Nuclear Free Local Authorities

RADIOACTIVE WASTE POLICY

Briefing No.67 – Scottish HAW implementation policy

Prepared for NFLA member authorities, January 2017

Implementation strategy for Scotland's policy on higher activity radioactive waste

A Summary and Overview for member authorities

i. Preamble

This edition of the NFLA Radioactive Waste Policy Briefing gives members an overview of the Scottish Government's plans to implement its policy on the management of Higher Activity Waste. It has been developed by the NFLA Scotland Policy Advisor. The NFLA Scotland Policy Advisor has been involved in the Scottish Government's Project Board looking to implement this policy. The Scottish Government published its plans to implement its Higher Activity Waste policy just before Christmas 2016, and this report considers it in some detail.

1. Introduction

The Scottish Government has published the final version of its Higher Activity Waste Implementation Strategy. It is available here:

http://www.gov.scot/Publications/2016/12/9017

The Implementation Strategy sets out in three phases the work needed to deal with Scotland's radioactive waste legacy.

This Strategy has been developed to support Scotland's Higher Activity Radioactive Waste Policy published in 2011 ("The 2011 Policy"). (1) The 2011 Policy is that 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. For safety reasons, developers will need to demonstrate how the facilities will be monitored and how waste packages, or waste could be retrieved. Unlike the rest of the United Kingdom the Scottish Government does not support deep geological disposal of Higher Activity Waste.

The NFLA published a Policy Briefing in January 2011 which gave a brief assessment of this policy document. It concluded that the Scottish Government had listened to local authorities during the Consultation and taken on board many of the points raised by NFLA and others. (2)

The new Implementation Strategy does not set out to identify new sites for near surface facilities, with long-term management of higher activity radioactive waste continuing to take place in existing facilities. A process for developing a full siting strategy for new facilities is expected to begin after 2030, with construction expected to start on 'disposal' facilities post-2070.

The Strategy has been published following an extensive public consultation exercise (3) and work with the Nuclear Decommissioning Authority (NDA), site stakeholder groups, the Scottish Councils Committee on Radioactive Substances (SCCORS) and the Nuclear Free Local Authorities. The NFLA sent an observer to many of the later meetings of the Scottish Government's Higher Activity Waste Implementation Strategy Project Board which met 9 times between 2009 and 2015.

2. What the Policy and Strategy Cover

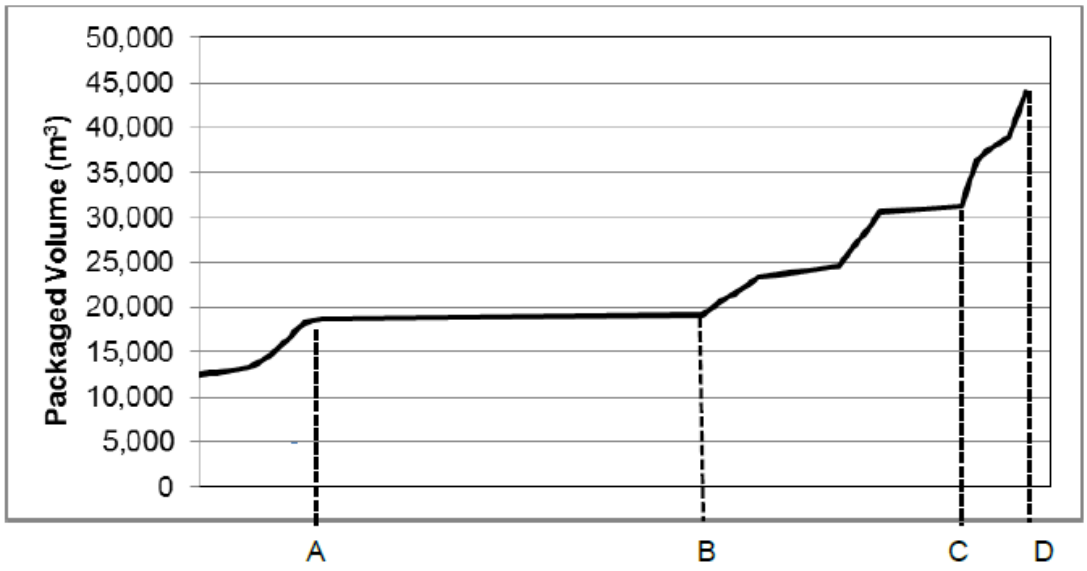
The term Higher Activity Waste (HAW) can be confusing. It cover High Level Waste (HLW), as well as Intermediate Level Waste (ILW) and a small proportion of Low Level Waste (LLW) which is not suitable for disposal at existing low level waste facilities.

There is currently no waste which is officially defined as High Level Waste in Scotland, so the 2011 Policy covers mainly Intermediate Level Waste. Spent Nuclear Fuel is still not classified as waste and continues to be transported to Sellafield for reprocessing or storage. In addition to spent fuel there are other radioactive substances and material which are not currently classified as radioactive waste, such as, plutonium, uranium or other such radioactive fuels and materials. These materials are considered a reserved issue and managed by the UK Government. These are being transported to Sellafield for storage pending disposal in a future Geological Disposal Facility (GDF).

Nor do the Policy and Strategy cover radioactive waste arising at defence establishments not subject to the Radioactive Substances Act 1993 including waste arising at Faslane, Coulport and Vulcan. Nor do they cover HAW arising from the decommissioning and dismantling of redundant nuclear submarines including those berthed at Rosyth.

3. Timelines for Waste Arisings

Figure 1: Indicative timeline for packaged waste arising in Scotland showing key milestones based on the current NDA decommissioning strategy and plans for Scottish EDF Energy sites



A. Torness nuclear power station is currently scheduled to close in 2030, and Dounreay is expected to enter its interim end state around 2030-33 by which time all the HAW will be packaged and placed in two stores on the site. After that all nuclear facilities in Scotland will either be preparing for, or already in, a period of care and maintenance during which time very little extra waste will arise.

B. Around about 2070 – 2085 active decommissioning work will start at Chapelcross and Hunterston A.

C. Active decommissioning work for Hunterston B and Torness won't start until around 2115.

D. By around 2120 final decommissioning and site dismantling should be complete and there will be no further arisings of HAW.

4. Storage vs Disposal

It has long been the contention of the NFLA that a set of clear environmental principles should be used when deciding how to manage nuclear waste. Amongst these is the rejection of the idea that radioactive waste can be 'disposed' of. The dictionary definition of the word 'dispose' is to get rid of something. Clearly it is not possible to 'get rid of' nuclear waste. If radioactive waste is placed in a deep underground geological disposal facility or a near surface facility radioactive substances could eventually leak out and be dispersed throughout the environment.

The Scottish Government's policy, however, has to be read in the context of the European Directive 2011/70/Euratom, which states that:

"*The storage of radioactive waste, including long-term storage, is an interim solution, but not an alternative to disposal*." (4)

'Disposal' is defined in the HAW Strategy as "...*placing the waste in a suitable specialised land-based facility without the intent to retrieve it at a later time*". This does not mean the waste cannot be retrieved if that proves necessary – it just means there is no present intention to retrieve it.

This is taken from the International Atomic Energy Agency's Safety Standards on the Disposal of Radioactive Waste which states that:

"*The term 'disposal' refers to the emplacement of radioactive waste into a facility or a location with no intention of retrieving the waste1. Disposal options are designed to contain the waste by means of passive engineered and natural features and to isolate it from the accessible biosphere to the extent necessitated by the associated hazard. The term disposal implies that retrieval is not intended; it does not mean that retrieval is not possible*." (5)

The IAEA continues: "*By contrast, the term 'storage' refers to the retention of radioactive waste in a facility or a location with the intention of retrieving the waste … The important difference is that storage is a temporary measure following which some future action is planned. This may include further conditioning or packaging of the waste and, ultimately, its disposal*." (6)

It is the view of the NFLA that the use of the term "disposal" in this way is likely to cause public perception problems in 2030 when the search for a site for new facilities begins in 2030. However, the crucial point is that: "***The Policy requires that disposal facilities should be monitored and that there should be a capability to retrieve waste packages and waste if necessary***."

The Implementation Strategy points out that "*Although there is no intention to retrieve the waste, any proposed disposal facilities in Scotland will have to demonstrate 'retrievability'. Retrievability means that, if necessary, waste could be removed from the facility at a later time*."

The Scottish Government says its ethos "*is that radioactive waste should not be considered "out of sight, out of mind" and that there needs to be a continued oversight of the waste whether it is in storage or in a disposal facility*."

It is anticipated that monitoring of a near-surface disposal facility would continue for around 300 years. Thresholds would be set for specific contaminants, and action would be triggered if these are exceeded. But the safety of any future facility should not be reliant on post-authorisation period monitoring – in other words the near surface facility should be designed to contain the waste to the extent possible so that, hopefully, it is never necessary to retrieve the waste.

5. The Three Phases of the Strategy

The Strategy describes the three phases of work and milestones from 2016 to 2070 and beyond. It is important in developing suitable waste management options to set out clear timescales.

A significant proportion of the waste in question will not arise for many years under current planning assumptions. This is mainly due to the current decommissioning plan for Magnox reactors

and AGRs (Advanced Gas-Cooled Reactors) which is to leave these reactors in a 'safe and quiescent state' for several decades until reactor dismantling commences. It also recognises that some HAW in Scotland will require the development of new long-term waste management options.

6. Nuclear Decommissioning

When a nuclear reactor has ceased generating electricity current policy is that it will pass through the following stages:

- Defuelling - fuel is removed from the reactor and transported to Sellafield for reprocessing or storage.
- Care and Maintenance preparations – hazards presented by nuclear materials (sludge/ resins) and conventional hazards, such as asbestos, are removed from the site (Chapelcross and Hunterston A are currently in this phase). Some of these nuclear materials may become Intermediate Level Waste which is a category of HAW.
- Care and Maintenance – the site and reactor buildings are left in a safe state for a number of decades to allow for radioactivity to decay.
- Final Site Clearance - this will involve removal of the remaining wastes/hazards and transfer to a near surface disposal facility. The site will then reach its designated end state.

7. Phase One (2016-2030)

***Hunterston A/ Chapelcross**:* Will continue with preparations for entering the Care and Maintenance phase of decommissioning in 2022 and 2028 respectively. Some HAW will be placed in storage facilities during this phase.
***Dounreay**:* Subject to funding, Dounreay is expected to reach its proposed Interim End State by 2030-2033, by which point all the HAW is expected to be packaged into two storage facilities on the site.
***Hunterston B**:* Will continue operating until 2023 and will subsequently begin work to prepare for the Care and Maintenance phase.
Torness is currently planned to continue generating electricity until 2030 and will subsequently begin work to prepare for the Care and Maintenance phase

During Phase 1, current plans for the construction of first generation interim storage facilities will progress. Storage facilities will be constructed at Dounreay, and Hunterston and Chapelcross, to provide storage capabilities for HAW arising during preparation for Care and Maintenance. Storage facilities are already operating at Hunterston A, accepting Intermediate Level Waste (ILW). An ILW store is also operating at Dounreay.

A significant portion of the HAW waste at Hunterston, Chapelcross and Torness should be suitable for near surface disposal. However, only around 40% of the HAW arising at Dounreay would be suitable due to the relatively high concentrations of long lived alpha-emitting radionuclides. This type of ILW waste will need to be stored until alternative waste management solutions are developed. A research programme to investigate alternative management options for these types of wastes will begin by Phase 2. (This means around 4,745m^3 out of a total Scottish inventory of around 46,577m^3 won't be suitable for near surface disposal)

The area where the NFLA has concerns is the way that the policy proposes to use the waste hierarchy. The policy allows for waste to be sent to another location for treatment, either in Scotland or elsewhere including overseas, subject to any requirements by the relevant regulators in the UK and overseas for the return of the waste. This might include, for example, sending waste oils for incineration to an incinerator in Southampton or sending contaminated metals for decontamination and recycling to Sweden.

8. Phase Two (2030-2070)

Chapelcross and ***Hunterson A*** will be in Care and Maintenance with some HAW in storage.
***Dounreay**:* All HAW will be in storage.
***Torness/Hunterston B**:* Will enter Care and Maintenance early in phase 2.

During this phase little HAW is expected to arise from the sites. The ILW stores built in Phase 1 will be under management by the responsible site mangers.

Plans for the design, siting and construction of second generation storage facilities will be developed. Second generation stores will be required for the safe and secure storage of HAW prior to future disposal facilities being commissioned.

During this period a disposal facility design will be developed and a detailed programme to select a site or sites, including comprehensive stakeholder engagement, will be carried out. This will enable completion of the planning process and construction of a disposal facility early in Phase 3.

The NDA and the Scottish Government will also have to devise a strategy for the HAW which currently understood to be unsuitable for near-surface disposal.

9. Phase 3 - 2070 onwards

Over 60% of Scotland's HAW inventory is expected to arise during this period as **Chapelcross, Hunterston A & B and Torness** enter their final decommissioning phases. The estimated completion date for decommissioning all nuclear sites in Scotland is 2120.

In Phase 3 second generation storage facilities planned during Phase 2 will be constructed for the storage of HAW prior to final disposal routes being available, and construction of near-surface disposal facilities will begin

Wastes that are understood to be unsuitable for near-surface disposal will still require on-going storage prior to a suitable waste disposal solution being selected. It is anticipated that facilities for the management of these wastes will be constructed in Phase 3 upon review of the R&D programmes undertaken in the previous phases. It remains the objective of the Policy to ultimately identify disposal routes for all the wastes.

10. Retaining Skills

Decommissioning and waste management in the future gives rise to a number of challenges in terms of making sure the workforce has the required skills available. Just over the next 15 years, at least 34% of the UK□s nuclear workforce will reach retirement age. Decommissioning in Scotland will be spread over a period in excess of 100 years. During which time operation of remaining reactors will cease, sites will enter Care and Maintenance when not much happens and then final site clearance will begin with reactor dismantlement and waste disposal when a nuclear skilled workforce will be required again. The Scottish Government is committed to working with industry to ensure that Scotland has the skilled workforce required for decommissioning.

11. Policy Review

The 2011 Policy will be subject to regular review at intervals of no more than 10 years. The Strategy will be reviewed at the same time as the Policy. It is possible that there are new scientific advances and technological developments so it might be necessary to assess whether these provide new and better methods of managing radioactive waste. The process to develop the Implementation Strategy has in practice reviewed the 2011 Policy, updating information on the inventory, available technologies and changing site plans. For this reason, the next review of the Policy and Strategy will take place no more than 10 years from the publication of this Strategy (i.e. 2026)

12. Conclusion

The radioactive waste within the purview of the Scottish Government will be placed in near surface facilities as near to the site where it is produced as possible with no intention to retrieve it but where it will be monitored and could be retrieved if necessary.

About 60% of the waste in question will not arise until 2070 and the rest will be managed in purpose built stores on the reactor sites until then.

About 60% of the waste on the Dounreay site is currently thought to be unsuitable to be placed in a near surface facility, but research will be carried out to find a suitable method of management for this waste.

A search for a suitable site or sites for a near surface facility will begin after 2030, but construction will not begin until after 2070. It is anticipated that monitoring of near-surface disposal facilities will continue for around 300 years. Thresholds would be set for specific contaminants, and action would be triggered if these are exceeded. Ease of retrievability, high monitoring standards and low thresholds for contaminants escaping into the environment will further blur the distinction between 'monitorable retrievable storage' and disposal with no intention to retrieve.

By 2120 there should be no further HAW waste arisings in Scotland.

13. References

(1) Scottish Government published its Higher Activity Waste Policy, January 2011 http://www.scotland.gov.uk/Publications/2011/01/20114928/0

(2) Scottish Higher Activity Waste Policy – a brief assessment, NFLA, January 2011 http://www.nuclearpolicy.info/docs/radwaste/Radioactive_Waste_Briefing_27_Scottish_policy.pdf

(3) See HAW Implementation Strategy Consultation Document Consultation Document is available at http://www.gov.scot/Resource/0046/00464771.pdf and NFLA Response to HAW Implementation Strategy Consultation July 2015 http://nuclearpolicy.info/docs/radwaste/Rad_Waste_Brfg_57_Scottish_HAW_consultation.pdf

(4) Council Directive 2011/70/Euratom 19th July 2011 http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0070&from=EN

(5) IAEA Safety Standards on the Disposal of Radioactive Waste, IAEA, 2011 para 1.8 page 3 http://www-pub.iaea.org/MTCD/publications/PDF/Pub1449_web.pdf

(6) ibid para 1.9