Policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom

Summary of comments and Government response

26 March 2007

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

An Agency within the Department of the
Environment
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Contents

1. Introduction

A public consultation on UK policy for the long term management of solid low level radioactive waste (LLW) was carried out by UK Government and the devolved administrations of Scotland, Wales and Northern Ireland (hereafter referred to collectively as Government) between 28 February and 31 May 2006[1].

This document contains a summary of comments received, and presents the Government's response. Government would like to thank all those who participated in this review of policy – this included attendees to two preparatory workshops and those who responded to the consultation. The final policy document was published on 26 March 2007[2].

2. Summary statistics

One hundred and fifty responses were received, and a break-down of their spread between constituencies and country of origin is given below.

Constituency	**Total**	**England**	**Scotland**	**Wales**	**Northern Ireland**
Central Government	3	2			1[3]
Local Government and associated bodies	39	22	16		1
Regulators	4	2	2		
Nuclear industry	12	12			
Hospitals	8		4		4
Research and education	18	11	5	1	1
Oil and gas industry	7	1	6		
Other non nuclear industry	1	1			
Non-governmental organisations	7	3	2	2	
Academic institutions	2	2			
Professional bodies	12	9	3		
Members of the public	15	9	5	1	
Incinerator and landfill operators	3	3			
Consultants (engineering and environmental)	17	14	3		
Other	2	1	1		
TOTAL	150	92	47	4	7

3. General response

The draft statement of policy, contained within the consultation document, was generally well received. The majority of respondents stated that a new statement along these lines, superseding aspects of the last statement of government policy on these matters[4] was both timely and necessary. For those questions which elicited an agree/disagree response, on average, approximately 65 per cent of respondents agreed, five per cent disagreed, and 30 per cent offered no comment on most of the questions. However, most respondents made caveats and suggestions within their responses.

The proposed redefinition of Very Low Level radioactive waste (VLLW – see Q11) and the proposed list of management options (see Q12), received the lowest level of agreement.

4. Summary of responses and the Government's reply to them

The Government posed 13 questions and invited other general comments. All but two questions invited agreement or disagreement, and most included invitation for specific comments. The following represents a summary of the main points made by respondents, with, in each case, the Government's response. (Unless otherwise stated, paragraph and chapter references are to those in LLW consultation document – see endnote 1).

Q1: Given that future arisings of LLW will exceed currently available capacity, do you agree that a change in LLW management policy is necessary? Have we identified the correct guiding principles for such change: flexibility of approach; use of a risk-informed approach to ensure safety; and additional emphasis on minimisation of arisings? (See Chapter 2, para 14; Chapter 3 paras 3, 10-16.)
1.1 There was overwhelming support for this initiative. The problems of LLW management needed to be addressed, and the starting point for addressing them was a clear statement of Government policy. **1.2** Some respondents believed that the principles needed to include the requirement for consultation with affected communities and planning authorities. **Government's response:** The policy statement already emphasises the need for such consultation. However, this requirement has been brought further 'up front' to emphasise its importance. **1.3** Some respondents believed the proposed Very Low Level Radioactive Waste (VLLW) definition worked against the guiding principles of "risk informed" and "flexibility". **Government's response:** Please see **Q11** below. **1.4** Some respondents commented that maintaining numerical limits in the

LLW definitions worked against the “risk informed” principle on the basis that they take no account of radiotoxicity and half life; others suggested that the UK should look to how other countries define their waste.

Government’s response: The current LLW definition needs to remain in place because it is a convenient and well-understood term. The Government recognises, though, that the risk informed approach to LLW management means that this definition does not necessarily imply that a particular waste route has to be employed. As a case in point, the LLW definition includes an upper activity level based on the acceptance criteria for the Low Level Waste Repository (LLWR) near Drigg in West Cumbria. This is not to imply that any future facility would be constructed so as to receive LLW based on the current upper LLW limits.

Waste definitions across the full range of radioactive wastes are already broadly in line with international practice, although a UK-specific numerical limit is in place to reflect acceptance at a UK-specific facility – the current LLWR near Drigg.

1.5 Some respondents commented on the need to cover risks to the environment and non-human species.

Government’s response: Para 15, Chapter 4 of the consultation document describes what the Government intended when waste management options are assessed. These options’ assessments should take into account ‘safety and environmental impacts, and social and economic factors’. However, the final policy statement now includes the following text: “The environment agencies will be providing updated guidance on the requirements for authorisation of near-surface disposals of LLW. This will include advice on the extent to which those undertaking radiological impact assessments for LLW disposals should take account of non-human species”.

1.6 Some respondents believed that Government needed to take a lead in finding new facilities and ensuring across-UK consistency.

Government’s response: Government is of the opinion that its role is to establish a policy in this area under which waste management strategies can be established. The Nuclear Decommissioning Authority (NDA – a Government-sponsored body) will have the major role in development of the UK’s nuclear LLW management strategy.

In addition, in light of comments received during the consultation, Government acknowledges that a national strategy for wastes arising from the non-nuclear sector is needed. Firstly, waste arisings from this sector will need to be defined – and this task will build on Government-commissioned work to assess the extent and geographical distribution of such arisings. Secondly, a process to develop a UK-wide strategy and identification of future arrangements for its delivery will be undertaken by Government working in conjunction with the NDA. Thirdly, Government will be looking to planning authorities across the UK to provide sufficient opportunities within their

national, regional and local planning strategies, as appropriate, to meet the non-nuclear industry disposal needs within each area, as will be set out in the national non-nuclear industry waste strategy.

Beyond this, Government believes that the market can provide the necessary solutions to problems identified within the planning strategies, provided that the necessary planning, legal and regulatory climate is established. But, if it does not, Government may need to reconsider how such facilities would be provided if these proved to be unavailable.

Regarding new facilities, recommendations made by the Committee on Radioactive Waste Management (CoRWM)[5] included some reference to site selection issues (albeit for higher level radioactive wastes) and the Government is considering these carefully in order to learn lessons from the CoRWM process[6].

Regarding consistency across the UK, the policy statement has been endorsed by all constituent parliaments and assemblies of the UK.

1.7 Comments were received to the effect that the concept of BPEO (Best Practicable Environmental Option) should be used to inform decisions on radioactive waste management.

Government's response: The options assessment methodology used must be in a form suitable for its purpose. A current common method used in the UK in support of the preparation of LLW management plans is the BPEO analysis process. The Environment Agencies have published guidance covering the use of the BPEO method which describes the way in which an options study should be conducted, how the methodology is applied and setting out the typical components of their regulatory assessments. The guidance pre-dates recent work to promote the use of Integrated Waste Strategies and, as such, is being reviewed.

Q2: Have we identified the correct requirements for the production of LLW management plans? (See Chapter 3, paras 9-10.)

2.1 Some local authorities commented to the effect that the plans should be discussed with regional planning bodies and they needed to relate to regional spatial strategies and waste development frameworks. In this connection, others, from a variety of constituencies, commented that LLW plans should map onto other requirements, eg area waste plans and integrated waste strategies. Yet more respondents added that co-ordinated plans were needed (hence there was a need to refer to integrated waste strategies to ensure the best overall option was chosen).

Government's response: Government fully accepts that it would be desirable for waste strategies at all levels to incorporate all wastes in an integrated fashion, including radioactive wastes. The Government does expect the plans to be prepared both within the context set by any national LLW strategies and with close engagement with regional and local planning authorities as appropriate.

However, the volumes of annual arisings of LLW from both the nuclear and non-nuclear sectors are very low when compared with non-radioactive waste from municipal, commercial and industrial sources. (See Table 1 below) Assuming a waste density of one tonne per cubic metre for LLW and VLLW, they amount to less than 0.07 per cent of the annual mass of non-radioactive waste.

Each country in the UK has its own Waste Strategy documents. The national waste strategy for England, *Waste Strategy 2000,* is currently being updated following extensive public consultation. The Government commissioned a brief study to examine if and how the revised strategy – *Waste Strategy 2007* – could be modified to incorporate LLW from the non-nuclear sector. The outcome was to the effect that, due to the extensive consultation (now closed) on revision to *Waste Strategy 2000*; detailed consideration of LLW within the strategy could not be effected at the moment. This will be revisited at the next revision of the strategy. However, *Waste Strategy 2007* (applying to England and Wales) is expected to contain references to the management of LLW and VLLW for completeness. Similar measures are under consideration in Scotland.

2.2 There were queries as to how the requirements would fit in with the concepts of Best Practicable Means (BPM), Best Practicable Environmental Option (BPEO), Best Available Techniques (BAT) etc and that these should be added to, rather than replaced.

Government's response: These concepts are well-established. Assurance that they are being applied, and applied correctly, is a matter for the environmental regulators. Use of these concepts, and how they are applied, will be kept under appropriate review by the regulators.

2.3 Respondents said that public and stakeholder engagement in developing plans was essential.

Government's response: Please see **1.2** above.

2.4 It was remarked that the lack of options made presumption towards early solutions difficult.

Government's response: The purpose of the policy statement is to enable options for LLW management to be maintained and expanded where necessary. The Government is of the opinion that given the right policy framework and demand from waste producers, the market can provide for this need. Please also see **1.6** above.

2.5 Many respondents commented on the practicalities of producing plans (in particular, that regulators should produce guidance and standards on the content of suitable plans for each sector). There was also a plea for consistency in regulation, both between HSE and the environment agencies, and within the latter.

Government's response: The environment agencies are in regular contact with waste producers authorised under the Radioactive Substances Act 1993 (RSA93), and will provide guidance on the need for, and extent of, waste management plans for each situation. The UK environment agencies are also in regular contact with each other regarding these matters, and endeavour to be consistent. Memoranda of understanding exist between the environment agencies and HSE. These are regularly reviewed and updated. The new policy looks to the regulatory bodies to maximise the consistency of their approaches. See also "Other comments" (**OC1**).

2.6 The Environment Agency has stressed that the full requirements of waste management plans as set out in the draft policy statement should only apply to the nuclear sector.

Government's response: Waste management plans should be fit-for-purpose. Government recognises that the range and scale of waste management issues is extremely wide; consequently, the nature and scale of waste management plans will vary widely. Requirements placed on the nuclear industry by the environmental regulators are obviously more onerous than those placed on the non-nuclear sector. For the latter, in the case of simple operations, a waste management plan could consist simply of a statement that a waste route has been identified, with a few lines of justification. These matters are usually already dealt with adequately under the current RSA93 application process.

Table 1: Approximate LLW and VLLW annual arisings in the UK (cubic metres)

	Nuclear sector	**Non-nuclear sector**
LLW to LLWR near Drigg[7]	10,000	200
LLW via controlled burial	Approx 14,000[8]	Approx 100[9]
LLW via incineration	Approx 2,000[8]	Approx 1,500[9]
VLLW via incineration	0[8]	1,900[10]
VLLW via landfill	4,400[8] (maximum authorised volume)	1,700[10]
Total from each sector	30,400	5,400
Total VLLW as incinerator ash from both sectors[11]	Approx 42,000[9]	
Total LLW/VLLW from both sectors	Approx 73,000 cubic metres per annum	

Note: Total amount of non-radioactive waste from municipal, commercial and industrial sectors is 116 million tonnes per year (2002/3 data): of this, 6.4 million tonnes goes for incineration, and 58 million tonnes goes to landfill[12].

Q3: Is use of the waste hierarchy as defined, the right way of securing LLW minimisation? (See Chapter 3, paras 15-16.)

3.1 The majority of respondents were supportive of the use of the waste hierarchy. However, some believed the hierarchy would need fiscal mechanisms to make it bite and yet others commented that, to be effective, a commitment would be needed to accurate assay and high quality environmental management systems.

Government's response: These specific points do not affect the principles behind the application of the waste hierarchy. Although the Government recognises that there are specific issues in connection with applying the waste hierarchy to LLW – particularly in relation to legacy wastes – this does not change the basic approach. In relation to 'accurate assay' and 'high quality environmental management systems', Government would stress that the principle states that wastes should be dealt with at the highest *practicable* level of this hierarchy (Chapter 3, para 16). Decisions on the necessary degree of assay will depend on a number of factors, e.g. waste disposal route, regulators' views, costs of sampling and analysis. However, the supplementary notes to the policy statement now identify the need to look closely at new developments in assay methods to establish best practice in this area.

3.2 Some respondents (mainly professional bodies and consultants) believed that an important factor was setting appropriate boundaries for free release and LLW categories.

Government's response: The Government has initiated a project which will address the modernisation of Exemption Orders (EO) made under the RSA93 and its predecessors. This review, if carried through to completion (funding permitting) will address the crucial EO relating to free release ('clearance'), this being the Substances of Low Activity (SoLA) EO.

3.3 Clarification was requested on the status of incineration (is it disposal or volume reduction?), and some questioned the use of incineration at all, on the basis that it represented a dilute and disperse policy. A few respondents believed that the waste hierarchy should end at containment, not disposal.

Government's response: Government believes that the incineration of some types of LLW, (particularly for clinical wastes that could otherwise present a biological hazard), represents an important waste management option, and that in properly controlled situations the environmental and human health impacts are low. Complete containment – taken to mean indefinite storage of all LLW – is not a practical proposition.

In compiling the draft statement of policy, the Government acknowledged that incineration could be treated as a volume reduction methodology (in terms of reducing the volume of primary LLW requiring disposal), and/or as a disposal methodology. But the Government believes that this is a semantic point which does not affect the overall waste management principles which should be

applied. However, it is accepted that the dilution of LLW and VLLW by large volumes of combustible non-radioactive waste at incinerators means that radioactivity that remains in the ash is effectively diluted into large volumes of ash which then go to landfill or in the case of material from lime scrubbers, for other uses. Recent radiological impact assessments have shown that the human health impacts of the disposal of relatively large volumes of VLLW to landfill are very low[13]. Where incineration of LLW leads to environmental discharges (to water or air or disposal of ash or use of residues from the combustion process), the practice must be carried out under an RSA93 authorisation and the environmental regulators must be convinced that the radiological principles of limitation and optimisation have been complied with.

Q4: Is best use being made of incineration of combustible LLW, for the minimisation of waste? If no, what are the obstacles for greater use of incineration? (See Chapter 2, para 9; Chapter 3, para 15.)

On what are the main obstacles to more incineration:

4.1 A substantial number of respondents cited public opposition and, related to this, difficulties in obtaining planning permission, as the main obstacles to more incineration.

Government's response: Government is of the opinion that incineration represents a vital component of radioactive waste management. (See **3.3** above) The Government recognises that there is opposition from some quarters, but public unease can only be overcome by the rigorous and transparent application, by the environmental regulators, of the principles and risk criteria outlined in the policy statement.

4.2 A number of respondents commented that the problem was mainly a consequence of the more stringent standards now in force which had reduced incinerator capacity. An associated comment was that legislative restrictions on waste disposal companies and difficulties with obtaining authorisations were also to blame.

Government's response: Government believes that the rigorous standards applied to incineration (of all types of waste) are appropriate; they help to guarantee that public health is not adversely impacted, and that the public are sufficiently reassured that this is the case.

4.3 A few respondents believed that one obstacle was the economics of modern incinerators, and others mentioned the cost of obtaining a licence as a negative factor.

Government's response: Government believes that these must be matters for the market.

Comments giving caveats to more incineration:

4.4 A number of respondents said there was a need to justify incineration via risk assessments and BPEO studies.

Government's response: This is already done; these are matters for the environmental regulators.

4.5 A small number commented on the need to look at long term impacts from further use of incineration.

Government's response: The environment agencies have been asked to consider this point, and to look at how the overall impact of all LLW incineration (that is, not specific to any one incinerator) can be assessed.

Other comments on incineration:

4.6 Some local authorities said that the Government had provided insufficient background information to allow them to comment on this point, but other comments from the same constituency were along the lines that more incineration of LLW might compromise that route for municipal and industrial wastes.

Government's response: Background information is available for the engineering and environmental aspects of incineration from the environment agencies' public registers. However, Government has asked the Health Protection Agency to consider how it might assist in providing improved information to the public on risks from incineration. Regarding the co-disposal of radioactive and non-radioactive wastes at the same facility, Government believes that this is an essential component of waste planning, where it is practicable and not precluded by other legislation.

4.7 Some respondents believed that the Government needed to re-establish incineration as a national strategy via an optioneering exercise – a few of them added that incentives might be needed.

Government's response: Please see **1.6** and **2.1** above (in relation to national waste plans). The Government believes that it should not interfere directly in the market by incentivisation in this area, but accepts that the appropriate planning, legal and regulatory framework needs to be in place to ensure that incineration remains a viable option, particularly for the non-nuclear sector.

Q5: Should the proximity and minimisation of transport principles apply to the management of LLW of different kinds? If yes, do you have any observations on the way they should be applied? (See Chapter 3, paras 21-22.)

5.1 Many respondents (dominated by local authorities, the nuclear industry and members of the public) commented that central facilities would be needed (as well as more localised ones) and consequently transport should not be an overriding criterion.

Government's response: The Government will not be prescriptive about the number and location of facilities, beyond stating that it believes that a mix of national and local facilities will be necessary. Minimisation of transport and the proximity principle have not previously been stated as principles to be considered in the management of LLW waste. However, given that they were raised in workshop discussions, the Government thought it timely and appropriate to introduce as principles to be considered. However, minimisation of transport is just one of a number of factors which should be taken into account in the decision on both waste routes and the location of any new facilities; this is not the only factor. Neither did Government intend, in the draft statement of policy, that the transport minimisation and proximity principles be given any exceptional consideration in options' studies. They are simply two factors amongst many.

Detailed suggestions made under this question will be passed to the NDA for consideration.

5.2 A number of respondents (dominated by local authorities, professional bodies and members of the public) commented that these principles should apply particularly to large volumes of low activity waste.

Government's response: Government expects that, in any options assessment process, these principles will receive higher prominence ('weighting') when applied to high volume low activity wastes. This does not change the way in which the principles are applied.

5.3 Some respondents (dominated by non-nuclear sector) agreed with the use of the principles but commented that actual routes were very limited.

Government's response: Government understands that routes are currently limited, but believes that this policy review should lead to greater flexibility of approach and thereby an easing of the situation. (See also **1.6** above.)

5.4 Other respondents, including some regulators, agreed with the use of the principles but said that overriding them should be maintaining high environmental standards and reducing risks from disposal.

Government's response: Please see **5.1** above.

Q6: Should the NDA also provide facilities for the disposal of non-nuclear industry LLW, where this is possible in conjunction with its main work on civil nuclear decommissioning and clean-up? (See Chapter 3, paras 26, 29.)

6.1 Many respondents listed benefits from this approach (cost savings, economies of scale, adequate infrastructure, experiences etc). It would avoid duplication of effort and provide consistency. Another point was that the additional volumes would be minimal in comparison with the volumes from decommissioning.

Government's response: The NDA, which will be working in conjunction with Government in the development of a UK-wide, non-nuclear LLW management strategy, is considering how it can help to provide facilities for the non-nuclear sector within its current terms of reference. There are, however, two caveats:

- The principal responsibility of the NDA is for the management of the UK's nuclear legacy wastes. Any service offered to the non-nuclear sector must not compromise its main mission.
- Whilst the NDA will assist where it can, it cannot be responsible for provision of all the facilities necessary for the management of the UK's non-nuclear waste. Rather, once it has established facilities for its own wastes, these will be available to the non-nuclear sector, where practicable, under appropriate commercial terms.

6.2 A number of respondents commented that of particular benefit would be for the NDA to handle spent sealed sources and other difficult non-nuclear waste. In this connection, some commented that the NDA should consider providing a total service (collection, conditioning, transport) to non-nuclear users.

Government's response: The NDA is considering this in the light of the points made under **6.1** above. However, as has been made clear under 6.1, the NDA cannot always be the lead provider of services for the non-nuclear sector.

6.3 Some respondents (dominated by non-nuclear users and local authorities) believed that this should be in conjunction with other local facilities, such as landfill etc, and others said the NDA should work with other facility operators to develop and maintain cost effective local/regional routes.

Government's response: The NDA is considering this matter, but it should be noted that they are already holding discussions with a wide range of waste disposal facility operators. (See also **1.6**.)

6.4 Other respondents agreed, but only where it was commercially viable, appropriate and practicable (with the overriding principle being safety); yet others said the costs must be reasonable to non-nuclear users.

Government's response: Pricing structures for LLW disposal at NDA facilities are a matter for the NDA. The NDA is not engaged in making profits from any sector, but must cover the costs of disposal.

Q7: What should be the relative roles of UK-wide or regionalised facilities vis-a-vis local management schemes for LLW, and how might these depend on the nature and activity of the waste in question (for example, in considering transport impacts)? (See Chapter 3, paras 21-22; 27-28, 30-34.)

7.1 Many respondents expressed support for localised disposal for lower activity LLW, and others were supportive of localised (often meaning regional) disposal of non-nuclear LLW.

7.2 Many respondents said that a range of facilities would be needed, depending on the physical nature of the waste; others that the policy should be based on science and risk (ie on half lives and radiotoxicity); and some that BPEO should be used to determine the relative roles of different facilities.

Government's response: These points have already been covered in the responses above. Please see in particular **1.7** (BPEO), **5.1** (facilities needed) and the policy statement itself for the Government's position on science and risk.

7.3 Some respondents supported fewer specialised facilities, rather than proliferation of smaller ones, with two respondents specifically suggesting regional facilities (eg one for north and south England, Scotland and Wales); others said the UK should only have regional facilities where no local ones can be developed or only have UK-wide facilities for more difficult material.

Government's response: The response under **5.1** above covers this point. The Government does not intend to dictate the number and location of facilities. These are matters for the NDA and the market generally, in partnership with the environmental regulators.

Detailed suggestions made under this question will be passed to the NDA for consideration.

7.4 Comments were also made on the need for a consistent national strategy.

Government's response: Please see **1.6** above.

7.5 Some respondents, including non-nuclear users, said that local authorities needed to be empowered by Government to employ local solutions.

Government's response: Government does not intend to enact legislation to return to the days when waste disposal operators were required to take wastes of certain types (e.g. when landfills were under local authority management). This 'empowerment' will be carried out through the national waste strategy if it is found to be possible to do this. Please see **1.6** and **2.1** above.

7.6 Some local authorities suggested that they should consider LLW via their Hazardous Waste Sub Groups.

Government's response: At present, the definition of Hazardous Wastes excludes radioactive waste because of their different regulatory regimes. However, in England at least, Regional Technical Advisory Bodies, as defined in Planning Policy Statement 10[14], would seem to be appropriate bodies to consider LLW and VLLW disposal needs for the non-nuclear industry, that will be set out in the national strategy for wastes from this sector. In Scotland, this consideration will be carried out centrally by Government. Please see also **1.6**.

7.7 Some respondents also used this question to comment specifically on the LLWR near Drigg (and these ranged from it being used for local wastes only, through to it being used for higher activity LLW and as a regional facility).

Government's response: The draft policy statement described the current situation with the LLWR near Drigg, and this will not be repeated here. The future use of this facility, its capacity and current status are under consideration by the site operators, the NDA and the environmental regulators. This will take into account the Government's new LLW management policy statement. The LLWR near Drigg and, potentially new equivalents to it, are central to the management of LLW in the UK. If such facilities are used only for higher-level wastes within the LLW category (which is the overall intention behind the policy statement), then this will considerably modify (beneficially) the national picture.

Q8: Is the availability of disposal routes for disposal of non-nuclear industry LLW diminishing? If so, please provide specific examples of difficulties and their consequences on operation of relevant industries. What steps can you suggest to address these problems? (See Chapter 2, para 9; Chapter 3, paras 30-34.)

Examples of routes diminishing:

8.1 Fewer landfills and incinerators taking LLW because of new Hazardous Waste Regulations (some respondents referring to landfill and others from the non-nuclear sector to incinerators).

8.2 Reduction in number of incinerators. A major factor suggested by one respondent was financial viability.

8.3 Some respondents from the oil and gas industries, and one other respondent, specifically commented on the problems of disposals of Naturally Occurring Radioactive Material (NORM) – reasons were the regulators' position on discharges from a major facility in Aberdeen, and on the use of the LLWR near Drigg.

Steps that should be taken to address the problem:

8.4 Non-nuclear users and professional bodies believed that the Secretary of State needed to give direction to local authorities to deal with their wastes locally. Others commented that facilities need to reflect a coherent national strategy.

Government's response: For England, Planning Policy Statement 10 already expects regional planning bodies in preparing regional spatial strategies to take into account "any waste management requirement identified nationally". To this end, the Government has initiated a project to collect data on geographical arisings of non-nuclear LLW across the UK.

Regarding LLW strategies, please see **1.6** above.

8.5 Regarding NORM, non-nuclear users from the oil and gas sector commented on the need to change OSPAR to allow reinjection into geological formations, with others commenting that NORM could go to the new LLW facility planned for Dounreay.

Government's response: It is the Government's view that, in terms of risk, NORM wastes from operating and decommissioning offshore oil and gas facilities are no different to any other LLW, and that such wastes should not be treated as a special case. Facilities for the disposal of such wastes are being sought, the LLWR being unsuitable because of the radium content.

Q9: Is it right in principle that local communities should take greater responsibility for the disposal of non-nuclear industry LLW arising from producers serving their communities, for example, hospitals and research and educational organisations? (See Chapter 3, paras 31-32.)

9.1 Many respondents commented that even though it was right in principle, there would be barriers – public opposition specifically was cited by a number of respondents.

9.2 Many respondents agreed with the principle but added that the BPEO concept should be used (for example, because national facilities might be best for some wastes).

Government's response: Please see **1.7** above.

9.3 A number of respondents agreed with the principle but said that the examples in the draft statement of policy (of local communities receiving benefit from a practice), were often of benefit to the wider community.

Government's response: The Government agrees that some local undertakings (e.g. some specialist hospitals) create benefits on a regional scale. The implication behind this question was that such wastes should not have to go to one central facility because of public opposition to its disposal more locally, provided this disposal meets the requirements of the environmental regulators.

9.4 Some respondents agreed but said that for economic reasons, this might need to be done at a regional level.

Government's response: Decisions on the location and number of facilities will be taken partly on the basis of economics. However, this is not a matter for Government directly. Please also see **1.6** (on development of a UK-wide strategy) and **5.1** above.

9.5 Other respondents agreed that regional and local planning strategies could address non-nuclear needs, but stressed the need for a consistent UK-wide approach. Others commented that the same standards should apply to non-nuclear disposals as to nuclear facilities.

Government's response: Matters concerning UK-wide waste strategies have been addressed in **1.6** above. Application of the risk-informed approach means that all wastes and all disposal facilities should be subject to the same standards of safety and environmental impact. The Government believes that all radioactive wastes, whatever their provenance, of the same radionuclide content, have the same intrinsic hazards and should be subject to the same limits and other principles of radiological protection ('justification' and 'optimisation'). However, it is the case that by virtue of its radioactivity content and quantity, LLW from the non-nuclear industry generally has gone to landfill and incineration, whereas that from the nuclear industry has been disposed of at the LLWR near Drigg. This balance is likely to change once LLW arisings are dominated by low activity wastes arising from decommissioning.

Q10: What role should national, regional and local planning strategies play in relation to the provision of facilities to dispose of such LLW (landfill and incinerators), particularly that at the lower end of the LLW activity range? (See Chapter 3, para 32.)

10.1 A significant number of respondents said that planning strategies at all levels should take account of non-nuclear LLW, but some local authorities who agreed with the latter point, were concerned that inclusion of LLW would jeopardise existing plans for conventional waste.

Government's response: The question of planning strategies has been dealt with under **2.1** above. The Government does not believe that inclusion of LLW in a holistic fashion in waste plans, and the joint use of facilities for conventional (non-radioactive) and radioactive wastes should be ruled out. This would be in conflict with a holistic approach to all waste management which brings significant benefits to the process.

10.2 A significant number of respondents stated that facilities needed to reflect a UK strategy – set this first and then feed into regional and local strategies and plans.

Government's response: Please see **1.6, 2.1** and **8.4** above.

10.3 Along similar lines, some respondents commented that the problem needed to be identified first of all (data on non-nuclear wastes, existing routes etc). The need for new capacity then had to be identified in regional plans before being fed into local plans. Others suggested the setting up of regional organisations to act as record-keepers of non-nuclear wastes, and to take decisions (suggestions for membership were included).

Government's response: The Government has initiated research to attempt to answer questions on non-nuclear industry waste arisings. (See **8.4** above) However, Government is persuaded that more needs to be done to maintain disposal routes for the non-nuclear sector. The first step is to establish a national strategy. (See **1.6** above.)

10.4 There were comments to the effect that there would be problems incorporating LLW disposal needs into local authority plans, and yet others suggested that any national strategy would have to be imposed on local authorities from central Government.

Government's response: Government does not agree with either point. There is no reason in principle why all wastes should not be treated in a holistic fashion by way of a UK strategy feeding down into local plans. Local authorities are aware of their responsibilities in producing plans for all wastes arising in their areas, and discharge these responsibilities accordingly. Government, in conjunction with the NDA, intends to identify the UK requirement for non-nuclear LLW disposal, and local authorities will then need to address this requirement via their planning strategies. (See **1.6** and **8.4** above.)

Q11: Do you support the proposed redefinition of VLLW to make it compatible with the wider definition of LLW? If not, why? (See Chapter 2, paras 12-13; Chapter 4, para 4.)

11.1 A significant number of respondents from the non-nuclear sector (that is, the sector which would be particularly affected by the proposals) believed the redefinition would increase restrictions on VLLW disposal because volumes of low density wastes which can be disposed of via this route would be reduced, leaving them with more LLW to dispose of by other means. Some respondents from the same sector said that redefinition would lead to assay problems.

11.2 Some respondents commented that VLLW should be redefined in concert with a redefinition of all other radioactive wastes. This is on the basis that, if we are stating that LLW disposal options should be risk informed, then artificial boundaries between wastes are counter-productive. The VLLW definition should include higher-volume wastes, for instance arising from nuclear site decommissioning operations. There were also requests that the phrase in the VLLW definition "in appropriately controlled quantities..." be explained.

Government's response: Government has taken heed of the widespread comments from the non-nuclear sector on their requests and arguments for maintaining current disposal practices for small quantities of VLLW (so-called "dustbin disposals"). However, in making its decision, it has also drawn upon a recent review of these practices[10], which constitutes a generic risk assessment for this waste type and for these waste routes (i.e. landfill and incineration). The authors of the review also considered alpha emitters in VLLW and a ten-fold relaxation for the soft beta emitters of tritium and carbon-14. It is concluded that on the basis that 20 microsieverts per year or less can be regarded as trivial, disposals of low volumes of VLLW from the non-nuclear industry remain acceptable. On the above basis, the definition of VLLW (low volume) largely remains as it has been up to now, with the amendment that alpha emitters are included within the total activity limit, and that a ten-fold relaxation for tritium and carbon-14 will be allowed by regulators across the UK.

To deal with large volumes of wastes in the same activity range (as proposed in the consultation document), the Government commissioned further research to ascertain whether a similar generic risk assessment can show that this waste, too, can be disposed of in the same way as low volumes of VLLW[13]. This work also considered alpha emitters within VLLW, and a possible ten-fold relaxation for tritium and carbon-14. The authors of this work have recommended that volume limits to any particular landfill for high volume VLLW disposals will need to be enforced. On this basis, Government has decided to add a second definition for VLLW (high volume) which is broadly as set out in the consultation document (para 4, chapter 4), but with the inclusion of alpha emitters in the total activity limit (i.e. maximum concentrations of four megabecquerels of total activity, and for wastes containing tritium up to 40 megabecquerels per tonne – note that the research

did not support a relaxation for carbon-14), and with the proviso that disposals must be to a specified landfill and that controls on disposal of this material, after removal from the premises where the wastes arose, will be necessary, in a manner specified by the environmental regulators.

In light of this new definition of VLLW, Government recognises that the question of exactly what volumes are meant by VLLW (high volume) versus VLLW (low volume) will need to be addressed. It is therefore planned that detailed guidance for the environmental regulators will be prepared as soon as possible in light of ongoing research on this issue.

In summary, VLLW will now have two definitions: VLLW (low volume) and VLLW (high volume). The former will mainly continue to apply to small quantities of waste from the non-nuclear industry; the latter will mainly apply to large quantities of waste from the both the nuclear and non-nuclear sectors. However, individual regulatory decisions will be needed on the exact applications of these two definitions.

11.3 Some respondents added that radioactive waste definitions needed to be harmonised with international practice.

Government's response: Please see **1.4** above.

11.4 A number of respondents said that the proposed redefinition should include specific comment on alpha emitters.

Government's response: Please see **11.2** above.

Q12: Do you believe that we have identified the correct options to be considered for the disposal of LLW, subject to the preparation of plans and safety cases that are acceptable to the regulators? (See Chapter 4, para 12.)

12.1 Some respondents commented that incineration and landfill were not long term management methods as they represented dispersal to the environment; a few others said this of incineration on its own, and others were not in favour of general disposal to unspecified landfill on the basis of traceability.

Government's response: Government believes that incineration and landfill are both viable and important options for the management of LLW, and both are safe under appropriately regulated conditions. (See also **11.2** above on risk assessments). The volumes of LLW and VLLW that are currently disposed of via these routes are very small in comparison with non-radioactive wastes arising from municipal, commercial and industrial sources. (See Table 1 under **Q2**.) See also Government response under **3.3**.

12.2 Some respondents thought that co-disposal with intermediate level waste (ILW), i.e. possibly via the post-CoRWM process, should be mentioned.

Government's response: This has been added to the options list in the policy statement.

12.3 Some respondents added that decay storage should be explicitly included in the list, and others that overseas based options (particularly for recycling) should be added.

Government's response: Decay storage is an invaluable tool in the management of LLW (and, indeed, other radioactive wastes). This is maintained as a management option in the final statement of policy.

Regarding shipment of wastes overseas for the purposes of recycling or treatment, the final policy statement contains new text which has been slightly modified to that contained in the 1995 policy (Cm2919)[4] for the following reasons.

In the case of treatment of waste that would make "its subsequent storage and disposal more manageable", the 1995 policy required that such processes were at a developmental stage, OR which involved quantities which were too small for the processes to be practicable in the country of origin. Cm2919 was written at a time when large scale decommissioning was not envisaged. But approximately 450,000 tonnes of radioactive metallic wastes will arise from decommissioning work over the next several decades, 90% of which will be ferrous metals. Currently, the UK has no facility for smelting of such material. Even if facilities were to be developed, the option to send material to alternative treatment centers might still be desirable.

Hence the new policy sets out the conditions under which UK regulators may authorise export and import of LLW. The policy allows for the export of such

material which previously would have been restricted on the basis of volume. Also, it is now the case that some overseas countries have processes to deal with contaminated metals that can no longer be considered “at a developmental stage”.

New policy on import and export of waste is confined to LLW only and for the reasons set out above, omits the previous conditions on export of waste for treatment.

In recognition that the UK may develop its own facilities for the treatment of wastes, and that an impending European Council Directive on the supervision and control of shipments of radioactive waste and spent fuel may expect that waste could be imported as well as exported, the new LLW policy also allows for the import of LLW for recycling or treatment.

In both cases of export and import, the new policy sets out the requirement that wastes remaining after treatment will be returned to the country of origin to a timescale agreed by relevant regulators and competent authorities.

12.4 Some respondents thought that marine and/or sub sea bed disposal should be included.

Government’s response: International treaties and laws do not currently permit the sea disposal of solid radioactive waste. However, see also **8.5** above.

12.5 A number of other options were suggested, for example microbiological treatments, or immobilisation in clay.

Government’s response: These were regarded as too detailed to include in the policy statement but will be shown to the NDA.

Q13: Should such LLW facilities be available to all waste producers including those in nuclear and non-nuclear industries, such as hospitals, research and educational organisations, and the oil and gas industries? If not, what should be the nature of any exception and why? (See Chapter 4, paras 12-14.)
13.1 Many respondents expressed the view that nuclear and non-nuclear wastes should be kept separate. A few believed there could be public opposition to co-disposing nuclear and non-nuclear waste. **Government's response:** The risk-based approach leads to the conclusion that there should be no distinction in principle between nuclear and non-nuclear radioactive wastes. Wastes are hazardous on the basis of their radiotoxicity, half-lives etc. and not on the basis of their provenance. See also **9.5** above. **13.2** Some respondents believed that charging schemes needed attention – commercial arrangements should be set up which do not differ between users. **Government's response:** Commercial arrangements are a matter for the NDA and the market. Please see **6.4** above. **13.3** Some respondents said that for non-nuclear users to take advantage of facilities, co-ordination was needed at national and regional levels. **Government's response:** Please see **1.6** and **2.1** above.

G. General

A number of points were made during the consultation which could not directly be categorised under the previous headings. Where a relevant Government response is not recorded above which would cover these points, the following responses are made.

G1 A large number of comments were received which, while not directly relevant to the statement of Government policy on LLW, were nevertheless possibly of value to other organisations such as the NDA and the environmental regulators. These comments have been collated and will be passed on to the relevant organisations.

G2 Is any new legislation planned in order to implement any aspect of the proposed policy?

Government's response: No. the Government believes that the policy can be implemented under existing legislation.

G3 Will the Government initiate any public information or publicity campaign relating to LLW management?

Government's response: Current research initiatives (see **8.4** above) will have the effect of introducing new information to the public concerning some of the problem areas in LLW, but the Government agrees that more could be done to provide public information on LLW disposals and associated risks. Government has written to the HPA, requesting assistance in the preparation of new information for the public.

G4 Can the risk target be explained and justified? Also, is it inconsistent with limits and constraints for other practices involving radioactivity and land remediation?

Government's response: These questions are sub-divided below:

G4(a) *What does a risk target mean and why has it been set at its present level?*

The risk target[15] of one death or serious injury in a million per year applies to the period after withdrawals of controls from a disposal site. It is a target rather than a limit or constraint because:

(i) a number of potentially exposed groups of people have to be considered, alongside the probability that any of them may become exposed. This is not the same situation as being able to identify existing critical groups, and being able to calculate their actual exposure through habit surveys and environmental monitoring;

(ii) a number of other uncertainties exist in calculations of dose into the future

(e.g. climate change, inadvertent human intrusion into the site), so the concept of a limit or constraint could not apply once the site was released from control;

(iii) more generally, imposing a regulatory standard in the form of a limit or constraint on risk for the performance of a disposal site after withdrawal of control is meaningless because compliance cannot be demonstrated.

The risk target has been set at its present level in conformity with Principle 4 of the IAEA Safety Fundamentals 111-F[16] (1996), namely that: "Radioactive waste shall be managed in such a way that predicted impacts on the health of future generations will not be greater than relevant levels of impact that are acceptable today." Because, as explained above, it is meaningless to set a limit or constraint on risk for the performance of a disposal site after withdrawal of control, it is necessary to consider what the **target** is for levels of impact that are acceptable today. In accordance with HSE[17], a level of individual risk of 10^{-6} y^{-1} is considered to be a suitable target for broad acceptability without concern (para. 130 says: "HSE believes that an individual risk of death of one in a million, per annum, for both workers and the public corresponds to a very low level of risk and should be used as a guideline for the boundary between the broadly acceptable and tolerable regions.")

G4(b) *Why should an operational LLW disposal facility have the same dose constraint as other nuclear facilities that have to discharge radioactivity to air and water?*

Although the regulators' guidance[15] refers to the dose constraint of 0.3mSv/y, based on the advice of the National Radiological Protection Board (now the Health Protection Agency), this is not to say that this level of constraint would necessarily apply to future disposal facilities. In practice, the regulators set limits on disposals, rather than a constraint on doses, in any authorisation issued for a disposal facility. In accordance with their usual practice, such limits (for a new disposal facility) would be set no higher than operationally necessary. Prospective assessments (i.e. future estimates of dose) would be carried out assuming disposals at the limits, to demonstrate compliance with the applicable dose constraint. Retrospective assessments (i.e. estimates of received dose) would also be carried out based on environmental monitoring. In addition, the authorisation would include a condition requiring the operator to use Best Practicable Means to minimise discharges.

G4(c) *What about limits and constraints for land remediation? Are they consistent with those applying to a LLW disposal facility?*

In recommending dose constraints to members of the public, the International Commission on Radiological Protection (ICRP)[18] distinguishes between interventions and practices. Intervention refers to a situation where action is being taken to reduce a pre-existing radiation dose, for example, where land has been contaminated by historic activities. Hence intervention is about doing something to alleviate a situation that already exists. This contrasts

with exposures which are occurring as a result of current practices (for example, the operation of a nuclear site), where one is seeking to ensure that doses are no greater than they need to be. For radioactive contaminated land, the Health Protection Agency has advised that the levels of exposure at which intervention should be considered is 3mSv/year[19]. This is set above the dose constraint of 0.3mSv/year for a practice because one of the principles of intervention is that the benefits must outweigh the detriments (i.e. take account of, for example, disruption to people's lives by the intervention, and the cost of so doing). A further difference behind the dose level at which intervention should be considered and the dose constraint for a practice is that in the former case, those responsible for the original contamination are no longer liable (or even unknown), whereas an existing site (i.e. a practice) is under the control of a known operator. However, if contaminated land was to be considered for some new development, then the dose constraint of 0.3mSv/year would apply, on the basis that a planned redevelopment would constitute a practice (i.e. would constitute an additional dose to those exposed after redevelopment and would be under control).

G5 Can the other relevant principles – sustainability, precautionary and polluter pays – be specifically stated in the policy?

Government's response: These principles were already implicit in the draft statement of policy.

G6 Can PPS10[14] be modified to specifically include radioactive waste?

Government's response: PPS10 sets out Government's national policies on land-use planning in England. (The equivalent in Scotland is Scottish Panning Policy 10). It already covers regional planning bodies' responsibilities for all waste streams in their areas, and that they should take account of any waste management requirement identified nationally. The final statement of LLW policy will be sufficient to permit integration with the wording in PPS10. Similar measures are under consideration in Scotland.

G7 Can the Government institute a fast-tracking procedure for planning applications for radioactive waste disposal facilities?

Government's response: The Energy Review[20] already highlights the importance of speeding up planning decisions on major infrastructure projects, and so this question is being dealt with as part of a wider Government process. However, fast-tracking will not be introduced specifically to implement this policy.

G8 Will the Government prepare a guide to the RSA93 to supersede the one produced in the 1960s?

Government's response: See response to OC1 below.

Other comments

OC1 There were requests for a wide variety of guidance documents:

a) what is being allowed in terms of landfill, incineration, recycling for materials above SoLA and clearance levels;

b) what is required (and when) in production of LLW plans (e.g. guidance and standards on content (and timing) of suitable plans for each of the different sectors;

c) more prescriptive guidance on BPM and ALARA;

d) clarify how requirements for production of LLW plans comply with BPM, BPEO, BAT etc;

e) clarify regulatory process for clearance;

f) criteria on which choice of options will be made;

g) producer needs to understand options available to them at outset of entering waste disposal process;

h) more generic RSA authorisations are needed, allowing disposal to classes of facility and not specific facilities;

i) consistent guidance on recycling of metals;

j) non-regular disposal of NORMs (sometimes outside of EOs) requires pragmatic guidance from regulator;

k) provide support to hospitals to undertake generic studies on incineration;

l) a national BPEO for all UK LLW has been suggested;

m) guidance on sampling and assay strategies;

n) Government should clarify licence surrender arrangements to facilitate more local disposal;

o) clear supporting guidance on best practice on how to characterise and sentence waste, and to prove material is free release will be important if policy is to be implemented effectively;

Government's response: Some of these requests are likely to be covered by existing guidance. However, we will consider these requests in more detail, and consult with the environmental regulators on what further guidance may be required.

OC2 The Landfill Directive was invoked as a possible constraint on LLW disposal.

Government's response: Whilst the Landfill Directive is relevant to all wastes that may go to landfill, LLW and VLLW comprise very small quantities of wastes compared to those arising from municipal, commercial and industrial sectors. (See Table 1 under **Q2**) It is also likely to be the case that for higher volumes of low activity decommissioning wastes (likely to fall into the new category of VLLW – high volume); disposal via landfill will be the only option after application of the waste hierarchy.
OC3 Are radioactive waste management principles aligned with those for managing Hazardous Waste? **Government's response:** Radioactive waste that is regulated through the provisions of the RSA93 is excluded from the definition of Hazardous Waste. It is therefore the case that radioactive waste that goes to landfill cannot be co-disposed of with wastes that are classified as Hazardous Wastes. The exceptions are some types of radioactive wastes covered by various exemption orders that are considered as Hazardous Wastes[21].

[1] Welsh Assembly Government, Northern Ireland Department of the Environment, Scottish Executive, Department for Environment, Food and Rural Affairs: "A Public Consultation on Policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom", 28 February 2006.
See http://www.defra.gov.uk/corporate/consult/radioactivity-llw/index.htm
[2] Welsh Assembly Government, Northern Ireland Department of the Environment, Scottish Executive, Department for Environment, Food and Rural Affairs: "Policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom", March 2007.
[3] Response submitted by Irish Government.
[4] White Paper, Cm2919: "Review of Radioactive Waste Management Policy: Final Conclusions", 1995.
[5] CoRWM: "Managing our Radioactive Waste Safely – CoRWM's Recommendations to Government", CoRWM Doc 700, July 2006.
[6] UK Government and the Devolved Administrations: "Response to the Report and Recommendations of CoRWM" PB 12303, 2006. See also, Hansard, Official Report: Column 1519: Secretary of State's statement to Parliament on 25 October 2006.
[7] Defra/Nirex: "2004 UK Radioactive Waste Inventory" Defra/RAS/05.002 Nirex Report N/090, October 2005.
[8] Environment Agency: communication dated 2006.
[9] (extrapolated from data from south-east England), in: Galson Science Ltd "Pilot Study to Assess Volumes and Disposal Routes for Solid Radioactive Wastes from Non-Nuclear Industries" December 2006. Data in this report are on a mass basis and have been converted to volumes assuming a density of one te/m^3. Uncertainty on data for the pilot study area is unlikely to exceed a factor 2-3.
[10] Galson Sciences Ltd "Dose Implications of Very Low Level Radioactive Waste Disposal Draft Final Report", SNIFFER project UKRSR09, January 2007. Data in this report are on a mass basis and have been converted to volumes assuming a density of one te/m^3.
[11] Total volume for ash from incineration includes volumes of primary LLW and VLLW sent for incineration.
[12] Source: Defra waste statistics 2003/4: see http://www.defra.gov.uk/environment/statistics/waste/download/xls/wrfg14.xls
[13] Kowe, R et al.: "Radiological Assessment of Disposal of Large Quantities of VLLW in Landfill Sites", HPA, March 2007.
[14] ODPM: "Planning Policy Statement 10: Planning for Sustainable Waste Management", July 2005.
[15] EA, SEPA, DoENI: "Disposal Facilities on Land for Low and Intermediate Level Radioactive Wastes: Guidance on Requirements for Authorisation", November 1996. This guidance, known as the "GRA", is about to be revised.

[16] The IAEA is currently updating 111-F, which UK environmental regulators will take account of when they review their own guidance (the GRA).
[17] HSE: "The Tolerability of Risks from Nuclear Power Stations (1992), and Reducing Risks, Protecting People", 2001.
[18] ICRP: "1990 Recommendations of the ICRP" Annal ICRP 21(1-3) ICRP Publication 60.
[19] For England, see Defra Circular 01/2006, Environmental Protection Act 1990: Part 2A "Contaminated Land" September 2006.
[20] See http://www.dti.gov.uk/energy/review/page31995.html
[21] For further information, see http://defraweb/environment/waste/special/pdf/hwr-notifguidance.pdf

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