

The Royal Society of Edinburgh

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

The Royal Society of Edinburgh (RSE) is pleased to respond to the Government consultation on the policy for the long term management of solid low level radioactive waste (LLW) in the United Kingdom. These comments have been compiled with the assistance of a number of expert Fellows of the RSE, under the direction of the General Secretary, Professor Gavin McCrone.

The specific questions raised in the consultation paper are addressed below:

Question 1: 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?

A change in LLW management policy is needed and in terms of science-based policy, a flexible and risk-informed approach is appropriate, with the proviso that risk is not solely anthropocentrically based. Recent advances in radiological protection require environmental exposures and risks to be included, i.e. risks to fauna and flora, as well as risks to humans.

In addition, while flexibility of approach is important, it is not clear how it is to be achieved given that the primary legislation is not to be changed and that the definitions of LLW and very low level waste (VLLW) given in the 1995 White Paper "Review of Radioactive Waste Management Policy: Final Conclusions" (Cm2919) and adopted here, with a minor modification, take no account of radiotoxicity or half-life. A flexible system should incorporate radiotoxicity, half-life, dose and the form of the waste. LLW as defined is extremely diverse and the associated risks correspondingly variable, depending on the uniformity with which the radioactive material is distributed in the waste and the probability for mobility or concentration by geological/chemical or biological mechanisms. At the lowest level of activity the toxic risk e.g. from heavy metals may be more significant than the radiation.

It should also be recognised that when considering the 'proximity principle', there must be a balance between the unnecessary risk and expense of transport and the undue proliferation of disposal sites in possibly unfavourable or undesirable places.

Q2: Have we identified the correct requirements for the production of LLW management plans?

The correct requirements for the production of LLW management plans appear to have been identified and are reasonable if the producer has an actual disposal route, which raises the questions of proximity and transport.

Q3: Is use of the waste hierarchy as defined, the right way of securing LLW minimisation?

The use of the waste hierarchy is valuable but the most important considerations will centre on the establishment of appropriate boundaries and appropriate segregation for the LLW categories. Unless there is careful planning, the spread of contamination could be a significant factor in determining final waste volumes, and the removal of surface contamination could generate additional volumes of liquid waste.

In addition, incineration is not a disposal mechanism as such, as there will be active ash and contaminated filters. Rather it works towards volume reduction with the added complication that the residual activity in the ash could move this into the intermediate level waste (ILW) category since the mass has been reduced.

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?

The obstacle to greater use of incineration would most likely arise from local concerns about emissions and safety and because of the requirement of unnecessary manipulations and separations of waste streams while increasing environmental release.

Unless firm and binding public guarantees can be provided on the environmental impacts, including particle size distribution and associated radioactive content of any stack releases, coupled with regular/daily monitoring reports, this method will pose uncertainties in the public domain that can potentially never be resolved to the satisfaction of concerned citizens.

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?

The proximity and minimisation of transport principles should apply to all kinds of LLW, particularly to large volumes of contaminated soil such as occur at Sellafield and to a much lesser extent at other sites. There should be a strong presumption for disposal on site for locations which are likely to remain under continued radiation management e.g. existing nuclear power sites.

Large volumes of lightly contaminated concrete should also be disposed of locally because the free release boundary established from measurements of the activity in the concrete will very probably depend on the extent to which highly mobile tritium has moved through the material. It makes no sense to move material like this, which has a radiologically insignificant radioactive content, around the country.

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?

The NDA should provide facilities for non nuclear industry producers because the quantities involved which cannot be disposed of by incineration or controlled burial will not place a great burden on any facilities which NDA might have to develop in pursuing its primary responsibilities under the Energy Act, and to avoid undue proliferation of responsibilities and sites.

More generally, the arrangements for disposing of the nuclear industry's radioactive waste must be, and must be seen by the public to be, transparent, logical, just and appropriate. In this connection, consistent practices and standards of performance should be applied by the NDA to all non-nuclear industry LLRW, rather than having a variety of approaches leading to further public uncertainty and growing apprehension about the disposal of all levels of radioactive waste. Without such integration there is the clear potential for some issues and wastes to fall between organisational responsibilities and of course for duplication of effort and cost in other areas. Indeed, experience in Japan of a fragmented waste management approach has already led to considerable unnecessary duplication of effort as several waste streams were found to encounter similar problems. In light of this, countries such as Switzerland have elected to have only one organisation responsible for all waste types, including medical, industrial and research, and this structure is found simply to be much more efficient.

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?

The NDA is funded by the public and Government should not expect local communities (which in any case do not have the expertise) to take responsibility for their own radioactive waste. The non-nuclear industrial wastes derive from activities which have particularly clear benefits to the public (such as in hospitals and education) and therefore should be in the first rank of wastes to be managed responsibly regionally and nationally by the NDA. However, those producing the waste could be asked to pay the costs, and a charging mechanism reflecting the true costs moderated by regulation would seem likely to provide an appropriate solution.

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?

Planning at local level is appropriate for waste at the VLLW activity range, but as mentioned above, Government should not expect local communities to take responsibility for higher activity LLW waste.

Q11: Do you support the proposed redefinition of VLLW to make it compatible with the wider definition of LLW?

The redefinition of VLLW in terms of mass is sensible and should be adopted, though equally exact and explicit quantitative clarification is needed on the limits on any alpha activity. The use of the single stated density in the conversion ensures that the limits for higher density materials do not become too small.

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?

We would agree with the options identified, except the general disposal to unspecified land fills and the fate of all radioactive waste must be properly documented and controlled. In addition, as mentioned above, incineration should be classed as volume reduction rather than disposal.

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?

All waste producers must have access at reasonable cost to disposal facilities in the interests of public safety and to avoid undue proliferation of responsibilities and sites.

Additional Information

In responding to this consultation, the Society would like to draw attention to the following Royal Society of Edinburgh publications which are of relevance to this subject: *Managing Radioactive Waste Safely* (March 2002); *Modernising the Policy for Decommissioning the UK's Nuclear Facilities* (March 2004), *Long-term radioactive waste management* (January 2005) and *How Should the UK Manage Radioactive Waste?* (June 2005). Copies of the above publications and further copies of this response are available from the Royal Society of Edinburgh (email: evidenceadvice@royalsoced.org.uk) or the RSE Website (www.royalsoced.org.uk).

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