would also be an opportunity to assess the public’s view on the ethics of creating more nuclear waste before we know what to do with existing waste.

**3. Do you agree with this approach to forming a Community Partnership? Are there other approaches we should consider?**

The proposals appear to weaken the power of county councils making it harder for them to prevent a community from agreeing to host the GDF. The consultation document says the final decision will be subject to a “test of public support”, which could be a local referendum. The right to vote in the referendum could be restricted to a small area around the proposed site. The decision on holding a referendum would be taken by a “community partnership” involving representatives from councils, businesses and community groups. (9)

Local Authorities will be concerned that a Potential Host Community (PHC) may be too small, both geographically and in terms of population numbers. The consultation document seems to suggest that a PHC could exclude many people within the same local authority area who have a clear interest in whether the project goes ahead or not. Paragraph 4.18 says a PHC may only be several electoral wards. Furthermore, these ward areas could be contained within one District, County, Combined Authority or Unitary authority or could cross more than one.

Communities along road and rail routes from radioactive waste stores, to any centralised repository should also be part of any Partnership. (11)

**4. Do you agree with the approach to engaging people more widely in the community through a Community Stakeholder Forum? Are there other approaches we should consider?**

The wider the consultation, the better. But this should not just be restricted to people from the Search Area and neighbouring local authority areas.

**5. Do you agree with the proposal for a Community Agreement and what it could potentially include?**

Should a Community Partnership be established it is obviously necessary that both the Partnership and the nuclear waste delivery body are clear about what is expected of them, the ways in which progress can be monitored and assessed, and how disputes can be resolved. Any Agreement needs to be flexible enough to be able to respond to changing circumstances, but it also needs to be able to take account of issues from outwith the immediate concerns of the community in question for instance, the problems associated with transporting waste from the other end of the country, to the lack of scientific research and evidence on processes which may impact public doses on the surface in hundreds of years' time.

**6. Do you agree with the proposed approach to the way community investment funding would be provided? Are there alternatives that we should consider?**

We are aware of comments made by Tim Knowles, who chaired the search process in Cumbria, known as the West Cumbria Managing Radioactive Waste Safely Partnership, has highlighted the government's history of underfunding Cumbria's infrastructure, so that promises of substantial community benefits were treated with understandable scepticism during the last process. This was one of the main reasons Cumbria County Council decided to withdraw from the previous process. (11)

Whilst we agree that the Community Partnership process needs to be properly funded, and any community suffering any detriment from what is proposed to sort of the nuclear industry's legacy problems should be properly compensated, our fear is that communities which do not necessarily host the best geology will volunteer out of economic desperation. The Government should commission research into the potential negative economic impacts for an area of agreeing to host a GDF. It could, for example, reduce tourism or impact on the popularity of certain agricultural and food products.

This goes back to the NFLA call 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. We note that in Finland a long public consultation started from around 100 potential sites, before two were shortlisted for the final siting decision. No direct incentives were offered to host communities. (12) In short, we question whether a site which has been chosen because it has the best geology back-up by superlative scientific research would require extra financial incentives to join the process.

**7. Do you agree with the proposed process for the right of withdrawal? Do you have views on how else this could be decided? Are there alternatives that we should consider?**

The NFLA has serious concerns that communities which volunteer are potentially trapped within the process for up to 20 years. For all the talk of volunteers having a continuous right of withdrawal, the document paints a much darker picture of coercion and a supposed partnership where the real power rests with one party. Paragraph 5.8, for instance seems to suggest that even though a Community Partnership may include parish councillors and other community representatives, once the process has started, they will be powerless to withdraw if the local authority decides it wishes to continue. There could be a partnership of around 12 people, where the 2 or 3 representatives of the local authority can overrule the other 9 or 10 members and force the partnership to continue against their will. This does not sound like an effective partnership in which all views have equal value.

**8. Do you agree with the approach to the test of public support? Do you agree that the Community Partnership should decide how and when the test of public support should be carried out? Do you have views on how else this could be decided? Are there alternatives that we should consider?**

Para 4.87 says there will only be one opportunity for a test of public support in each PHC. During the last MRWS process, there were several tests of public support before moving to the next stage

to ensure that the public view was being represented. This time we have a process which potentially lasts for 20 years and during that time only one test of public support is allowed, and controlled by the local authority. This appears to be intended to take place at the end of the 20 year siting process. So once a local authority has volunteered, the community are in effect locked-in for 20 years if the local authority wishes to continue. During that time there is potential for very significant blight which may damage businesses, particularly those which rely on image such as tourism, and may make some properties unsaleable. It is clearly unworkable for there to be a single test of public support over such a long period.

It appears that this process has been designed to be easy to enter and extremely difficult to leave. Communities may need to exercise extreme caution before volunteering.

**9. Do you feel this process provides suitably defined roles for local authorities in the siting process? Are there alternatives that we should consider?**

See response to question 3.

**10. Do you have any other views on the matters presented in this consultation?**

Local authorities will also be concerned about the idea that anyone can express an interest in initiating a search for a suitable site for a GDF. Paragraph 4.23 discusses this, but doesn't make it very clear how this would work. It would be unfortunate if the Ministry of Defence or Forestry Commission was able to drag a community into a 20 year process against its better judgement.

**Third Party Expert Views**

The UK Government says it "*will ensure that communities will be able to access third party expert views on contested and unresolved technical and/or scientific issues once communities are constructively engaged. There will be an agreed process whereby third party expert views can be accessed from Learned Societies, as was committed to in the 2014 White Paper. The delivery body will produce guidance to help communities understand when and how they can access the process for third party expert views.*" This is unclear. Obviously communities need to be able to access the views of third party experts of their own choosing, and not be restricted to Learned Societies.

- (1) See <http://www.nuclearwasteadvisory.co.uk/wp-content/uploads/2011/06/NWAA-ISSUES-REGISTER-COMMENTARY.pdf>
- (2) C-14: How we are addressing the issues, Nirex February 2006, Technical Note No: Number: 498808 [See p12 (Fig 1)]
- (3) See <http://www.nuclearwasteadvisory.co.uk/wp-content/uploads/2011/06/NDAResponsePart1024.pdf>
- (4) Summary of the court's decision (translation), 180123 >> (MKG's unofficial translation into English) [http://www.mkg.se/uploads/Summary\\_opinion\\_Swedish\\_Environmental\\_Court\\_regarding\\_proposed\\_final\\_repository\\_spent\\_nuclear\\_fuel\\_Forsmark\\_Jan\\_23\\_2018\\_\(unofficial\\_translation\\_MKG\).pdf](http://www.mkg.se/uploads/Summary_opinion_Swedish_Environmental_Court_regarding_proposed_final_repository_spent_nuclear_fuel_Forsmark_Jan_23_2018_(unofficial_translation_MKG).pdf)
- (5) Guardian 24th January 2018 <https://www.theguardian.com/environment/2018/jan/24/exposing-uk-government-folly-of-investment-in-new-nuclear>
- (6) Re-iteration of CoRWM's Position on Nuclear New Build, Gordon Mackerron September 2007. Page 3 [http://webarchive.nationalarchives.gov.uk/20130717140311/http://corwm.decc.gov.uk/assets/corwm/pre-nov%202007%20doc%20archive/doc%20archive/tier%202%20\(7\)%20-%20implementation/tier%203%20-%20implementation%20advice/2162%20-%20corwm%20position%20on%20new%20build%20reiterated.pdf](http://webarchive.nationalarchives.gov.uk/20130717140311/http://corwm.decc.gov.uk/assets/corwm/pre-nov%202007%20doc%20archive/doc%20archive/tier%202%20(7)%20-%20implementation/tier%203%20-%20implementation%20advice/2162%20-%20corwm%20position%20on%20new%20build%20reiterated.pdf)
- (7) The Final Report of the West Cumbria Managing Radioactive Waste Safely Partnership, August 2012 <http://www.westcumbriamrws.org.uk/images/final-report.pdf>
- (8) Cumbria Trust 31st July 2014 <https://cumbriatrust.wordpress.com/2014/07/31/prof-neil-hyattsheffield-university-tells-bbc-radio-4-you-and-yours-listeners-for-a-gdf-we-need-the-geology-to-be-very-simple/>
- (9) Times 26th Jan 2018 <https://www.thetimes.co.uk/edition/news/42m-offer-to-communities-thattake-radioactive-waste-svrjj29nb>
- (10) Watford Observer 5th Feb 2018 <http://www.watfordobserver.co.uk/news/15920008.letter-nuclear-waste-on-roads/>
- (11) Cumbria Trust 15th Jan 2018 <https://cumbriatrust.wordpress.com/2018/01/15/a-change-of-view-for-tim-knowles/>

## **UK Government consultation on a National Policy Statement for a ‘Geological Disposal Facility’**

### **1. Chapter 3 - Does the draft NPS provide suitable direction to the Planning Inspectorate and Secretary of State on the need for geological disposal infrastructure?**

No. The Government is basing the “need” for a GDF on the fact that the Committee on Radioactive Waste Management (CoRWM) recommended geological disposal as the best available option. But CoRWM also made important recommendations which have been ignored.

For instance CoRWM recommended:

*“...an intensified programme of research and development into the long-term safety of geological disposal aimed at reducing uncertainties at generic and site-specific levels, as well as into improved means for storing wastes in the longer term.”*

As former member of CoRWM, Prof Andrew Blowers, has pointed out: *“...demonstrating a safety case, finding suitable geology and a willing community are tough challenges and likely to take a long time. The search for a disposal site diverts attention from the real solution for the foreseeable future, which is to ensure the safe and secure management of the unavoidable legacy wastes that have to be managed.”* (1)

The Draft NPS says the Government believes there is an urgent need for new electricity generation, including new nuclear power, for the UK to meet its climate change objectives:

*“It is Government policy that new nuclear power should be able to contribute as much as possible to the UK’s need for new capacity. New nuclear power stations will help to ensure a diverse mix of technology and fuel sources, which will increase the resilience of the UK’s energy supply.”*

Yet the Government presents no evidence to support its case that there is a need for new nuclear power stations. And it ignores CoRWM’s view that its *“...recommendations are directed to existing and committed waste arisings ... the political and ethical issues raised by the creation of more wastes are quite different from those relating to committed – and therefore unavoidable –wastes”*. (2)

And in September 2007 CoRWM said: *“To justify creating new spent fuel from an ethical point of view, there must be a management solution that is ethically sound, not just least bad. ... In short, a solution that is ethically acceptable for dealing with existing spent fuel is not necessarily a solution that would be ethically acceptable for dealing with new or changed materials.”* (3)

The draft NPS on Geological Disposal is based on the false premise that there is a “need” for new nuclear power stations. Energy efficiency has already reduced electricity consumption by 30% compared with what it was expected to be in 2017 at the time that Hinkley Point C was first mooted, and the reductions are expected to continue.

So, in CoRWM’s view, whilst it might be necessary to search for a more permanent management solution for existing nuclear waste, it is not ethically sound *“to compound the problem by a new-build programme that will result in vastly increased radioactivity from spent fuel and other highly radioactive wastes ...”* (4)

### **2. Chapter 4 - Do the assessment criteria adequately address the principles that the developer, the Planning Inspectorate and the Secretary of State should take into account in an application for development consent? If not, what further information on the assessment criteria is required?**

Any assessment of large infrastructure projects should look at alternative options. According to Radioactive Waste Management Ltd, the radioactivity from existing waste (i.e. not including new

reactors) is expected to be in the year 2200. The waste inventory in 2200 after a 16GW programme of new reactors would be around 27.3 million TBq – almost a six-fold increase. Potential host local authorities have no way of knowing how much waste they are volunteering to accept. (5) The proposed 16GW nuclear programme could be followed by another generation of reactors or a string of Small Modular Reactors. And there will be questions over how much say will be given to adjacent local authorities impacted by waste being transported to a GDF.

Whilst it may not be possible to avoid the need to manage existing waste with a radioactive inventory of 4.8 million terabecquerels (TBq), it would be perfectly feasible to avoid producing another 22.5 million TBq.

**3. Does the draft NPS appropriately cover the impacts of geological disposal infrastructure and potential options to mitigate those impacts? Please provide reasons to support your answer.**

Some of the main impacts of the GDF infrastructure in the immediate future will probably involve the transport and storage of waste on the surface and any associated packaging facilities which could be built near the head-end works. There could be, for example, considerable quantities of spent fuel stored on the site at any one time awaiting emplacement in the repository. It is not clear from the list of topics in chapter 5 whether this includes the potential for accidents or malicious attack, radioactive discharges to the atmosphere, the impact of leaks from transport containers enroute to the facility and the health of workers at the facility.

Another issue not addressed is the management of material (rock and soil) generated from construction of the surface facilities and the underground vaults. This is likely to be significant.

As suggested above there should be an appraisal of the negative socio-economic impacts of large infrastructure development such as:

1. The impact on rents and homelessness of a large influx of construction workers;
2. The impact on local businesses of the sudden short-term availability of higher paid jobs leading to local skill shortages;
3. The possible increase in unemployment at the end of the construction period;
4. The possible reduction in the establishment of new businesses because some companies no longer want to move to an area closely associated with nuclear waste disposal;
5. The impact on tourism (a) because tourists no longer want to visit an area closely associated with nuclear waste and (b) because of the lack of cheap short-term accommodation during the construction period;
6. The potential impact of certain agricultural and food products because consumers no longer want to buy products from an area so closely associated with nuclear waste disposal.

**4. Do you agree with the findings (of ‘likely significant effects’) from the Appraisal of Sustainability Report and the recommendations for enhancing the positive effects of the draft NPS? Please provide reasons to support your answer.**

The Appraisal of Sustainability starts from the premise that the principle of geological disposal of higher activity radioactive waste has already been established and is therefore not the subject of this Appraisal of Sustainability. The draft National Policy Statement is intended to support the delivery of a GDF in a timely manner.

In the NFLA view any Appraisal of Sustainability should take the opportunity to look at alternative options. In this case the alternatives would be the passively safe, above ground monitorable retrievable storage of existing waste. The future generation of 22.5 million TBq. of waste should be compared with a non-nuclear energy policy which produces no such waste.

**5. Do you agree with the conclusions of the Appraisal of Sustainability Report? If not, please explain why.**

We note that the Appraisal of Sustainability (AoS) argues that there 'are no reasonable alternatives at a strategic level to meeting the need for geological disposal'.

NFLA does not accept this. It notes the quite separate development by the Scottish Government for 'near site, near surface' facilities for the management of its higher activity radioactive waste as an obvious alternative. NFLA has noted in detail above its concern with deep geological disposal and for the far more urgent need for interim solutions for managing radioactive waste.

- (1) Guardian 24th January 2018 <https://www.theguardian.com/environment/2018/jan/24/exposing-uk-government-folly-of-investment-in-new-nuclear>
- (2) Managing our Radioactive Waste Safely, CoRWM, July 2006. Para 26 [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/294118/700\\_-\\_CoRWM\\_July\\_2006\\_Recommendations\\_to\\_Government\\_pdf.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/294118/700_-_CoRWM_July_2006_Recommendations_to_Government_pdf.pdf)
- (3) Re-iteration of CoRWM's Position on Nuclear New Build, Gordon Mackerron September 2007. Page 3 [http://webarchive.nationalarchives.gov.uk/20130717140311/http://corwm.decc.gov.uk/assets/corwm/pre-nov%202007%20doc%20archive/doc%20archive/tier%202%20\(7\)%20-%20implementation/tier%203%20-%20implementation%20advice/2162%20-%20corwm%20position%20on%20new%20build%20reiterated.pdf](http://webarchive.nationalarchives.gov.uk/20130717140311/http://corwm.decc.gov.uk/assets/corwm/pre-nov%202007%20doc%20archive/doc%20archive/tier%202%20(7)%20-%20implementation/tier%203%20-%20implementation%20advice/2162%20-%20corwm%20position%20on%20new%20build%20reiterated.pdf)
- (4) Guardian 24th January 2018 <https://www.theguardian.com/environment/2018/jan/24/exposing-uk-government-folly-of-investment-in-new-nuclear>
- (5) Geological Disposal: An overview of the differences between the 2013 Derived Inventory and the 2010 Derived Inventory, RWM Ltd July 2015 <https://rwm.nda.gov.uk/publication/differences-between2013-and-2010-derived-inventory/>

## Welsh Government communities consultation

**1(a)** Do you agree with the proposed approach of identifying communities? Do you have any alternative solutions that we should consider?

NFLA welcomes the Welsh Government's clear statement that, regardless of the approach to planning, the GDF development can only go ahead within a willing host community where there has been agreement through a Test of Support.

However, the focus of the Welsh Government's consultation, like the parallel consultation of the UK Government, is solely on finding a site for a deep underground geological repository. The Welsh Government also expressly notes its support for the development of new nuclear power stations in Wales, and it is actively supporting the development of such facilities in Wylfa.

In the NFLA's view, this consultation in seeking to identify communities is, at best, premature. Given the uncertainties surrounding the implementation of geological disposal, there needs rather to be a focus on the safe and secure management of wastes in robust interim stores, not just for the period awaiting the opening of a GDF, but also because of a risk of delay or failure in the repository programme. The possibility that storage might be required for the long term or even indefinitely needs to be considered. The NFLA believes the Welsh Government should instead be first consulting on strategies for interim storage and the implications new nuclear reactors will have for long term storage, including the need to find appropriate and secure locations for spent fuel stores into the far future.

In our view the Welsh Government should also be looking at a system more like the one proposed by the Scottish Government, and NFLA is disappointed the Welsh Government has not sought to research this option.

As NFLA have noted to the UK Government, and reiterated here, the recommendations of CoRWM were clear – the deep 'disposal' of radioactive waste is far from a proven technology. It recommended an intensified programme of research and development into the long-term safety of geological disposal, but also a robust programme of interim storage.

NFLA also note that the Nuclear Waste Advisory Associates (NWAA) has produced a list of 100 issues which will need to be resolved before a safety case can begin to be demonstrated. (1) As things stand it is currently not possible to demonstrate with any scientific credibility that radiation NFLA Radioactive Waste Briefing 71 – UK & Welsh radioactive waste policy

doses to people from a GDF would be at an acceptably low level into the far distant future. There are simply too many uncertainties about how packaged nuclear waste will behave underground.

For instance, it is possible that radioactive carbon in methane could breach acceptable dose limits on the surface after that repository has been closed for just 40 years. (2) Large quantities of hydrogen gas are likely to be produced by a disposal facility. Although this gas would not be radioactive, it would present a problem due to the large volumes involved and the resultant need to provide a release pathway in order to avoid a build-up of pressure. Such a release pathway would necessarily also provide an escape route for radionuclides. The provision of such an “escape route” is contrary to the notion of a disposal facility as a sequence of “barriers”. Despite the fact that the hydrogen problem has been recognised for over twenty years, it is still not clear whether a hydrogen “over-pressure” would lead to the opening of fractures and the resultant creation of fast migration pathways. Gas release would be determined by the interaction of a number of different processes. Although these processes are understood on an individual basis, their interaction is not.

RWM Ltd says this depends on the design of the engineered system and the characteristics of the surrounding rock. But this will be investigated at a later stage in the programme when potential candidate sites have been identified. (3) Surely this is back to front and we should be carrying out research to discover what the characteristics of a site which could best deal with these gas problems would be, and then looking for such a site.

Another example comes from Sweden where the Environmental Court has recently rejected the Nuclear Waste Company SKB’s license application for a final repository for spent nuclear fuel in Forsmark, Sweden. The court said no to the application because it considered that there were problems with the copper canister that had to be resolved now and not later. The court says that some uncertainties will always remain but it sees the possible copper canister problems as so serious that it is not clear that the regulator’s limits for release of radioactivity can be met. (4)

Former CoRWM member, Professor Andy Blowers has pointed out that there is little evidence to support the government’s claim that effective arrangements will exist to manage and dispose of nuclear waste: “*demonstrating a safety case, finding suitable geology and a willing community are tough challenges and likely to take a long time. The search for a disposal site diverts attention from the real solution for the foreseeable future, which is to ensure the safe and secure management of the unavoidable legacy wastes that have to be managed ...To suggest that a repository is the solution is in the realm of fantasy.*” (5)

There needs to be much more work done before Wales / UK Governments should consider moving ahead with a Geological Disposal Facility. But in the meantime the first step must be to stop producing nuclear waste as soon as possible. CoRWM has said that “*...a solution that is ethically acceptable for dealing with existing spent fuel is not necessarily a solution that would be ethically acceptable for dealing with new or changed materials.*” (6)

**1(b)** Do you agree with the proposals for an independent chair and independent facilitators and evaluators to help with the formative engagement activities? Are there any other approaches we should consider?

**1(c)** Do you agree with the proposed membership of the formative engagement team? Are there any other potential members that should be considered? Please give your reasons for proposing additional members.

In the NFLA’s view moving now to an approach of formative engagement in Wales would be putting the cart before the horse. NFLA continues to call 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 such a debate should have taken place before embarking on a National Geological Screening Exercise. During such a debate RWM could put forward its view was that “*although characterising and demonstrating safety is more challenging for a comparatively complex site [like sites in West Cumbria] than for a simpler site this does not prevent complex sites from being considered*”. (7)



The alternative view that what is required is very simple geology with an absence of major faults and really slow-moving groundwater could also be discussed. (8)

An extensive consultative exercise, along the lines of the CoRWM process prior to 2006, would also be an opportunity to assess the public's view on the ethics of creating more nuclear waste before we know what to do with existing waste.

2. Do you agree with the proposed approach for defining a Search Area? Are there any other approaches we should consider?

The wider the consultation, the better. But this should not just be restricted to people from the Search Area and neighbouring local authority areas.

3. Do you agree with the proposed approach to forming a Community Partnership that is supported by a Community Stakeholder Forum? Are there other approaches we should consider?

Should a Community Partnership be established it is obviously necessary that both the Partnership and the nuclear waste delivery body are clear about what is expected of them, the ways in which progress can be monitored and assessed, and how disputes can be resolved. Any Agreement needs to be flexible enough to be able to respond to changing circumstances, but it also needs to be able to take account of issues from outwith the immediate concerns of the community in question for instance, the problems associated with transporting waste from the other end of the country, to the lack of scientific research and evidence on processes which may impact public doses on the surface in hundreds of years' time.

4. Do you consider the process outlined in paragraphs 100 – 102 and detailed elsewhere in the consultation paper provides a suitably defined role for relevant local authorities in the siting process? Are there alternatives that we should consider?

In the NFLA's view, the arrangements for Formative Engagement; Engagement Funding; Community Engagement and Community Partnership appear to be similar across the UK and Welsh Government documents.

Our comments made in questions 1 – 3 above outline our views on the siting process.

5. Do you agree that, in Wales, the community council area or group of community council areas should be the basis for identifying a potential host community? Are alternative ways of identifying the boundary of a potential host community preferable? Please give your reasons.

NFLA notes with concern that the Welsh Government is proposing to use Community Council areas, rather than ward boundaries to define Potential Host Communities. This may lead to a Host Community being established that is too small, both geographically and in terms of the local population. This approach may exclude many people with a clear interest in the proposal. In a similar way to the UK proposals NFLA believe the Welsh Government's proposals appear to weaken the power of county councils making it harder for them to prevent a community from agreeing to host the GDF.

Local Authorities will be concerned that a Potential Host Community (PHC) may be too small, both geographically and in terms of population numbers. The consultation document seems to suggest that a PHC could exclude many people within the same local authority area who have a clear interest in whether the project goes ahead or not.

Communities along road and rail routes from radioactive waste stores, to any centralised repository should also be part of any Partnership.

6. Do you agree with the proposed approach to the way community investment funding would be provided? Are there alternatives that we should consider?



We are aware of highly relevant comments made by Tim Knowles, who previously chaired the search process in Cumbria, known as the West Cumbria Managing Radioactive Waste Safely Partnership, has highlighted the UK Government's history of underfunding Cumbria's infrastructure, so that promises of substantial community benefits were treated with understandable scepticism during the last process. This was one of the main reasons Cumbria County Council decided to withdraw from the previous process. (11)

Whilst NFLA agrees that the Community Partnership process needs to be properly funded, and any community suffering any detriment from what is proposed to sort of the nuclear industry's legacy problems should be properly compensated, our fear is that communities which do not necessarily host the best geology will volunteer out of economic desperation. The Welsh Government should commission research into the potential negative economic impacts for an area of agreeing to host a GDF. It could, for example, reduce tourism or impact on the popularity of certain agricultural and food products.

This goes back to the NFLA call 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. NFLA note that in Finland a long public consultation started from around 100 potential sites, before two were shortlisted for the final siting decision. No direct incentives were offered to host communities. (12) In short, NFLA questions whether a site which has been chosen because it has the best geology back-up by superlative scientific research would require extra financial incentives to join the process.

7. Do you agree with the proposed arrangements for managing community investment funding? Are there alternatives that we should consider?

Please note our response to question 6.

8. Should the arrangements to provide communities with access to third party expert views, outlined in the UK Government and the Northern Ireland administration jointly issued 2014 White Paper and discussed above, be extended to include communities in Wales?

The UK Government says it "*will ensure that communities will be able to access third party expert views on contested and unresolved technical and/or scientific issues once communities are constructively engaged. There will be an agreed process whereby third party expert views can be accessed from Learned Societies, as was committed to in the 2014 White Paper. The delivery body will produce guidance to help communities understand when and how they can access the process for third party expert views.*" This is unclear. Obviously communities need to be able to access the views of third party experts of their own choosing, and not be restricted to Learned Societies. The Welsh Government should clarify this matter before extending it to include communities in Wales.

9. Is it appropriate for the Community Partnership to decide whether to exercise the right of withdrawal and put the question to the community? Do you have views on how else this could be decided?

The NFLA has serious concerns that communities which volunteer are potentially trapped within the process for up to 20 years. For all the talk of volunteers having a continuous right of withdrawal, the documents presented by the Welsh and UK Governments paint a much darker picture of potential coercion and a supposed partnership where the real power rests with one party. For example, Paragraph 5.8 of the UK Government's parallel consultation seems to suggest that even though a Community Partnership may include parish councillors and other community representatives, once the process has started, they will be powerless to withdraw if the local authority decides it wishes to continue. There could be a partnership of around 12 people, where the 2 or 3 representatives of the local authority can overrule the other 9 or 10 members and force the partnership to continue against their will. This does not sound like an effective partnership in which all views have equal value.

NFLA seek assurances from the Welsh Government that this would not be the case in the Community Partnership.

10. A test of public support must take place in the potential host community before a GDF can be developed. Is it appropriate that the Community Partnership should decide how and when the test of public support should be carried out? Do you have views on how else this could be decided?

NFLA refer to the UK Government consultation, Paragraph 4.87; that says there will only be one opportunity for a test of public support in each PHC. NFLA note that during the last MRWS process in Cumbria, there were several tests of public support before moving to the next stage to ensure that the public view was being represented. This time NFLA notes a process which potentially lasts for 20 years and during that time only one test of public support is allowed, and that controlled by the local authority. This appears to be intended to take place at the end of the 20 year siting process. So once a local authority has volunteered, the community are in effect locked-in for 20 years if the local authority wishes to continue. During that time there is potential for very significant blight which may damage businesses, particularly those which rely on image such as tourism, and may make some properties unsaleable. It is clearly unworkable for there to be a single test of public support over such a long period.

It appears that this process has been designed to be easy to enter and extremely difficult to leave. Communities may need to exercise extreme caution before volunteering. The Welsh Government needs to urgently resolve this real concern in the view of the NFLA.

11. Do you have any other views on the matters presented in this consultation?

Local authorities will be concerned about the potential idea that anyone can express an interest in initiating a search for a suitable site for a GDF noted in the parallel UK Government consultation. It would be unfortunate if government owned land or privately owned land was able to drag a community into a 20 year process against its better judgement.

***References noted are the same as for the UK communities consultation noted above.***