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CARRY ON AT CORWM!

On 17 March 2003, Elliot Morley the then newly appointed British government minister for the environment, wrote to the chair of the Radioactive Waste Management Advisory Committee, RWMAC, thanking him for his hard work and sound advice. In doing so the minister summarily put RWMAC into abeyance.

In some ways RWMAC was the architect of its own demise. For years this quango had sat on the fence, seemingly only perking up to respond in great detail to the Government's 2001 consultation process on *'Managing Radioactive Waste Safely'*. For this, RWMAC suggested that any future decision-making process on radioactive waste should be guided by six principles of openness and transparency, public involvement, accountability in decision making, an adequate time scale for tackling the issues involved, peer reviewing of the scientific and expert evidence, and a somewhat high-minded principle of equity, that is the process for deciding the policy and the policy itself. These six principles laid down the framework of RWMAC's replacement, the Committee on Radioactive Waste Management (CoRWM), formally established by minister Morley at the time of RWMAC's demise.

CoRWM was to be a *back-to-basics* committee of diverse membership, it was to review the options for the management and disposal of intermediate- and high-level radioactive wastes and other nuclear materials, its budget was a stumping £4,887,000, and it was to report by July 2006. Most of all, CoRWM was to *'inspire public confidence'*.

So now, more than a year on since its establishment and just over a year to go before its final reporting, how and with what success has CoRWM addressed Britain's burgeoning nuclear waste problem?

By all accounts, not very well.

First, there was the stumbling and embarrassing start with the first committee chair Katherine Bryan resigning shortly following the inaugural committee meeting in November 2003; then, in its clinically dissecting 5th Report, the House of Lords Science & Technology Committee lambasted CoRWM's diverse membership, noting that it *"had no confidence in the technical ability within CoRWM itself to understand the science"* of radioactive waste management and that it believed that it could not be considered an *"intelligent customer"* for receiving technical advice; and in December 2004 one of its sponsoring government departments, Trade and Industry (DTI), neatly sidestepped CoRWM by determining itself the long-term policy for substitution of high-level waste arising from overseas fuel reprocessing contracts. If not enough, in January 2005 Dr Keith Baverstock was suspended from the committee, with Professor David Ball consequentially and voluntarily suspending himself at about the same time thus, with the temporary or otherwise loss of these two established, technically based CoRWM members, further weakening the scientific and technical element that the House of Lords had earlier identified to be in short supply on CoRWM.

So what has led this debacle?

It is not that the UK's radioactive stockpiles are any more complex and diverse than other nations that have been involved in nuclear power generation, the nuclear fuel cycle and a nuclear weapons arsenal and, in these respects, the UK is about on par with France, a country that manages its radioactive waste arisings in the absence of any great controversy. In terms of volume, the current UK stockpile, derived from decades of military and nuclear power and fuel activities, comprises around 2,000 cubic meters of high-level (heat emitting) radioactive waste and 75,000m³ intermediate-level waste with, on the basis that there will be no expansion of the UK nuclear fuel and power generation activities in the foreseeable future, the arisings over the next 100 years or so will increase to a total of about 3,000m³ high- and 250,000m³ intermediate-level, with the latter deriving mostly from power station and fuel plant decommissioning wastes. A third category of radioactive waste, low-level, is continuously disposed to an established shallow burial repository in north-west England, so its disposal option is already determined, although there is some doubt whether this facility (Drigg) has the capacity to receive the projected total of 1,800,000m³ of low-level wastes arising over the next 100 or so years.

In the UK the policy and route to effective radioactive waste management for the short, interim and longer terms have been well prepared: as long ago as 1976 the Royal Commission on Environmental Pollution identified the need to develop firm policies on long-term storage and eventual disposal of radioactive wastes; more pressure was brought to bear by the 1982 industrial action of the seamen's trade union halting the sea-dumping of radioactive wastes (mainly intermediate- and low-level), a practice that was formally abandoned by the UK in 1985 in line with the recommendations of the Holliday Review; and with the formation of the nuclear industry radioactive waste executive (NIREX) there developed, albeit in fits and starts through the 1980s and 1990s, a radioactive waste management strategy progressing from the shallow burial proposals through to the final phased deep disposal repository concept. NIREX pressed on, mysteriously arriving at its optimum repository site which just happened to be adjacent to the by far largest UK waste producer, the British Nuclear Fuels reprocessing plants at Sellafield.

But even with all of its progress, NIREX never wholly convinced and took the public with it, falling at the last hurdle when in 1997 the outgoing government upheld a planning decision **not** to grant NIREX permission to proceed with its rock characterisation laboratory, an absolute prerequisite for the development of the full scale deep repository.

So it might be argued that much to the credit of NIREX, the UK had turned itself around since the pre-1985 days of sea dumping: it had invested heavily (£500M) in researching and developing viable means for future management and safeguarding of its radioactive wastes; it had developed and largely substantiated a generic phased geological repository concept; and it had put in place the associated arrangements to ensure that the radioactive wastes of yesterday, today and tomorrow would be packaged and shielded in ways that could be accepted by a future generic deep repository.

Simply, or so it seemed, all that needed to be resolved by CoRWM was the matter of tinkering with and endorsing NIREX's phased deep repository concept, and then determining the timing of the onset and lengths of the institutional and post-institutional care periods, incorporating these into a policy that would inspire public confidence.

However, CoRWM's approach to this was flawed in three important respects: First, it assumed that the public would readily become involved in a consultative process whose outcome, in the absence of CoRWM having any say whatsoever on the final siting of the repository, would have no effect on them directly – this has clearly failed as borne out by the lean attendance figures of the public to the regular CoRWM road shows carried out around the provinces nearby nuclear sites (with an average of 14 and 8 individual stakeholders attending each of the open meetings and discussion groups respectively, although a high proportion of these are interested professionals from NIREX, the government's DTI, local press and local authorities). Second, and again relating to final site selection, future generations might not be particularly forgiving if CoRWM presented the wrong policy simply because it was considered to have 'inspired public confidence' mainly on the basis of appeasing today's generation. And, third, CoRWM decided to start afresh with a 'blank sheet of paper' and, in doing so, seemingly cast aside the previous heavy investment of intellectual effort, R&D and funding of the previous two or more decades only to replace it with something far less rigorous.

Thus CoRWM, subsequently to be described as collectively unintelligent in technical matters, committed itself, in the first instance at least, to unravelling the scientific and technological complexities of each of a long list of potential options including surface storage, near-surface storage, near-surface disposal, deep disposal, direct injection, disposal at sea, sub-seabed disposal, subduction zone disposal, dilution and dispersal, partitioning and transmutation, burning in reactors, incineration, disposal in space, and disposal in ice sheets. Several of these options should have been ruled out in the first instance as being either outlawed by international treaty, clearly unacceptable, daft and/or totally barmy, and at least one option (partitioning and transmutation), if at all practicable, would provide only a small and partial solution.

Yet, much against common sense and at its half-way stage to reporting in July 2006, CoRWM is still at the stage of reviewing the 'no go' options of sea disposal, sub-seabed disposal, disposal in ice sheets and, quite astonishingly, disposal in space.

But, most of all, CoRWM has failed, so far at least, to inspire and gain the confidence of the public.

If its objective to involve and inspire a wide stakeholder group (the public, industry, etc) is to be met then CoRWM would need to successfully mould the best scientific input, where the knowledge exists, with or against criteria that have been established by the stakeholders, either acting as individuals or in groups. This might be conveniently described as a three stage process whereby acknowledged experts are principally responsible for

identifying and constructing a series of radioactive waste management profiles, second with CoRWM adapting and presenting these to the stakeholders, and with stakeholder knowledge being introduced on an option basis with some form of weighting of criteria.

The CoRWM approach to this has, apparently, encountered a number of difficulties.

The input from science and technology experts may have been overly managed and constrained. For example, CoRWM itself has identified a series of 'tasks' that are to be undertaken by expert consultants and, to date, about 45 tasks or 'work packages' have been sent out to consultants via the programme manager, NNC Limited. For each work package the consultant has, on average, 5 to 7 days of work time and, for certain tasks, there is an additional one-half to a full day for the peer reviewing of the consultant's input.

CoRWM consider this very short time commitment for exploring the science of radioactive waste management to be adequate, arguing that it was not within its remit to commission fundamental scientific work and that sufficient information on the physical processes, etc., already exists to permit a decision on the most appropriate radioactive waste strategy to be made in principle. This seems to be at odds with the subject nature of certain of the CoRWM work packages, that are either relatively unique (ie disposal in space) or have not previously attracted that much attention but which are critically important (ie risk from terrorism to surface stores, transport, etc).

In the specific example of the work package covering terrorism, the specification generated for the task (apparently written directly by a CoRWM member without external guidance or peer review) might be considered by some to be particularly naïve, in that it required the frequency of incident to be assessed in terms of the Nuclear Installations Inspectorate's Safety Assessment Principles (SAPs) which are, fundamentally, based on a pre 9/11 attack *posteriori* rationale, and it omitted to identify the vulnerability of consignments of waste during the transport phase. The terrorism work package report itself (CoRWM Document N° 619) comprises a single page summary and six pages of text which, because of the security issues involved, admits that "*it is not comprehensive*", and it seems to be an incomplete draft retaining its text editing comments, deletions, etc. - hardly the stuff to engender public confidence.

In fact, it is believed that Dr Baverstock's discontent, which resulted in his suspension from CoRWM, related to what he identified to be the ad hoc and piecemeal introduction of science and engineering to CoRWM's work. Furthermore, the suggestion is that several members of CoRWM are antagonist to any form of scientific expertise and that, although some are not, they are poorly equipped to spot a genuine expert, not understanding the absolute strengths of the scientific approach, how to do it and how long it could take.

In these respects, given the minimum time allocation for the expert reports, the coverage and detail of the expert profiles must be minimal indeed, perhaps not much more than the written up results of a Google search; some work (such as the terrorism package) has not been at all peer reviewed; and for the important issue of terrorism risk, which may effectively rule out the on-surface storage option, CoRWM has not received confidential advice from the appropriate UK security agency (the Office of Civil Nuclear Security – OCNS).

The second difficulty derives from the decision-arriving techniques employed by CoRWM itself to rationalise the expert input, engage the stakeholders and to assess the long-term waste management options. Early in its proceedings CoRWM had embarked with a little known (or proven) technique referred to as *Deliberative Mapping* (DM) in order to explore how public and expert knowledge might be integrated into the decision making. DM was introduced to CoRWM in or about February 2004, thereafter there occurred a spend of some £80,000 to £120,000 on trials, with additional costs involved in paying the 'citizen' group and experts to attend. When, in September 2004, it was pointed out that a full DM programme would have to be run several times (thereby extending the cost to several £100,000s) to have even a slim chance of coping with the many, poorly-understood variables which could influence DM's output and, hence, the final policy formulation, the DM approach was abandoned.

CoRWM received further advice in December 2004 on multi-attribute analysis from a number of distinguished practitioners, including Professor Ortwin Renn. However, even now so late in its evaluation programme, it is not clear how the committee intends to proceed. This is because the trashed DM exercise has taken so much time from CoRWM's programme that there may not now be sufficient time remaining to run sophisticated Renn-like analyses. The risk here is that, under its tight time schedule, CoRWM may opt for another unproven technique referred to as *Strategic Action Planning* (SAP), primarily because a number of CoRWM members are familiar with it via their experience in a recently completed national dialogue on other aspects of the UK's nuclear industry.

So what has been the outcome of CoRWM's deliberations since its inception in November 2003?

Well not that much has been achieved if the committee is still faltering over daft and barmy ideas as disposing radioactive waste to space, and there is a sense from the depth and understanding of the technical input to CoRWM that science and technology has not been given anything like the right level of priority. The time consuming, and some might opine, time wasting and relativistic adoption of the Deliberative Mapping methodology may have led the committee astray, even prompting the House of Lords Science and Technology committee's seemingly apposite comment that some of CoRWM's proceedings '*could be taken as a satire on bureaucratic processes in general*'.

Limiting the scientific and technological input to the leanly sponsored 'work packages' runs the risk of introducing shallow if not 'junk' science which an 'unintelligent' receptor could not be expected to differentiate, let alone use to arrive at a rational scientific and/or technological outcome. The excuse proffered by CoRWM for restraining the science input is that it is not necessary to commission any new, fundamental work but, quite contrary to this, the 9-11 the terrorism risk assessment, which runs counter to the established PRA assessments universally adopted by the nuclear industry, is entirely new.

Indeed, CoRWM's approach to prioritising public involvement follows the present day political fashion to include, from the onset, the public in decision-making on complex technical issues, is at jeopardy of introducing a category of self-appointed 'experts' to act as voices of authority. This approach is high risk because it could demoralise the true experts by marginalising their work and/or sully their reputation, it is patronising to the public by diluting, eroding and sometimes trivialising the technical information to render it 'accessible' and, most of all, it panders to those who manipulate and purport to know what the public wants.

The means by which Britain's nuclear wastes are safeguarded, managed and eventually disposed of is a complex and demanding technological problem, it is bounded by strong economic and social factors, it has to be a sustainable development for generations to come and, of course, the determination of a management policy will open or firmly close the presently ajar door leading to further nuclear power generation in the near and interim futures. The contribution of science and technology in finding an acceptable policy, more so a solution, to this problem is absolutely fundamental and it cannot be sidelined by CoRWM as just another mutable point of view.

So, could CoRWM's public stakeholder engagement (PSE – ie public dialogue) simply be a ruse or sideshow to offset the demise of the much berated political debate that has fumbled on and off for many years over nuclear matters in the UK and, instead of holding those responsible for the mess of Britain's radioactive wastes accountable, far from making the procedure more transparent might it not result in a greater politicisation of the decision-making process?

ACKNOWLEDGEMENTS

This article draws upon a number of sources, including the House of Lords Science & Technology Committee 5th Report, *Radioactive Waste Management*, December 2004, the government's *Managing Radioactive Waste Safely*, September 2001, and a number of specialised papers including Bill Durodié's *Limitation of Public Dialogue in Science and the Rise of the New 'Experts'*, Critical Review of International Social and Political Philosophy, 2003, Ortwin Renn's *Hormesis and risk communication: Considerations about Uncertainty, Ignorance and Governance*, Human & Experimental Toxicology, January 2003, my own *Review of the Strategic Action Planning Working Group*, Environment Council October 2004, David Ball's paper *Taking Care with Radioactive Waste in the Post-modern Era*, as given at the Society for Risk Analysis (Europe) Conference, Paris, November 2004, together with a number of CoRWM papers, including David Collier's *Evaluation of the Deliberative Mapping Pilot*, August 2004, although that said all of the views expressed in this article are entirely my own.

