

Nuclear Free Local Authorities **RADIOACTIVE WASTE POLICY**

Briefing Number 22 – Scottish waste policy

Prepared for NFLA Scotland members, 22, February 2nd 2009

SCOTLAND'S HIGHER ACTIVITY RADIOACTIVE WASTE POLICY CONSULTATION 2010

1. Introduction

The Scottish Government is consulting on a Detailed Statement of Policy for Scotland's Higher Activity Radioactive Waste. The policy is needed to allow waste owners and producers plan for now and the longer term. The vast majority of the waste is the result of nuclear power generation or research.

There are three documents:-

(1) Scotland's Higher Activity Radioactive Waste Policy Consultation 2010

<http://www.scotland.gov.uk/Resource/Doc/298914/0093253.pdf>

(2) Environmental Report 2010

<http://www.scotland.gov.uk/Resource/Doc/298929/0093254.pdf>

(3) Supplementary Information 2010

<http://www.scotland.gov.uk/Resource/Doc/298942/0093255.pdf>

Consultation responses need to be submitted by **Friday 9th April 2010** and should be sent to:-

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Scotland's Higher Activity Radioactive Waste Consultation
The Scottish Government
Waste and Pollution Reduction Division
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2. Summary of main outcomes from the consultation workshop

- 2.1 In addition to publishing its draft policy, the Scottish Government also held a stakeholder workshop to explain further the nuances of its policy. This was held in Edinburgh on 29th January 2010.
- 2.2 It should be noted that Scottish Government policy, since June 2007 has been to support the long-term management of higher activity radioactive wastes arising in Scotland using long-term near surface, near site storage facilities so that waste is monitorable and retrievable and the need for transporting it over long distances is minimal.
- 2.3 This consultation proposes extending the Policy to include near surface, near site disposal as well as near surface, near site storage. (Consultation Document (CD) para 1.01.02 p6)
- 2.4 Around 25% of the waste in question could not be disposed of in near-surface disposal facilities, and would need to be stored until there are further technological developments. (Environment Report (ER) para 3.22).

- 2.5 The Environment Report makes clear that **disposal will take priority over storage**, (ER p8) although there did not appear to be unanimity amongst officials at the consultation meeting that this is the case.
- 2.6 This does not, however, mean that 75% of the waste would definitely be 'disposed' of. The 75% which might be eligible for disposal is the contaminated metals (14%), activated metals (15%) and graphite (45%). (See pie chart ER p29)
- 2.7 The Near Surface Disposal Facilities on Land for Solid Radioactive Waste – Guidance on Requirements for Authorisation (Near Surface GRA) provides guidance on the approach the regulators will take to application for an authorisation to dispose of waste. (CD para 4.03.09). This says *shorter-lived or less radiotoxic intermediate level waste (ILW)* might be suitable for disposal. (Short-lived means radionuclides with a half life up to around 30 years, and probably includes caesium-137 with a half-life of 30.1 years). While it was confirmed at the consultation workshop that the Near Surface GRA might allow disposal of 'less radiotoxic' long-lived waste, most participants seemed to think it unlikely this would allow all the 75% to be disposed of. 80% of the graphite is long-lived, and although the NDA is looking at treating this graphite to see if it is possible to remove some of the main contaminants (Chlorine 36 and Carbon 14), this work is at an early stage.
- 2.8 Since the Near Surface GRA also covers England and Wales, a question was posed about whether all the waste destined for near surface disposal in Scotland would also end up in near surface disposal in England and Wales. The answer was 'no', some of it would go to a deep geological facility.
- 2.9 Although the consultation documents are not sufficiently clear on retrievability, it was generally agreed at the workshop that the ability to retrieve the waste would be a requirement of any proposal for a near surface disposal site. Looking at Figure 9 of the Environmental Report (p54) this seems to suggest the near surface disposal sites would be at point 2 or 3 on the chart. The important distinction between 'disposal' and storage in this context is that there is 'no intention to retrieve' the waste.
- 2.10 The possibility of changing the name of a 'near surface disposal site' which contains only short-lived waste with a half-life of less than 30 years (which would, therefore be almost no longer radiotoxic after 300 years) to a 'near surface storage site' which may eventually become a disposal site, in recognition of the retrievability, would legally not allow the regulators to make sure there was an adequate disposal safety case.
- 2.11 On the waste hierarchy and contaminated metal 'recycling', it was pointed out that there was a conflict here between the environmental benefits of recycling the metals and the ALARA (As Low As Reasonably Achievable) principle because of the radioactive discharges to the environment inherent in the decontamination process.
- 2.12 It was also mentioned at the workshop that the National Planning Framework (1) states that a low level waste disposal facility, in addition to the one at Dounreay, will be needed in the South of Scotland for radioactive waste.

3. What waste does the Scottish Policy cover?

- 3.1 This policy does not cover spent fuel from nuclear reactors operating in Scotland. This material is not officially classified as radioactive waste – "*because of the potential value to the owners of plutonium and uranium derived from reprocessing spent nuclear fuel*" (2). Para 4.03.02 explains that the policy does not cover the reprocessing of spent fuel. Spent fuel from Scottish nuclear reactors is transported to Sellafield for reprocessing - a chemical separation process to remove plutonium and unused uranium leaving high level liquid waste. No opinion is expressed about this practice. Instead the document says there is no High Level Waste (HLW) in Scotland. It does, however, refer to waste which resulted from the now closed reprocessing facilities at Dounreay, which was, until recently, classified as

HLW. This waste has now cooled down sufficiently to allow it to be reclassified as ILW. (para 2.01.05).

3.2 The consultation document does not take up an earlier suggestion from the Nuclear Legacy Advisory Forum (NuLEAF) that a question is included about whether Vitrified High Level Waste (VHLW) at Sellafield which originated in Scotland should be repatriated. The implication is that the VHLW at Sellafield that arises from the reprocessing of spent fuel from reactors in Scotland will be stored at Sellafield pending disposal to a Geological Disposal Facility (GDF). (3)

3.3 The policy doesn't cover waste from the decommissioning and dismantling of nuclear submarines either. (para 2.01.04)

4. Policy changes

4.1 Scottish Government policy, since June 2007, has been to support the long-term management of higher activity radioactive wastes arising in Scotland using long-term near surface, near site storage facilities so that waste is monitorable and retrievable and the need for transporting it over long distances is minimal.

4.2 The Consultation Document says "*engagement with stakeholders on the Waste arising in Scotland has ... identified the option for extending the Policy to include near surface, near site disposal as well as near surface, near site storage.*" (Para 1.01.02 p6) A question arises about who these stakeholders are.

4.3 In the Proposed Detailed Policy Statement, this translates into: "*The Scottish Government Policy for the Waste is to: support long-term near surface, near site storage and disposal facilities....*" (para 6.02.01)

4.4 The Environment Report makes clear that disposal will take priority over storage:

"Research has suggested that storage infers a greater and unacceptable burden on future generations (as compared to disposal) ...where disposal in near surface facilities is feasible, the Scottish Government considers it to be a preferred alternative at this stage. As this cannot be achieved for all types of Waste, storage options have also been included within the Policy". (p8) (Emphasis added)

4.5 The only explanation for this rather dramatic policy U-turn is that "*engagement with stakeholders ... has demonstrated that there may be alternative methods for dealing with some types of ...waste.*" (para 3.02.01)

4.6 The Environment Report also makes clear that it is relying on the Committee on Radioactive Waste Management's (CoRWM's) report to Government when it says "*Research has suggested that storage infers a greater and unacceptable burden on future generations (as compared to disposal), and that it carries additional security and health risks.*" (para 3.21)

4.7 This fails to acknowledge CoRWM's recognition of the uncertainties surrounding disposal and the need for continued research.

4.8 Disposal is defined as no "intent to retrieve". (i.e. not the usual dictionary definition of disposal which is "to get rid of" which is, of course, in the context of the bio & geospheres, impossible). (Consultation Document p26)

4.9 The Environment Report goes on to say that "*the concept of retrievability is built into the Policy as a requirement [but] this could mean that disposal facilities can still be backfilled and sealed.*" It is left up to the regulators to decide when a disposal facility is capable of closure. (para 4.06)

5. What kind of waste is the Scottish Government talking about?

- 5.1 The Near Surface Disposal Facilities on Land for Solid Radioactive Waste – Guidance on Requirements for Authorisation (Near Surface GRA) provides guidance on the approach to regulation. This document was produced jointly by SEPA, the EA and the Northern Ireland Environment and Heritage Service. (Para 4.03.09) (4)
- 5.2 This says: “Types of solid radioactive waste that might be suitable for disposal in near-surface facilities include very low level waste (VLLW), low level waste (LLW), **and shorter-lived or less radiotoxic intermediate level waste (ILW)**. We do not envisage that near-surface facilities would be suitable for the disposal of high level waste (HLW), spent nuclear fuel or nuclear materials such as plutonium.” [Emphasis added – it was confirmed at the workshop that this might possibly include longer-lived ILW]
- 5.3 The Environment Report states that only around 25% of the total waste in Scotland could not be disposed of in near-surface disposal facilities, and would, therefore, need to be stored until there are further technological developments. (para 3.22) NuLEAF has pointed out that the NDA is carrying out a review of disposal routes for reactor decommissioning waste. This has clearly indicated that further assessment is needed before it is known what proportion of Reactor Decommissioning Waste can be disposed of in near surface facilities. So the Scottish Government’s 25% figure may need to be revisited.
- 5.4 The differences between this proposal and the proposal to bury low (LLW) and intermediate level waste (ILW) at Dounreay, which was so comprehensively rejected by voters in the 1989 Caithness referendum, needs to be further explained. Superficially it looks as though we have gone from rejecting deep disposal of LLW and ILW to acceptance of shallow disposal of at least 75% of the same waste.
- 5.5 The Supplementary Information (p33) includes a table of waste arising in Scotland. By far the largest volumes are graphite, short and long-lived, contaminated and activated metals. These are the categories of waste which may be suitable for near surface disposal. But over 80% of the graphite is long-lived, and as we have seen in para 2.7, the Near-Surface GRA does allow the near surface disposal of some long-lived waste. The Scottish Government needs to clarify which material could be disposed of in a near-surface facility according to the Near-Surface GRA. It is disturbing that the Scottish Government refused to tell the *Sunday Herald* what sort of waste could end up in near surface dumps. (5) The NDA will be investigating the feasibility of processing some of the graphite waste, so that it might become short-lived waste after the removal of carbon-14 and chlorine-36, but this research is at an early stage. (5)

6. The Waste Hierarchy

- 6.1 The Consultation Document says the policy will explicitly require waste producers and owners to apply the Waste Hierarchy. The NFLA has expressed concern about the application of the waste hierarchy to radioactive waste in the past.
- 6.2 In this context the use of the hierarchy tends to be used to promote ‘recycling’. The term ‘recycling’ refers to converting used materials into new products. (6) But in the case of radioactive waste what we are doing is not recycling all of the material. We are removing most of the radioactive chemicals from the waste and then turning the remaining material into a new product. This raises two questions:
- What happens to the radioactive material which is removed? Are liquid chemicals such as solvents or water, or blast shot used to remove the radioactive material and does this material then get discharged into the environment?
 - Is the material, which has been decontaminated, still contaminated slightly? And is this going to cause problems if the material re-enters the market place as consumer products?

- 6.3 In other words is the so-called recycling going to help dilute and disperse radioactivity throughout the environment? The Environmental Report notes that treatment processes could result in the production of secondary wastes, both radioactive and non-radioactive, which will have to be regulated.
- 6.4 The metal recycling plant operated by Studsvik at Lillyhall, near Workington in Cumbria, received its first delivery of contaminated metal in September 2009. This plant has a radioactive discharge authorisation because radioactivity is being dispersed into the environment which would have previously been disposed of with the contaminated metal. In other words application of the waste hierarchy means there is a potential conflict between the ALARA principle (As Low As Reasonably Achievable) and the environmental benefits gained from recycling the metal. (7)
- 6.5 Annex A lists the expected discharges from the Lillyhall metal recycling plant which were given in the Planning Application.

7. Decontamination and Treatment of Waste.

- 7.1 The policy also says it will allow the option of sending waste elsewhere for treatment, including overseas – which could mean sending metal from Scotland to Sweden or Lillyhall for decontamination, for example. (para 4.01.03 p32)
- 7.2 Treatment of waste can be for the recovery of materials, as in metal recycling, or it could be for the purposes of making storage and disposal of the waste more manageable. In terms of this policy it does not mean reprocessing.

8. How deep is near surface?

- 8.1 The policy allows for storage or disposal down to “several tens of metres”. This could mean, say, 50 metres or 160 feet below the surface. The Environment Report says disposal facilities can use geological or engineered barriers, and they might be newly constructed or accommodated within existing structures where an acceptable safety case can be made.
- 8.2 Rather surprisingly, the Scottish Government has also revived a suggestion that storage or disposal facilities might be constructed under the seabed, but accessed from land. When this concept was proposed by the UK Government in the past there was considerable international opposition because the intention is that any leakage would go into the marine environment.
- 8.3 The Policy does discuss the requirement for retrievability from disposal facilities. The Environment Report highlights the fact that retrievability requires much greater security, monitoring and management, and waste which is more difficult to retrieve has the potential to require less active management over the long-term. However:

“Scottish Ministers have expressed a commitment to near surface facilities, partly in order to facilitate easier retrievability over the long-term.”

9. How near is near site?

This is not fully defined. It is proposed to apply the Proximity Principle and to optimise the transportation of waste. But there is no requirement to store or dispose of waste on an existing nuclear site. The Policy would allow waste to be moved to the nearest suitable facility.

10. Socio-economic Effects

NuLEAF points out that, despite an acknowledgement that significant effects could arise from perceptions of hazard and risk (para 6.04), the Environment Report does not systematically address the potential socio-economic impacts of siting different types of facility, including blight.

11. Other Comments on the Environmental Report

- 11.1 Paragraph 3.13 compares radiation doses from man-made sources with doses from natural radiation, and medical sources. Such a comparison is irrelevant and inappropriate - it invites the inference that natural background radiation is safe. (8) This is not the case. In the UK it has been calculated that it causes, on average, about 6,000 to 7,000 future cancer deaths per year. (9) There is an important ethical difference too. There is not much we can do about natural background radiation, apart from perhaps dealing with radon gas in some buildings. But we can tackle man-made radiation.
- 11.2 Paragraphs 3.14 and 3.15 imply that radioactive discharges into the environment are of little concern provided they are regulated and remain within authorized limits. This fails to recognize the uncertainties involved in estimating doses from inhaled and ingested radionuclides and the consequent health effects. (10) Nor does it acknowledge the 'paradigm shift' currently going on amongst scientists working on radiation and health as a result of recent discoveries. (11)

12. References

- (1) National Planning Framework for Scotland 2, Scottish Government, June 2009, para 172
<http://www.scotland.gov.uk/Resource/Doc/278232/0083591.pdf>
- (2) Managing Radioactive Waste Safely: Proposals for developing a policy for managing solid radioactive waste in the UK. DEFRA, DoENI, National Assembly for Wales, Scottish Executive, September 2001.
http://www.sepa.org.uk/radioactive_substances/rs_publications/idoc.ashx?docid=3cf671f4-4e74-4307-8eab-3cbb6a08e52b&version=-1
- (3) NuLeaf Steering Group Paper 27th Jan 2010: Scottish Government Consultation on Higher Activity Wastes. http://www.eastspace.net/nuleaf/documents/2009-01-27_SG_item_8_Addendum_Scottish_Government_Policy.pdf
- (4) http://www.sepa.org.uk/radioactive_substances/radioactive_waste/idoc.ashx?docid=4a1c64c2-5599-4e94-86d1-cb99cb62683c&version=-1 para 3.4.1
- (5) Sunday Herald 17th January 2010
<http://www.robedwards.com/2010/01/ministers-drop-ban-on-dumping-nuclear-waste-in-scotland.html>
- (6) http://www.recyclenow.com/why_recycling_matters/why_it_matters/index.html
- (7) See <http://nuclearcareersonline.net/2009/09/studsvik-first-delivery-metals-recycling-facility/>
- (8) Edwards R (1996) Natural Radiation May Kill Thousands. New Scientist, May 4 1996, p4.
- (9) Robb JD (1994) Estimates of Radiation Detriment in a UK Population. NRPB Report R-260. National Radiological Protection Board. Chilton. Oxon.
- (10) See CERRIE (2004) Report of the Committee Examining the Radiation Risks of Internal Emitters (www.cerrie.org).
- (11) See <https://ssl.note-ip.org/index.asp>

ANNEX A – extract from the Planning Application by Studsvik to build a metal recycling plant at Lillyhall near Workington, plus comment by CORE.

Disposal of gaseous wastes

Wastes will be disposed from one discharge point only - a stack on the south corner of the building.

Intended gas discharges:

Caesium 137 to a maximum of 500Bq per day, 10,000Bq maximum in a year.

Americium 241 to a maximum of 250Bq/day, 5000Bq maximum in a year.

Discharges will be continuous.

Aqueous Waste

Arisings of aqueous wastes expected only from changing rooms (sink, shower, toilet) - with discharges going into the public sewer.

Caesium 137 at max 25,000Bq/month

Americium 241 at max 25,000Bq/month.

Solid Waste

Expect to dispose max of 0.4 cubic metres. of solid VLLW in any one month. To be collected by local authority for landfill with normal refuse.

Expect to accumulate up to 2000 cu m of solid waste over a 12 month period and containing 'all radionuclides associated with waste management and decommissioning activities from nuclear/registered MOD site' with max activity of 1 T bq.

This waste will be transferred to the Low Level Waste Repository at Drigg or to the Sellafield site.

Cumbrians Opposed to a Radioactive Environment (CORE) said in its response to the planning application:

“The principal radioactive materials to be released ‘continuously’ to the local and wider environment in gas and liquid form are identified as Americium 241 (Am241) and Caesium 137 (Cs137). Radioactive gases will be discharged via a stack whilst radioactive liquids will be discharged to the public sewer.

The predominant discharge will be to air, with Am241 identified as providing 95% of the estimated radiation dose (from all pathways) to the public – via the inhalation pathway. Neither [Cs137 nor Am241] is ‘short-lived’ in terms of radioactive potency. Cs137 has a radioactive half-life of 30 years and, in the form of Beta particles and Gamma rays, concentrates in human muscle and reproductive organs. Am241 emits Alpha particles and Gamma rays, has a radioactive half-life of 458 years and concentrates in human blood and bone.”