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

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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
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)
• 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

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• 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

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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