Department for
Business, Energy
& Industrial Strategy

IMPLEMENTING GEOLOGICAL DISPOSAL: PROGRESS REPORT

April 2017 - April 2019

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Introduction

In its November 2010 response to the House of Lords Science and Technology Select Committee's report Radioactive Waste Management: a Further Update (March 2010), the UK Government committed to producing an annual report to Parliament, setting out progress in relation to the management of higher activity radioactive waste.

This document sets out progress made in relation to the management of higher activity radioactive waste for the period April 2017 to April 2019. Following the publication by BEIS of the updated policy framework for higher activity radioactive waste in December 2018, and the launch of the process to identify a location to develop a geological disposal facility (GDF), this will be the last report produced under our 2010 commitment. Moving forward, as the siting process continues to develop, we expect future updates on the progress of more specific areas of activity to be led in a timely manner by Radioactive Waste Management (RWM), as the delivery body for a GDF.

Background

Since 2006 it has been the UK Government's policy to manage higher activity radioactive waste through geological disposal as recommended by the Committee on Radioactive Waste Management.

Geological disposal involves isolating radioactive waste within an engineered, multi-barrier underground facility, typically between 200 metres and 1,000 metres deep, inside a suitable rock formation, to ensure no harmful quantities of radioactivity ever reach the surface environment.

There is general agreement internationally that geological disposal provides the safest long-term management solution for higher activity radioactive waste. Other countries that are progressing plans to implement geological disposal include Canada, Finland, France, Switzerland, Sweden and the USA.

The UK Government continues to favour a consent-based process for identifying a site for geological disposal as set out in Implementing Geological Disposal - Working with Communities: An updated framework for the long-term management of higher activity radioactive waste, which was published in December 2018. This publication marked the launch of a new process to identify a location to develop a geological disposal facility.

Progress with implementation of Geological Disposal Policy

During the period covered by this report the UK Government has made significant progress on delivering the outstanding initial actions set out in the 2014 White Paper, Implementing Geological Disposal.

These initial actions were:

- Developing land-use planning processes;
- Preparing to work with communities and;
- National Geological Screening.

In January 2018, the UK Government published a draft National Policy Statement (NPS) for geological disposal infrastructure, which proposed the policy framework for planning decisions in England. The draft NPS underwent Parliamentary Scrutiny during the summer of 2018. Following this, the revised NPS is due to be laid in Parliament shortly. The preparation and publication of a draft NPS for consultation marked the completion of the initial action on national land-use planning.

A draft policy that described the process for working with communities in order to identify a suitable location to develop a GDF, Working with Communities, was published for consultation in January 2018, jointly by the UK Government and the Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland. The UK Government published its final policy in December 2018 in Implementing Geological Disposal - Working with Communities: An updated framework for the long-term management of higher activity radioactive waste. It reiterates the Government's overarching policy framework on implementing geological disposal including the policy for how RWM will engage with local authorities and communities in England to identify a suitable location for a GDF.

This policy sets out how communities that participate in the process:

- can benefit from early investment;
- can withdraw from the process;
- must indicate they are willing to host a GDF through a Test of Public Support before RWM seeks development consent.

The UK Government and DAERA also published separate summaries of responses to the consultation on their respective websites in December 2018[1],[2]. The responses demonstrate that there was broad support in England for the general approach on engaging with communities. However, there were views that the Government should provide more clarity on some parts of the process, particularly in relation to the role of local authorities and this was addressed in the final policy.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766661/Summary_of_responses_to_the_consultation_working_with_communities_-_Implementing_geological_disposal-rev.pdf
[2] https://www.daera-ni.gov.uk/articles/radioactivity

Future policy decisions in relation to geological disposal in Northern Ireland would be a matter for the Northern Ireland Executive, which is currently suspended. Accordingly, in the continued absence of the Executive, no further policy commitments can be given with respect to Northern Ireland at this time.

The Welsh Government consulted in parallel on a similar process for engaging with communities in Geological Disposal of Radioactive Waste: Working with Communities. The consultations closed in April 2018. The Welsh Government published its final policy on the arrangements for community engagement in Wales in January 2019.

Scottish Government policy is that the long-term management of higher activity radioactive waste should be in near-surface facilities. While the Scottish Government does not support deep geological disposal for Scotland, it continues, along with the UK Government and other devolved administrations, to support a robust programme of interim storage and an ongoing programme of research and development.

RWM completed its national geological screening exercise and has published the outcomes. This is discussed in the Update from RWM section of this report.

All the initial actions in the 2014 White Paper have now been completed and a new siting process in England was launched in December 2018 and in Wales in January 2019.

Update from RWM

National Geological Screening

During the period covered by this report, RWM completed the commitment to undertake national geological screening (NGS), working closely with the British Geological Survey (BGS). The NGS summarises the geology of England, Wales and Northern Ireland that is relevant to the safe disposal of higher-activity radioactive waste, and brings together existing information on:

- rock type – where rocks which may be suitable to host a GDF are located within the depth range of interest (between 200 metres and 1,000 metres below the surface);
- rock structure – the locations of major faults and highly folded zones;
- groundwater – including the presence of aquifers, and the geological features and rock types which may indicate the separation of deep and shallow groundwater systems;
- natural processes – the distribution of earthquakes and extent of past glaciations; and
- resources – the locations of existing deep mines, intensely deep-drilled areas, and potential for future exploration or exploitation of resources.

These topics were selected because the information enables an understanding of how effectively the geology could contain and isolate radioactive waste. The exercise provides an assessment of the geology in each region which is relevant to the safety of a GDF, although more detailed knowledge will be needed to identify suitable locations.

The underpinning geological information has been collated and reported by the BGS as Technical Information Reports (TIRs) for each of the 13 geological regions of England, Wales and Northern Ireland used by the BGS in their Regional Guides. Although the geological screening outputs include Northern Ireland because this was a commitment in the 2014 White Paper issued by the UK Government and the Northern Ireland Executive, they will only be used initially for England and Wales. Future policy decisions in relation to geological disposal in Northern Ireland would be a matter for the Northern Ireland Executive, which is currently suspended.

RWM has interpreted the geological information provided by the BGS for each region in terms of its relevance to the safety of a GDF. RWM's screening outputs are in the form of narratives, maps and videos. These outputs summarise the conclusions for different regions and subregions. The publication by RWM of the outputs from the national geological screening exercise marks the completion of the initial action on national geological screening.

Update on Siting Process Launch 2018/19

The publication of updated UK Government policy on geological disposal in Implementing Geological Disposal: Working with Communities in December 2018 marked the launch of the GDF siting process in England. In Wales, the siting process was launched by the Welsh Government's publication of its Working with Communities policy in January 2019. To support

the launch of the siting process, RWM published information for communities in England and Wales, including:

- Introduction to Geological Disposal;
- Community Guidance;
- The outputs from national geological screening;
- RWM's Site Evaluation consultation for England and Wales, which sets out how RWM plans to evaluate prospective sites for a GDF.

RWM's Introduction to Geological Disposal is a short, easy-to-read leaflet that explains the concept of geological disposal and how communities can benefit from being involved in the siting process.

RWM's Community Guidance documents for England and Wales provide detailed information on how RWM will work with, and support, communities that participate in the siting process. The siting process could take up to 20 years, during which time RWM would conduct detailed technical work at potential sites to assess their suitability. There will be a wide range of support available to communities that wish to explore what a GDF might mean for their community. The guidance documents suggest how the funding available to communities could be used to fund projects, schemes or initiatives that provide economic development opportunities, enhance the natural and built environment, or improve community well-being.

RWM's Site Evaluation consultation documents for England and Wales aim to bring together the key policy, legislative and regulatory requirements that will apply at various points throughout the siting process in order to support a consistent and understandable approach to the evaluation of sites which may be considered to host a GDF. The documents set out RWM's proposed six Siting Factors and underpinning Evaluation Considerations. The consultations on how RWM will evaluate prospective sites for a GDF ran from December 2018 to March 2019 in England, and from January to April 2019 in Wales. RWM organised a series of events across England and Wales to help people understand the context of RWM's proposed approach to Site Evaluation.

Organisational Change

During 2018/19, RWM undertook a detailed review of the organisational design required for the delivery of the RWM Mission, including the GDF Programme. The review considered what the demands will be of RWM, how these will change as the programme develops and what operating models will be required.

As well as this forward review RWM has significantly invested in the skills and capabilities required in the current phase of the siting process with significant recruitment made to the relevant teams through an increase in employees and also, where required, resources have been introduced from the supply chain. This has also included a comprehensive development programme for staff engaged in this area covering both technical awareness and high performing teams training. Over the last two years RWM has significantly enhanced its capabilities in community and stakeholder engagement and communications. RWM now has fully populated Stakeholder, Engagement and Communications teams and for 2019/20, RWM will review capabilities both in the front line teams and also in the supporting functions.

Update from the Regulators

The independent regulators (the Office for Nuclear Regulation, and the relevant environment agencies[3] - the Environment Agency and Natural Resources Wales) are responsible for ensuring that any future GDF meets the required high standards for protecting people and the environment when it is being developed and constructed, while it is operating, and after it has closed.

Regulation of the development, operation and eventual closure of a GDF will take place in a staged manner. Initial permission is required relatively early on for intrusive surface-based investigations, and in due course for underground investigations, construction and operation. The developer is not able to progress from one stage to the next without first securing the relevant permissions it needs. The purpose of this staged approach to regulation is to ensure that at all times the development is undertaken safely and securely, and in ways that ensure proper protection of people and the environment without inadvertently undermining the long-term performance of the facility.

The relevant environment agency will regulate the development, operation and closure of any future GDF to ensure protection of people and the environment. The Environment Agency published guidance on how a GDF would be regulated in England in September 2018. This would be under the Environmental Permitting (England and Wales) Regulations 2016. The formal regulatory process for geological disposal will start when the developer decides there is a need for intrusive surface-based investigations such as drilling boreholes. At this stage, the developer will need to apply to the relevant environment agency for an environmental permit prior to undertaking any such works.

A GDF would be a nuclear site, licensed under the Nuclear Installations Act 1965. This means that it will be the role of the Office for Nuclear Regulation to ensure that any future GDF is constructed and operated safety and securely. Prior to construction of a GDF, RWM will be required to have applied for and been granted a nuclear site licence, with the requisite site licence conditions attached, by the Office for Nuclear Regulation. Work is progressing to ensure the relevant regulations are in place, so the Office for Nuclear Regulation has the required legal powers to license a GDF under the Nuclear Installations Act 1965. The Office for Nuclear Regulation published guidance on its regulatory expectations for achieving compliance with the site licence for a future GDF in March 2018.

The regulators are working together and engaging with RWM now to ensure that any future applications for the development of a GDF will take full account of regulatory requirements[4]. In November 2018 the regulators published their assessment of RWM's 2016 generic Disposal System Safety Case, providing advice and comment from their respective regulatory remits. This assessment sits outside regulatory decisions on permitting or licencing a GDF.

They are also working to ensure that the advice RWM currently provides to waste producers, about how they should manage their radioactive waste for future geological disposal, is

[3] A number of environment agencies are responsible for environmental regulation of the nuclear sector within their respective jurisdictions. The Environment Agency is responsible for the enforcement of environmental protection legislation in England, regulating radioactive and non-radioactive discharges and disposals to air, water (both surface and groundwater) and land, including disposal by transfer to another site. This responsibility sits with Natural Resources Wales in respect of Wales.

[4] https://www.gov.uk/government/collections/scrutiny-of-radioactive-waste-management-directorates-rwmd-work

appropriate. The regulators' approach to the regulation of higher activity waste management is described in a joint position statement.

The regulators provided input to the development of policy related to geological disposal by responding to government consultations. Following publication of the updated English and Welsh policies on implementing geological disposal, the regulators published a joint position on geological disposal.

They continue to learn from the experience of their international counterparts in regulating geological disposal and maintain involvement in numerous international collaborations. The regulators are not involved in making decisions about site selection, however they will work with communities, local authorities and others to explain how their work will protect people and the environment, both now and in the future.

Work of the Committee on Radioactive Waste Management (CoRWM)

The Committee on Radioactive Waste Management (CoRWM) is an advisory non-departmental public body, funded by the Department for Business, Energy & Industrial Strategy.

CoRWM provides independent advice to the UK Government and Devolved Administrations on the long-term management of radioactive waste, including the geological disposal of higher activity radioactive wastes.

CoRWM's work during the period covered by this report, 2017 – 2019, is set out in its Work Programmes[5],[6] and its Annual Report. In relation to geological disposal, CoRWM's work focussed on scrutinising and providing advice to the UK Government, Welsh Government and RWM on the following policies and activities on:

- working with communities and communications (to the UK Government, Welsh Government and RWM);
- national geological screening (to RWM);
- the development of a GDF safety case, including the role played by geology and the timescales and cost of site characterisation (to RWM);
- land-use planning and the NPS (National Policy Statement) for Geological Disposal Infrastructure (to the UK Government); and
- on the licensing and regulation of a GDF (to the UK Government).

In addition, CoRWM provided advice on RWM's transition to becoming the delivery organisation for a GDF. It also provided advice to RWM regarding their Letter of Compliance process. This is a process by which waste packages are approved as compliant in their specifications for future management, for example, they are compliant for disposal in a GDF.

At the end of 2018 and beginning of 2019, CoRWM published on its website a series of position papers addressing commonly asked questions about geological disposal. These included:

Why Geological Disposal?
This paper revisits CoRWM's earlier advice on geological disposal and reconfirms CoRWM's position that geological disposal is the best option for disposal of higher activity radioactive waste.

[5] https://www.gov.uk/government/publications/corwms-programme-of-work-2016-19
[6] https://www.gov.uk/government/publications/committee-on-radioactive-waste-management-corwm-programme-of-work-2018-to-2021

Retrievability considerations for geological disposal
This paper reviews CoRWM's 2006 work on retrievability and summarises arguments for and against disposal with retrievability and discusses what issues should be considered in decision making regarding retrievability.

Geological disposal of radioactive waste – safety requirements
This paper is a response to technical safety issues commonly raised. It sets out that the experience gained from the work of RWM, the regulators and CoRWM.

Selecting a GDF site based on the best geology
This paper sets out CoRWM's position that any move away from the UK Government's favoured consent-based siting approach towards 'choosing the best geology' at the start of the siting process is not justified on technical grounds as each geological setting has its advantages and disadvantages.

Radioactive waste: support for disposal rather than indefinite storage
This position paper reflects CoRWM's current position on the disposal of radioactive waste rather than storing it indefinitely.

Transport Considerations for radioactive materials
This paper is a response to arguments that waste should be stored at sites where waste is generated rather than transported for disposal. It sets out why geological disposal is the preferred policy in comparison to ongoing storage.

International Development

Many countries around the world have nuclear power programmes and significant inventories of radioactive waste from the use of radioactive materials in industry, medicine and research. There is general agreement internationally that geological disposal provides the safest long-term management solution for higher activity radioactive waste. Many countries are making progress towards implementing geological disposal. Some examples are given below.

Canada

The Nuclear Waste Management Organisation (NWMO) is continuing its preliminary assessments with communities that have expressed interest in learning more about Canada's plan for the long-term management of spent fuel. Initially, more than twenty communities expressed interest. Site selection is now focussed on five communities in Ontario. In January 2018, NWMO completed drilling its first borehole near Ignace. The purpose of this borehole is to obtain initial core samples and provide access to the rock at depth for further investigations.

Plans for a separate repository (to be located in Ontario) for low and intermediate level radioactive waste have been proposed by Ontario Power Generation and are progressing through the Canadian regulatory process(es).

Finland

Posiva, the organisation responsible for the final disposal of spent fuel in Finland, is a private company owned by the power producers. Posiva has received its construction licence for a disposal facility from the Finnish Government and expects to submit its operation licence application in 2020. Excavation work is underway on the first disposal tunnels at Finland's final disposal facility for spent fuel at Olkiluoto. Waste emplacement is expected to start in the 2020s.

France

The French Waste Management Organisation, Andra, is continuing to develop its licence application for the French GDF, Cigeo. Subject to approvals, the construction of the disposal facility could begin in 2022 and the commissioning, beginning with a pilot industrial phase, could take place in 2025 - 2035. Cigeo will take intermediate and high-level waste. Short-lived intermediate level waste and low-level waste is managed at a separate facility, Aube.

Germany

BGE (the Agency for the Disposal of Nuclear Waste), is the implementation body for all radioactive waste disposal projects in Germany.

In March 2017, the German Parliament, the Bundestag, adopted the StandAG (Repository Site Selection Act). The aim of the Act is to find the best possible repository site for high level waste

and spent fuel. A three-phase site selection process is planned, accompanied by extensive public participation with bodies at regional, inter-regional and national level. Potentially suitable locations for surface exploration are expected to be identified by 2023.

Sweden

In January 2018, the Swedish Radiation Safety Authority (SSM) and the Land and Environment Court (MMD) presented their final review statements to the Government. SSM gave approval to Swedish Nuclear Fuel and Waste Management Company's (SKB) system for final disposal of spent fuel. MMD was positive in several important respects, for example, the issues relating to the selection of the Forsmark site, the rock, the buffer and the environmental impact statement, but it called for more information on specific technical details regarding the copper canister packaging of waste.

SKB submitted additional documentation, including responses to the issues raised by MMD, to the Ministry of the Environment in April 2019 and preparation for a Government decision is now continuing. Before the Government makes a decision, the concerned municipalities must also be consulted, as they have a right of veto. SKB hopes that construction of the Spent Fuel Repository can begin in the early 2020s and will take around ten years to complete.

Switzerland

A site selection process for deep geological repositories for low, intermediate and high-level waste in Switzerland has been underway since 2008. In November 2017, the Swiss Federal Council announced that the Swiss Waste Management Organisation, Nagra, should progress to Stage 3 of its siting process (deep borehole investigations) and that three potential siting regions should be considered: Jura Ost, Nördlich Lägern and Zürich Nordost. Borehole investigations have now begun.

When these investigations have been completed, Nagra will prepare its general licence application, which it expects to submit it by 2024.

USA

The USA has operated since 1991 the Waste Isolation Pilot Plant (WIPP), a GDF in New Mexico for defence-related waste containing long-lived radionuclides.

The USA continues to consider a consent-based approach to siting another disposal facility for used nuclear fuel and high-level radioactive waste. In May 2018, the House of Representatives voted to direct the Department of Energy to resume the licensing process for a nuclear waste facility in Nevada's Yucca Mountain, however funding to revive Yucca Mountain remains in doubt.

Japan

The Japanese Government revised its siting policy for a GDF in 2015. The policy includes three steps: a literature survey, preliminary site investigation, and detailed site investigation.

In July 2017, the Japanese Government released a geoscientific characteristics map to provide a basis for selecting locations for high heat generating waste disposal sites. The map identifies areas as favourable or unfavourable on the basis of the geological characteristics. In addition, it identifies areas that are favourable in terms of transportation from the coast. The government and the Nuclear Waste Management Organization of Japan (NUMO), are now promoting activities to gain public understanding, mainly in those areas whose characteristics have been judged favourable. Identification of a site is expected in the mid-2020s.

Next steps

Land-use planning

BEIS aims to lay the NPS for Geological Disposal Infrastructure in Parliament shortly with the aim of it being designated.

Siting Process

The siting process for geological disposal has now opened in England and Wales. RWM is engaging widely to raise awareness of the siting process and seek to open discussions with interested parties and, in due course, potential host communities. Further information on the siting process is provided in the Update from RWM section of this Report.

Licensing

Work is progressing within Government to ensure the relevant regulations are in place, so the Office for Nuclear Regulation has the necessary powers to license a GDF.

Future of Reporting

This report is part of a commitment made in 2010 to produce an annual report to Parliament, setting out progress in relation to the management of higher activity radioactive waste. This commitment was made in response to recommendations from the House of Lords Science and Technology Select Committee's report Radioactive Waste Management: a Further Update (March 2010).

With the completion of the initial actions as set out in the 2014 White Paper and launch of the siting process in England in December 2018 and in Wales in January 2019, Government is of the view that it has fulfilled its commitments made to the Science and Technology committee in 2010.

This document will be the last report published by Government under this commitment. Future updates on progress will be provided on a more focussed basis by RWM Ltd as the delivery body for a GDF.

This publication is available from: www.gov.uk/government/publications/implementing-geological-disposal-progress-report-april-2017-to-march-2019

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