

Meeting:	NuLeAF Steering Group, 30 April 2008
Agenda Item:	6
Subject:	Consultation on Radiological Protection Objectives for Land-Based Disposal
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Purpose:	To report on the Health Protection Agency (HPA) consultation

Introduction

This report outlines the HPA's proposals for revised advice on radiological protection objectives for the disposal of solid radioactive waste.

These are outlined to provide the Steering Group with an indication of the nature of risk assessments for disposal facilities.

Recommendations

That the Steering Group agrees to:

- 1 note the HPA proposals and comments made at the recent stakeholder workshop; and
- 2 draw member authority attention to the offer from the HPA to meet to discuss the proposals.

The HPA Advice

The HPA Radiation Protection Division is responsible for preparing advice to Government on radiological protection.

The proposed advice is intended for the detailed risk assessment of solid radioactive waste disposal facilities at the planning stage. It will replace advice issued by the former National Radiological Protection Board in 1992. The scope of the advice is restricted to radiological risks and the protection of human health. An important principle is that people in the future should have the same level of protection as people have today. The protection of non-human species is outside the remit of the HPA.

The advice will apply to all types of solid radioactive waste and all types of land-based disposal facilities. The primary focus is on the situation after a facility has closed, rather than on the operational period when it is receiving waste.

HPA proposes to divide potential exposure routes into three categories:

- Natural processes – including groundwater driven flow of radioactive contaminants and climate change effects. These have gradual, continuous interactions with the disposal system being assessed.
- Natural events – including volcanic activity, seismic activity and flooding that have a specific start time and a shorter duration than ‘natural processes’.
- Human intrusion – that can be deliberate or accidental. The advice focuses on accidental intrusion, rather than intrusion in the knowledge of the facility’s presence and contents.

The HPA’s main proposals include:

- For natural processes and events, repositories estimated to give rise to a risk greater than 10^{-5} per year would not be acceptable. This is known as the annual risk constraint.
- Optimisation is also required to demonstrate that any risks below the constraint are as low as reasonably achievable. If risks are below a ‘lower guidance level’ of 10^{-6} per year, then the scope of the optimisation study can be restricted to the design of the repository.
- The total probability of a person receiving a dose above 0.1 Sv per year as a result of natural processes and events should not exceed 1 in 1 000 000 per year.
- For inadvertent human intrusion, different advice applies according to the type of facility and duration of exposure. For near surface facilities and short-term exposures (less than a few weeks), a dose guidance level of 20 mSv per year applies. For longer-term exposures, the dose guidance level is 3 mSv per year. For geological facilities, HPA proposes using ‘stylised scenarios’ to explore the range of likely probabilities and consequences and to demonstrate that the site has been optimised.
- Uncertainties in the estimates of doses and risks should be discussed.

HPA notes that any assessments of doses and risks should be regarded solely as estimates of potential impacts based on the documented assumptions. They should be seen as indicators of safety, not as predictors of safety. It adds that the uncertainties associated with dose or risk estimates increases with time and therefore the appropriate approach changes from a more quantitative one to a more qualitative one.

Following facility closure, HPA proposes that time periods are likely to include ‘active institutional control’, ‘passive control’ and an ‘uncontrolled phase’:

- Active institutional control: this period involves on-site management and can include monitoring, surveillance and corrective actions. The time period may vary with type of facility and is likely to be significantly longer for geological disposal. During this period, HPA advises that the system of dose limitation should be applied as for an operational facility.
- Passive control: this can include existence of accessible records and land use control. HPA suggest that this period be considered to last for 10 000 years. During this time there may be major local and regional changes to the biosphere (eg rivers or lakes drying up, coastal erosion and climatic impacts), and significant changes in human behaviour. However, significant natural changes in the UK geosphere are considered unlikely. HPA makes suggestions for the way possible exposures to a number of ‘hypothetical representative persons in representative biospheres’ should be calculated to ensure adequate assurance of the protection of future communities.
- Uncontrolled phase: HPA suggest that this cover a period between ten thousand and one million years, when the range of possible biosphere conditions and human behaviours are too great to allow reliable modelling. HPA points out that repeated glaciation is expected within this timeframe. It proposes that calculations are performed to give an indication of the possible range of exposures using stylized ‘reference’ assumptions. HPA suggests that it is inappropriate to apply numerical dose or risk criteria beyond this timeframe.

The consultation started on 3 March and runs to 3 June.

Stakeholder Workshop

The HPA organised a stakeholder workshop on 18 April to discuss its proposals. It is understood that the main issues included:

- Whether the use of numerical targets conveys a spurious impression of accuracy, particularly as applied to the long-timescales involved in geological disposal of higher activity wastes. HPA indicates that numerical targets are proposed to provide focus and benchmarks for the assessments that will be undertaken.
- Whether it is necessary to have an annual risk constraint *and* a lower guidance level.
- The need to clarify what constitutes accidental human intrusion and the approach to applying HPA advice in different cases.
- The need to clarify the approach to take to disposal facilities that may not fall easily into the categories of either near surface or geological.

HPA has offered the possibility of arranging a meeting for any authorities that may wish to discuss its draft advice in further detail.