Development and Delivery of National Strategic Approaches to Radioactive Waste Management in the UK – 16595

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ABSTRACT

The UK has limited capacity for the management of radioactive wastes. Such capacity is needed to enable nuclear and non-nuclear sectors to continue to make responsible use of radioactive substances (eg for healthcare provision) as well as to deliver key objectives such as the decommissioning and clean-up of the civil nuclear legacy. A revision in UK LLW policy in 2007 led to the development of a range of national LLW strategies, each focusing on a particular radioactive waste sector. For various reasons each of the strategies was developed in a different way. The success of these strategies to-date includes the development of a range of new routes for LLW management, greater transparency and understanding of the challenges facing LLW management across the UK, and recognition of priorities for national work, e.g., to address issues such as the management of radioactive asbestos waste and the treatment of metallic radioactive wastes. The work also revealed common issues across each of the waste producing sectors, and the opportunity to improve future waste management through further integration.

INTRODUCTION

Radioactive wastes in the UK are generated from activities in both the nuclear and non-nuclear sectors. The Environment Agency is responsible for radioactive substances regulation in England, Natural Resources Wales for Wales, Scottish Environment Protection Agency for Scotland, and the Northern Ireland Environment Agency in Northern Ireland (which has no nuclear sites). The Office for Nuclear Regulation regulates the accumulation of radioactive wastes at nuclear sites in England, Wales and Scotland. An overview of UK arrangements for radioactive

waste policy development and regulation is provided elsewhere in these proceedings [1].

A decade ago the UK government recognised that the national repository for LLW (the 'LLWR') was rapidly approaching capacity. Much of the waste that was being sent to the LLWR for disposal, primarily from the nuclear industry, was of such a low level of radioactivity that its safe disposal did not depend upon the level of engineering protection available within the LLWR itself. However, at that time no alternative routes were available to the nuclear industry. This meant that UK objectives for the timely decommissioning and clean-up of legacy nuclear sites would be threatened, and furthermore that it could impact on the availability of such a route for safe disposal of LLW from other non-nuclear producers of radioactive wastes (eg hospitals). In response the UK developed and published a revised LLW policy [2].

The revised policy established a number of significant changes, including, for the first time, the ability for the nuclear industry to make use of landfill where appropriate for its disposal of LLW. However, in addition to making provision for diversion of wastes to alternative, more suitable routes, the policy also required dedicated strategies to be developed for LLW management.

DEVELOPMENT AND CURRENT STATUS OF UK RADIOACTIVE WASTE STRATEGIES

Implementation of the UK LLW policy resulted in the development of three strategies for LLW management across the UK. These cover the full scope of LLW produced within the UK: nuclear LLW [3], non-nuclear anthropogenic [4] and naturally occurring radioactive material (NORM) wastes [5].

National Nuclear LLW Strategy

The first strategy developed was the national nuclear LLW strategy. Responsibility for this was given to the Nuclear Decommissioning Authority (NDA), the organisation tasked with delivering decommissioning and clean-up of the legacy civil nuclear industry in the UK, recognising that these activities would generate the bulk of LLW requiring management. A number of projects and initiatives were undertaken to ensure development of a robust strategy. These included: development of a strategic partnership between NDA and LLWR Ltd focussed on delivery and implementation of the strategy; a review of the LLW management in the UK at that time and numerous topic specific studies, a Strategic Environmental Assessment (SEA) to assess the impact of a number of options that the strategy could undertake; and extensive stakeholder engagement, focussed on broad ranging stakeholder group and full public consultation. . The engagement was important to ensure that the strategy was founded upon a common understanding of the issues and challenges meeting the industry, and that it had the support of

key players from across the industry. This early engagement was important in helping secure subsequent participation in the delivery of the strategy, as well as helping to raise the awareness and interest of the supply chain in supporting the development of alternative opportunities for LLW management.

The aim of the strategy was to provide a high level framework within which low level radioactive waste (LLW) management decisions could be taken flexibly to ensure safe, environmentally acceptable and cost-effective management solutions that reflected the nature of the LLW concerned.

Three strategic themes guided its development:

- the waste hierarchy;
- the best use of existing LLW management assets;
- and the need for new fit-for-purpose waste management routes.

The strategy sought to apply the waste hierarchy more effectively to the management of LLW. It established a clear preference for managing LLW at higher levels of the hierarchy, marking a significant shift away from the past focus on disposal. This was key to helping ensure that the UK was able to make the best use of the LLWR – not only extending the UK's capacity for the management of LLW that required that level of engineering protection it provides, but also minimising the cost to the UK tax payer through securing better value management routes and avoiding the unnecessary cost of investment in a new repository. Nonetheless the strategy continued to emphasis the fact that where disposal is deemed necessary, it must be optimised to minimise the overall impact of LLW management on people and the environment.

The strategy was clear in setting the context and need for this change in the approaches to LLW management that had existed previously in the UK, explaining that:

• Waste prevention is a fundamental principle for the operation and decommissioning of nuclear facilities
• There are resource and cost benefits in minimising the amount of LLW we have to manage
• Reuse defers waste production and extends the life of resources
• Recycling is the preferred way forward for the treatment of metallic LLW
• Volume reduction ensures best use of disposal capacity
• Disposal capacity is a precious resource and it must be used sparingly and as a last resort

As well as emphasising the need for planning for LLW, and for decisions to take account of the waste hierarchy, the proximity principle and the need for early solutions, amongst other things, the strategy also highlighted the importance of early dialogue with communities affected by waste management activities.

This first strategy was published in 2010 following public consultation on a draft version. Its subsequent implementation has been managed via a national nuclear LLW programme office, operated by the LLWR on behalf of the NDA. It has governance and oversight mechanisms in place to enable the routine engagement of the nuclear operators and regulators. It has delivered significant improvements in LLW management for the UK, including the diversion of an average of 85% of LLW from the LLWR to alternative, more appropriate management routes, delivering cost savings of over £130 million [6].

National Non-Nuclear LLW Strategy – Anthropogenic

Whilst the key concern that lead to the revision of UK LLW policy had been the concern that UK nuclear decommissioning and clean-up ambitions might be challenged by the limited capacity at the LLWR, during the development of the Government's LLW Policy, the non-nuclear industry reported a reduction in the availability of facilities to take their wastes. There was concern about the continued availability of these facilities as well as the need to transport waste over long distances, and the increased costs and environmental consequences associated with this. Consequently the LLW policy made a commitment to prepare a UK-wide strategy for the management of solid non-nuclear industry LLW, as part of the Government's commitment to produce a UK-wide strategy. This non-nuclear LLW (anthropogenic) strategy was produced, partly fulfilling that commitment. (It did not include Naturally Occurring Radioactive Material (NORM) wastes which were the topic of a subsequent strategy (see below)).

This non-nuclear strategy covered the majority of sectors making up the non-nuclear industry as well as general information applicable to the whole of the non-nuclear industry (including NORM was producers). It expanded upon and explained the concepts in the Policy in more detail, setting out some of its implications for the benefit of a range of stakeholders.

The aim of the strategy was to reduce the fragility of disposal arrangements for the non-nuclear industry by helping to ensure that existing treatment routes were conserved and other appropriate routes to be established or expanded as necessary.

Its development was led by UK government, working with the devolved administrations, each of the environment agencies, and engaging with representatives of the non-nuclear industry through an established route for industry engagement (the Environment Agency's 'Small Users Liaison Group' (SULG) comprising representatives from across the healthcare, research and other non-nuclear industries). The engagement was less extensive than that for the nuclear industry, primarily seeking to provide a framework to enable the waste planning authorities to make accommodation for the disposals of small volumes of

very low level radioactive waste disposal within existing municipal landfills as part of their waste planning provisions generally. The draft strategy was the subject of public consultation prior to a final version being published in 2012.

The strategy has resulted in the inclusion of radioactive wastes within local authority plans for waste management across considerable parts of the UK and ensured that local arrangements continue to exist to provide for the ongoing management of non-nuclear radioactive wastes.

Naturally Occurring Radioactive Material (NORM) Waste Strategy

The publication of the NORM waste strategy completed the production of strategies needed to address the full range of LLW producers across the UK. Its development was led by Scottish Government working with the UK government and the various environment agencies, as well as with representatives of some of the NORM waste producing industries through a Project Board which helped steered the work.

Earlier development of this strategy was hampered by a lack of any comprehensive information across the UK relating to the range of NORM waste producing industries that existed, and the current and expected quantities and characteristics of the NORM wastes that they generated. Significant work was undertaken by SEPA to identify the various organisations involved and, through use of questionnaires and interviews, collate, for the first time, an overview of NORM waste arisings. Consequently a key objective of the eventual strategy is to improve UK understanding of the future arisings of NORM wastes and arrangements for their management.

An industry workshop was held to bring together for the first time the various NORM waste producers and waste management operators, sharing the initial findings of the strategy development team and gathering views on proposals for improvement that were starting to emerge. Public consultation on the draft strategy took place in early 2014 and a final version was published later that year.

FUTURE DEVELOPMENTS

Development of each of the strategies has improved in the UK understanding of the issues and challenges it faces relating to radioactive waste management. They have each addressed key acute issues for the UK – the need to preserve the capacity of the LLWR, the need for better provision within the planning framework for radioactive wastes, and the need for better information on the range and types of radioactive wastes that exist and are forecast to arise in the future. However, the development of each of these strategies has also revealed that none of these issues are themselves relevant only to any one radioactive waste producing sector.

Recognition of this has led to consideration now being given to integration of these waste strategies for LLW, and looking to extend the UK's strategic thinking for radioactive waste management across to the management of higher activity radioactive wastes.

CONCLUSIONS

The development of a strategic approach to radioactive waste management within the UK has brought about significant change in the ways in which radioactive wastes are managed, helping minimise the production of wastes and ensuring that waste producers have access to a range of cost-effective management solutions that offer continued protection of people and the environment as well as helping secure a more resilient infrastructure. Developing the strategies on a sector-by-sector basis helped ensure that the key issues and priorities relevant in each area could be identified and addressed. However, they have also revealed that many of the issues that the strategies are seeking to address are common. Subsequent exploration of opportunities for further integration of the strategies will be explored to consider whether it may enable the UK to develop a more comprehensive radioactive waste inventory and to develop improvements in radioactive waste management through the economies of scale and opportunities that this may reveal.

REFERENCES

1. R. MCTAGGART. The UK's National Policy and Programme for the Management of Spent Fuel and Radioactive Waste - 16574, WM2016.

2. Policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom. UK Government, Scottish Government, Welsh Government, Department of Environment Northern Ireland, 2007

3. UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry, Nuclear Decommissioning Authority, 2010.

4. Strategy for the Management of Solid Low Level Radioactive Waste from the Non-Nuclear Industry in the United Kingdom – Part 1 (anthropogenic radionuclides). UK Government, Scottish Government, Welsh Government, Department of Environment Northern Ireland, 2012.

5. Strategy for the Management of Naturally Occurring Radioactive Material (NORM) waste in the United Kingdom. UK Government, Scottish Government, Welsh Government, Department of Environment Northern Ireland, 2014.

6. LLWR's impact on waste flow, 2009-2015. LLW Repository Ltd 2015.