

Nuclear Free Local Authorities **RADIOACTIVE WASTE POLICY**

Briefing No.51 – Welsh radioactive waste policy

Prepared for NFLA member authorities, June 2014

Review of Current Welsh Policy on the Disposal of Higher Activity Radioactive Waste (HAW)

1. Purpose of report and overview of consultation

This report has been developed by the NFLA Secretariat to provide a model response for NFLA members to the Welsh Government's review of its policy on the disposal of higher activity radioactive waste. NFLA Welsh Forum members are encouraged to submit an individual Council response reflective and supportive of this NFLA model response. The response will be adapted as a generic NFLA response to the consultation.

The Welsh Government has launched a call for evidence to seek the views of stakeholders about whether it should review the current Welsh Government policy on the disposal of HAW, and if so the options it should consider.

Stakeholders are invited to respond to this call for evidence by responding to this consultation document:

<http://www.wales.gov.uk/consultations/environmentandcountryside/disposing-of-higher-activity-radioactive-waste/?lang=en>

Completed responses need to be submitted by **24th June 2014**, either by e-mail to RPPmailbox@wales.gsi.gov.uk or by post to: People and Environment, Radioactive Waste, Welsh Government, Cathays Park, Cardiff, CF10 3NQ

If responding to the consultation, Councils need to state whether they wish the response to be made public.

2. Background to the Welsh Government Policy

In the 2008 White Paper - *Managing Radioactive Waste Safely (MRWS): a Framework for Implementing Geological Disposal* – (1) the then Welsh Assembly Government reserved its position on geological disposal and neither supported nor opposed the policy, while stating its intention to continue to play a full part in the MRWS programme in order to secure the long term radioactive wastes, to ensure the implementation of a framework appropriate to the needs of Wales and to ensure that the interests of Wales are taken into account in the development of policies in this area.

The Assembly Government also supported the Committee on Radioactive Waste Management's (CoRWM's) recommendations regarding the safe and secure interim storage of waste, maintaining the security of such storage against terrorist attack, and the need for research and development to support the optimised management and disposal of waste.

The Assembly Government also stated that, should a community within Wales wish to put forward an Expression of Interest in potentially hosting a geological disposal facility, it should do so to the Welsh Assembly Government. If this were to happen the Assembly Government would at that point consider its position in respect of the geological disposal programme and the specific Expression of Interest.

The Welsh Government considers now is the right time to review its policy for the following reasons:

- (1) The Welsh Government is now actively supporting the construction of new nuclear reactors at Wylfa on Anglesey.
- (2) The Spent Fuel and Radioactive Waste (SF&RW) Directive (Directive 2011/70/Euratom), which came into force in 2011 requires Member States to establish and maintain a national policy for the safe and responsible management of radioactive waste be implemented through a national programme and to report on that programme by 23 August 2015.
- (3) DECC is restarting the siting process in England following the closure of site selection discussions in Cumbria.

3. Introduction to the NFLA Model response

Nuclear Free Local Authorities (NFLA) believes that nuclear waste management policy should be governed by a clear set of environmental principles. The box below shows the principles agreed at the NFLA AGM in 2004.

Environmental Principles

The NFLA Steering Committee agreed a set of clear environmental principles which should be used for the management of nuclear waste in October 2004 at its Annual General Meeting in Hull. These are:

- **The idea that radioactive waste can be "disposed" or be rejected in favour of radioactive waste management;**
- **Any process or activity that involves new or additional radioactive discharges into the environment be opposed, as this is potentially harmful to the human and natural environment;**
- **The policy of 'dilute and disperse' as a form of radioactive waste management (i.e. discharges into the sea or atmosphere) be rejected in favour of a policy of 'concentrate and contain' (i.e. store safely on-site);**
- **The principle of waste minimisation be supported;**
- **The unnecessary transport of radioactive and other hazardous wastes be opposed;**
- **Wastes should ideally be managed on-site where produced (or as near as possible to the site) in a facility that allows monitoring and retrieval of the wastes.**

'Disposal' implies getting rid of something, but placing waste in a Deep Geological Facility is simply moving the waste from the surface environment to an underground environment. It does not 'get rid of' the waste. Key to the philosophy of deep geological disposal is that it removes a burden from future generations. But this would only be the case if radionuclides do not leak at a faster rate than expected. It may, in fact, create a significant burden for future generations if radionuclides leak faster than expected.

There are two main reasons NFLA opposes deep disposal. Firstly, making a safety case for deep disposal relies on computer models which purport to show that radionuclides will only leak from a disposal site at a sufficiently slow rate to limit the doses to members of the public living nearby to an acceptably low level. These predictions are far too uncertain. The rate of leakage may turn out to be much faster than expected. If the waste has been irretrievably buried, the problem of radionuclides leaking at a faster rate than expected could not be rectified. This means a Geological Disposal Facility (GDF) could create a leaking nuclear waste dump, representing a significant but unquantifiable burden for future generations rather than removing a burden from them through 'disposal', as was argued by CoRWM in arriving at its disposal recommendation. It would be far better to leave them the option of managing the waste in the way they see fit.

Secondly, even if the predictions turn out to be correct, there is no 'safe' dose of radiation, and there are huge uncertainties involved in deciding what dose members of the public actually receive and what the health impact of those doses might be. The methodology used in deciding the dose of an individual is quite complicated, and is derived using computer models. The cumulative uncertainty in dose estimates could be large as recognised by the Committee Examining Radiation Risks of Internal Emitters (CERRIE) in 2004. (2) In other words, even if the deep disposal models are correct, future generations would be committed to a radioactive burden which they might decide is unacceptable, but there would be very little they could do about it if deep disposal goes ahead.

4. UK Government Policy

The June 2008 White Paper on "A Framework for Implementing Geological Disposal" (3) set out an approach to the siting of a geological disposal facility (GDF) based on voluntarism and partnership.

This process failed, partly because of the intractability and complexity of the nuclear waste problem, but also because of the Government's refusal to accept most of the recommendations of its own advisory committee – the first Committee on Radioactive Waste Management (CoRWM 1).

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. 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. (4)

5. Response to Consultation Questions

Q1. Should the Welsh Government review its current policy on HAW disposal?

NFLA agrees that the Welsh Government should review its policy. Although the Welsh Government has reserved its position on geological disposal, it has been playing a full part in the MRWS process. This process has clearly failed.

The Welsh Government should examine why the MRWS process failed.

The UK Government's recent consultation following this failure focussed solely on finding a site for a geological repository rather than looking at why the process had failed. (5)

In the NFLA view one of the main reasons why the process has failed is because the Government has ignored most of CoRWM's original recommendations.

Geological disposal purports to involve immobilising radioactive waste within multiple, engineered barriers, and then isolating it deep inside a suitable rock formation to ensure that no harmful quantities of radioactivity ever reach the surface environment. But radioactive chemicals can migrate from a repository by dissolving in underground water or by being carried to the surface through rock fractures as a gas. This involves complex chemical and geological processes.

The government and its agencies have so far failed to demonstrate an ability to gather enough accurate information to enable a sufficiently rigorous calculation of the extent to which radioactive chemicals will escape from a GDF – and hence they are unable to provide a robust safety evaluation and give adequate assurances on health impacts and environmental contamination that a GDF may pose to affected communities.

It is impossible to demonstrate with any scientific credibility that radiation doses to people from a nuclear waste repository would be at an acceptably low level into the far distant future, if there is such uncertainty on how nuclear waste will behave underground. For instance, methane and carbon dioxide will be produced in bulk in a GDF and the extent to which these gases are radioactive will depend on how much radioactive carbon is in the waste. Originally it was thought that these gases would combine with cement placed around waste drums, but now it is thought that this won't happen with methane. This serves to illustrate the huge uncertainties involved in estimating the behaviour of radioactive chemicals underground.

The Radioactive Waste Management Directorate (RWMD) has listed 900 outstanding scientific and technical issues which need to be resolved. However, because 400 of these were internally raised and work on resolving them is already in-hand they were removed, leaving 500 issues listed in a March 2012 RWMD report. (6) The process of resolving the 900 issues needs to be much more open and transparent.

CoRWM was aware of the uncertainties surrounding the implementation of geological disposal. It expressed the view that 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 Geological Disposal Facility (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.

CoRWM was clear that 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.

CoRWM also said it **did not** want its recommendations to be seen as a green light for new nuclear reactors.

"New build wastes would extend the timescales for implementation possibly for very long but essentially unknowable, future periods. Further, the political and ethical issues raised by the creation of more wastes are quite different from those relating to committed – and therefore unavoidable – wastes. Should a new build programme be introduced, in CoRWM's view it would require a quite separate process to test and validate proposals for the management of wastes arising" (7)

It is also worth remembering that spent fuel from new reactors may require storage for up to 100 years after the end of generation, to enable an adequate cooling period before it can be emplaced in a GDF. This means, for example, that interim storage may be required on Anglesey for up to 160 years if new reactors are built at Wylfa. (8)

The NFLA believes the UK and Welsh Governments 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. The first step in any new process must be to develop a comprehensive programme of research and development into examining the uncertainties of disposal, research into the concept of retrievability and improving robust interim storage. Technical and scientific uncertainties as well as ethical issues should be examined in a process which is accessible and open to scrutiny.

Optimum or adequate geology?

Another reason why the process failed was because of a lack of discussion and agreement about whether the key factor was to look for the best type of geology to contain radioactive waste, or whether the geology just needs to be adequate with more reliance placed on engineered barriers.

The leader of Cumbria County Council at the time of the decision to withdraw from the process was Councillor Eddie Martin. He said:

“The key question for us ... is whether or not Cumbria is the optimum location.” (9)

Clearly the County Council’s view was that Cumbria is not the optimum location.

The Government’s view is that *“there is no ‘best’ or ‘most suitable’ generic type of geology”* and that *“engineered elements can be tailored”* to meet the requirements of different geologies. It was clear in the West Cumbria Managing Radioactive Waste Safely Partnership Report that the Nuclear Decommission Authority’s (NDA) Radioactive Waste Management Directorate (RWMD) (now Radioactive Waste Management Ltd) is only looking for a site which is *“sufficiently good”*. RWMD’s view was that *“although characterising and demonstrating safety is more challenging for a comparatively complex site [as sites in West Cumbria would be geologically speaking] than for a simpler site this does not prevent complex sites from being considered”*. (10)

A recent letter from the former leader of Cumbria County Council, Eddie Martin, in his role as Chair of the newly formed local group Cumbria Trust, to CoRWM members discusses the importance of the geological barrier and the current emphasis there appears to be from RWM Ltd on engineered barriers. Eddie Martin concludes that:

“With so much scientific uncertainty and, indeed, scientific conflict of opinion there are clearly multiple assurances yet to be made and many caveats yet to be heeded before the public can be entirely confident that a GDF, anywhere in the UK, is the optimum solution to the permanent disposal of HLW ... We remain unconvinced, therefore, that engineered solutions can be tailored to fit the geology.” (11)

The Cumbria Trust, like the NFLA, has consistently argued for a national geological survey to identify the most geologically suitable potential sites for radioactive waste disposal in England (and Wales) as, indeed, did the vast majority of responders to DECC’s recent consultation exercise.

In the NFLA’s view the Welsh Government should withdraw its support from the current MRWS process until it is made clear that the objective is to look for the best available geology for the job rather than making use of mediocre geology and relying more heavily on engineered barriers.

Q2. CoRWM carried out extensive work before recommending geological disposal in its report in 2006 and confirmed that recommendation in 2013. In the light of this if the Welsh Government reviews its current policy should it limit its consideration of disposal options for HAW to geological disposal?

It is clear from CoRWM’s 2006 report that geological disposal is viewed by CoRWM as the “least worst” option. Its ***second recommendation which is often overlooked*** is that:

“...uncertainties surrounding the implementation of geological disposal, including social and ethical concerns, lead CoRWM to recommend a continued commitment to the safe and secure management of wastes that is robust against the risk of delay or failure in the repository programme”.

The idea that geological disposal is the best available policy, but is still a far from ideal solution to the problem, is the reason why CoRWM said the creation of more wastes raises new ethical issues.

Whilst it may not be necessary to look again at most of CoRWM’s long list of options, it is for this reason that NFLA would urge the Welsh Government to look in detail at the development of the well considered policy to managed Higher Activity Waste in Scotland. It emphasises that other solutions are available.

Scottish Government Higher Activity Waste Implementation strategy

In January 2011 the Scottish Government published its Higher Activity Radioactive Waste Policy. (12) This states that the long-term management of higher activity radioactive waste should be in near-surface facilities. Facilities should be located as near to the site where the waste is produced as possible. Developers will need to demonstrate how the facilities will be monitored and how waste packages, or waste, could be retrieved. All long-term waste management options will be subject to robust regulatory requirements.

The Scottish Government has been developing a Strategy to implement the policy. To achieve this it convened a Project Management Board which included members from a wide range of stakeholders including the Scottish Councils Committee on Radioactive Substances (SCCORS) and NFLA.

It is expected that the Scottish Government will publish a consultation document on its proposed implementation strategy during the summer.

How Wales compares with Scotland

Scotland has two Magnox nuclear power stations at Hunterston and Chapelcross and two AGR stations, at Hunterston and Torness, as well as a nuclear research site at Dounreay. Scottish policy also covers some waste at the Rosyth Royal Dockyard, but not the HAW which is expected to arise from dismantling submarines at the base, which is being dealt with in a different policy process led by the Ministry of Defence.

Similarly, Wales is the site of two Magnox stations, but there are no AGR stations or nuclear research sites located in the country.

In Scotland the total reported volume of radioactive waste at 1 April 2013 and in estimated future arisings is 264,000m³. Most waste is from Dounreay and the Magnox power station sites at Chapelcross and Hunterston. In summary:

Scotland	Volume at 1 st April 2013 plus estimated future arisings.	Packaged Volume
HLW	Nil	Nil
ILW	25,600m ³	41,200m ³
LLW & VLLW	237,000m ³	LLW 271,000m ³
		VLLW 1040m ³

In Wales the total reported volume of radioactive waste at 1 April 2013 and in estimated future arisings is 131,000m³. In Wales nearly all waste is from the Magnox power station sites at Trawsfynydd and Wylfa. There is a small amount of ILW generated at the Cardiff GE Healthcare plant. In summary:

Wales	Volume at 1 st April 2013 plus estimated future arisings.	Packaged Volume
HLW	Nil	Nil
ILW	14,200m ³	22,300m ³
LLW & VLLW	117,000m ³	LLW 133,000m ³
		VLLW 40m ³

So the HAW arisings in Wales (22,300m³), once packaged, will be around half the volume of the HAW arisings in Scotland (41,200m³). (13)

A significant portion of HAW waste in Scotland will not arise for many years because under current planning assumptions Magnox reactors will be left in place for several decades to allow radioactivity to decay before they are dismantled. The most significant HAW produced at Scottish sites will be irradiated graphite and this will not arise until after 2080. Graphite accounts for 45% of Scotland's HAW.

In Wales Trawsfynydd will be only the second UK site to enter the care and maintenance phase, in 2016. Final Site Clearance is expected at Trawsfynydd in 2073. (14) Final Site Clearance at Wylfa isn't expected until 2091. (15) Unlike Scotland, Wales has no raffinate or plutonium contaminated waste, so an even higher proportion of HAW arising will be accounted for by irradiated graphite which will not arise until 2070-2090.

By the time the care and maintenance phase begins at Trawsfynydd (2016) and Wylfa (2025) all the early arisings of HAW will have been placed in interim storage.

A recent NDA options paper pointed out that dissolution of Fuel Element Debris (FED) is not considered to be an appropriate treatment for FED at Trawsfynydd, due to progress already made in the construction of interim waste storage facilities. (16)

FED is not generated at Wylfa because desplitting of spent fuel elements is not undertaken at the site.

Q3. If the Welsh Government should consider disposal options other than geological disposal what should these be?

NFLA recommends that the Welsh Government looks in detail at Scottish Government policy on HAW. (17)

The Scottish Government Policy is that the long-term management of higher activity radioactive waste should be in near-surface facilities. Facilities should be located as near to the site where the waste is produced as possible. Developers will need to demonstrate how the facilities will be monitored and how waste packages, or waste, could be retrieved.

Although the term "near-surface disposal facilities" is used, the word 'disposal' is used simply to indicate that waste is being placed in a facility without the intention to retrieve it. But this does not mean the waste cannot be retrieved if that proves necessary – it just means there is no present intention to retrieve it. (paragraph 2.04.26) The Chair of CoRWM pointed out at a recent meeting in Workington, Cumbria, that the term "disposal" is used in Scotland as a legal term to mean the transfer of waste.

*"...Scottish Government Policy at the present time is that long-term **storage is still the primary** long-term management option"* (paragraph 2.04.03) (emphasis added by NFLA). (18)

6. Conclusions

In this model response, NFLA has made five specific arguments on the review of Welsh Government HAW policy:

- HAW arisings in Wales, once packaged, will be around half the volume of the HAW arisings in Scotland. A significant proportion of this waste will not arise until Final Site Clearance at the two Welsh reactor sites in 2073 and 2091 in any case. By the time the care and maintenance phase begins at Trawsfynydd in 2016 and Wylfa in 2025 all the early arisings of HAW will have been placed in interim storage, so there is no need to rush decisions and, for instance, start emplacing waste in a deep geological repository with inadequate geological barriers.
- The Welsh Assembly Government should investigate why the MRWS process has failed. NFLA believes the process has failed partly because it has ignored most of the recommendations of CoRWM in particular that there should be an intensified programme of research and development into the long-term safety of geological disposal, as well as research on a robust programme of interim storage. There are currently too many uncertainties about how packaged nuclear waste will behave underground.

- The MRWS process also failed because it did not start with a debate about whether we should be looking for the most suitable geology for radioactive waste disposal. Experience from Cumbria suggests that the public wants to see the best geological barriers AND engineered barriers, not simply adequate or poor geology with a greater reliance on engineered barriers. At the very least the Welsh Assembly Government should withdraw from the MRWS process until it is made clear that the objective is to look for the best available geology for the job rather than making use of mediocre geology and relying more heavily on engineered barriers.
- The Welsh Assembly Government should implement CoRWM's recommendation that a quite separate discussion should be held on the political and ethical issues raised by creating new wastes by building new reactors. In any case spent fuel from the new reactors proposed for Wylfa will need to be stored for up to 100 years before it can be emplaced in a geological disposal facility.
- **NFLA recommends that the Welsh Government adopts the Scottish Government policy on HAW:**

"...that the long-term management of higher activity radioactive waste should be in near-surface facilities. Facilities should be located as near to the site where the waste is produced as possible. Developers will need to demonstrate how the facilities will be monitored and how waste packages, or waste, could be retrieved."

7. References

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- (4) C-14: How we are addressing the issues, Nirex February 2006, Technical Note No: Number: 498808[See p12 (Fig 1)]
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<http://councilportal.cumbria.gov.uk/documents/s17776/Minutes%2030012013%20Cabinet.pdf>

- (10) The Final Report of the West Cumbria Managing Radioactive Waste Safely Partnership, August 2012 <http://www.westcumbriamrws.org.uk/images/final-report.pdf>
- (11) A letter to the members of CoRWM (Committee on Radioactive Waste Management) from CT chairman Eddie Martin. Cumbria Trust 10th May 2014. <http://cumbriatrust.wordpress.com/2014/05/11/a-letter-to-the-members-of-corwm-committee-on-radioactive-waste-management-ct-chairman-eddie-martin/>
- (12) Scotland's Higher Activity Radioactive Waste Policy, Scottish Government, January 2011 <http://www.scotland.gov.uk/Resource/Doc/338695/0111419.pdf>
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