The Long-term Management of Nuclear Waste in the UK: the Committee on Radioactive Waste Management

Prof. Gordon MacKerron – Director, Sussex Energy Group, SPRU and Chair, CoRWM

EPRG Energy and Environment Seminar, Judge Business School, Cambridge

15 May 2006

Sussex Energy Group
SPRU - Science and Technology Policy Research
History

- 1950s and subsequently – poor waste management practices, especially at Sellafield and Dounreay
- 1960s onwards – expansion of nuclear reactor programme and commitment to reprocessing spent fuel
- 1976 – landmark ‘Flowers report’ – no further commitment to nuclear power without resolution of waste issue
- 1980s – 1997 – various failed attempts to find disposal sites first for high level waste (HLW) and later intermediate level waste (ILW)
- After 1997 – Government recognition of death of DAD(A)
Technology

- Three UK waste categories: Low level waste (LLW), Intermediate level waste (ILW) and High Level Waste (HLW – heat generating)

- CoRWM inventory (as well as very limited LLW)
  - ILW - 80% of volume, 3% of activity
  - HLW - 0.3% of volume, 50% of activity
  - plutonium - 1% of volume, 5% of activity
  - uranium - 17% of volume, <0.01% of activity
  - spent fuel - 2% of volume, 42% of activity

- In volume terms, nearly 500,000 cubic metres or about 5 Albert Halls’ worth, and hazards may persist for hundreds of thousands of years

Sussex Energy Group
SPRU - Science and Technology Policy Research
CoRWM

Set up in November 2003 with a remit to start again – ‘blank sheet of paper’ – and examine all potentially credible management options

Membership drawn widely e.g. nuclear industry, ex-Greenpeace, Chair of Equal Opportunities Commission - not a conventional ‘science advisory’ committee

ToR: to recommend long-term management option to Government to protect people and the environment and inspire public confidence

Required to consult extensively with public and stakeholders

ILW, HLW, U, Pu and spent fuel all within ToR, but not LLW (currently goes to Drigg)
Process

- Three major rounds of public and stakeholder engagement (PSE), each of 12 weeks’ duration, including a ‘framing’ round early on

- Progressive narrowing of range of management options from a long-list of 15 to a short-list of 4 main options, each stage being informed by PSE results

- Introduction of intensive specialist review after short-list chosen, involving science, technology, ethics and social science

- Use of multi-criteria analysis as framework for much of specialist input, with ‘scoring’ done by specialists and ‘weighting’ by CoRWM after PSE review

- Draft recommendations also informed by ‘holistic’ assessment (including ethical and environmental issues)

- Significant early criticism on limited use of science, now broadly met
• Largest consultation of this type undertaken in UK

• Clear distinction drawn between public (non-aligned) and stakeholders (having some ‘interest’)

• Public canvassed in several ways, mostly deliberatively eg
  • Citizens Panels, meeting three times
  • Large school project involving over 1000 students

• Stakeholders also variously canvassed eg
  • National Stakeholder Forum
  • Nuclear Site Round Tables
Multi-criteria approaches (1)

- 11 headline criteria established, with total of 26 sub-criteria
  - 3 safety criteria: public safety (short term and long term) and worker safety
    - security
    - environment
    - amenity
    - socio-economic
    - burden on future generations
    - implementability
    - flexibility
    - cost
Multi-criteria approaches (2)

- 7 specialist panels set up to cover 11 criteria, each containing 6-12 people
- Panels had two main meetings, to set up scoring scheme and then to assign actual scores – performance of each short-listed option against sub-criteria
- Specialist scores were baseline for MCDA, but wider group of specialists and stakeholders were invited to comment and provide alternative scores
- Public consultation on weighting (as far as possible ‘swing weighting’)
- CoRWM completed MCDA, ultimately using its own view of weights
- Substantial sensitivity testing on both scores and weights
- MCDA results showed variants of deep disposal to be robust to almost all ‘bounding cases’, in which both scores and weights were changed
Ethics

• CoRWM held major workshop, using inputs from four ethicists with relevant experience in science/nuclear issues

• Major ethical issue is inter-generational equity, involving assessment of both justice and liberty principles

• Ethical issues reflected in MCDA criteria – ‘burden’ criterion reflects justice (and polluter pays concept), while ‘flexibility’ criterion reflects liberty

• Ethical issues also considered in holistic assessment – liberty aspect of inter-generational equity seem extremely weak when main inheritance of future generations will be waste not resource

• Critical question is then confidence in long-term safety of geological disposal
Short-listed options

- Interim storage (up to 300 years) – i.e. storage not an ‘end-point’
- Geological disposal – 300 –1000 metres deep, designed for early closure
- Phased geological disposal – as previous option, except designed to remain open, if desired, for up to several hundred years
- Fourth option, applying only to reactor decommissioning wastes, is shallow disposal, probably near existing locations
Draft recommendations (27 April)

• An integrated package – warning against cherry-picking – and unlikely to change radically

• Three main elements: deep disposal the end-point, potentially for all waste streams; interim storage a vital intermediate and contingency step; implementation to be based on principle of community willingness to participate and right (up to pre-determined point) to withdraw

• Recommendations neither a red nor green light for nuclear new build; no technical problem in principle in accommodating new build wastes, but political and ethical issues are different for new build wastes compared to legacy wastes