

Enabling Nuclear Innovation

Environmental innovation can save time and reduce cost - if you can learn to think in new ways

By Ian Jackson

Environmental legislation is traditionally regarded as adding cost, not a source of value. But the UK Government's proposed *Energy Bill*¹ may soon turn this on its head, placing environmental innovation at the heart of Britain's nuclear clean-up strategy. For companies competing to decommission nuclear sites, environmental performance will be a huge differentiator. Out will go the vertically-integrated public sector management structures of the past, to be replaced by modern performance-based management contracting arrangements relying on innovation to reduce the projected £1 billion per year cost of clean-up. And therein lies the problem. True innovation requires risk-taking. But traditionally managers in the nuclear industry are implementers of Government policy, not innovators, where often only the safest, and by the same token least innovative, ideas are taken forward. This is not surprising since scientists traditionally favour analytical thinking over the capacity to innovate. Breakthrough answers needed to solve decommissioning problems are unlikely to be found within the continuous improvement culture of the nuclear industry, simply because better mousetraps won't necessarily make a big difference to the estimated £48 billion cost of decommissioning Britain's civil nuclear infrastructure over the next 100 years. Of course the regulators can play a role encouraging environmental innovation, but no amount of regulation can make a nuclear workforce live these qualities.

How then, can the nuclear sector learn to innovate ?
The answer seems to lie with importing fresh ideas.

Unblocking Innovation Barriers

- *Focus on innovation* instead of continuous improvement - better mousetraps won't make a big difference to scope and cost savings anyway.
- *Challenge "we can't do that"* to reveal the underlying assumptions that are limiting progress. Breakthrough business processes are often hiding in illogical solutions.
- *Borrow a best practice from a different industry.* Then recombine existing technologies but in different ways to outperform the competition.
- Remember that *content and context* drive projects. All solutions are context dependent and can rarely be transported without modification.
- Be *open-minded* in tailoring a service to match the customer's specifications. Develop *common objectives* with the customer and trust each other to achieve them. Collaborate to avoid conflict.
- Develop *fixed outcomes and clear end-points* that need to be achieved. Focus on the end result, not the letter of the specification. Avoid claims culture.
- Provide *incentives* for everyone to save costs. Exploit the experience of supply chain partners. Work hard at developing a no blame culture and avoid wasting resources cross-checking each other.
- Avoid *risk-dumping* projects where the customer's only interest is in driving down cost and you cannot add value through innovation.

US Strengths and Weaknesses

Steve Jobs, founder and CEO of Apple Computers, points out that the reason creative people are able to innovate is that they've had more experiences or thought more about their experiences than other people. Ironically this places companies outside the nuclear sector in a stronger competitive position to manage nuclear decommissioning projects. For traditional nuclear operating companies, the challenge is to go outside the nuclear industry to find and bring back new solutions. Management processes are artefacts of technology and need to be replaced as better technology offers different opportunities.

Although North America is in the lead it hasn't got it all right yet. US President George Bush makes an unlikely champion of the environment. But soon after entering the White House, the so called Toxic Texan's new administration ordered a root and branch review of the US Department of Energy's \$220 billion Environmental Management Programme, one of the largest nuclear clean-up programmes in the world. His motive may have been to save money but the conclusions of Bush's *Top-To-Bottom Review Team* are nevertheless startlingly frank in exposing serious weaknesses in the US decommissioning system².

Viewpoints

"I believe strongly that our ability to innovate differentiates us from our competitors and we at AECL have been concentrating our efforts on innovation. But this innovation is not restricted to technology. We know it is important to innovate in other areas of our activity, including product and service delivery, business models, customer relations and internal processes.... We are looking at our customers in a new light - as partners. Key to a partnership is the goal that partners work together to add value to each other's business, sharing risks and sharing rewards together. This is quite different from the traditional customer/supplier model.... Put another way I want AECL to prosper through the success of our customers, not through contracts that simply address their problems or add revenue or income to our bottom line. For some of you who have known us for a long time this is a fundamental shift in our thinking".

Robert Van Adel
CEO, Atomic Energy of Canada Limited
March 2003

"Over the last decade, as our name implies, EM has focussed on managing risk rather than reducing or eliminating it. We have avoided many tough decisions, rather than confronting them. We have not held ourselves accountable to deliver real risk reduction.... In short our indicators measured process not progress, opinions not results. Obviously, a programme that reports high success in its internal indicators while failing to deliver to the public has a real problem".
Assistant Secretary Jessie H Roberson
US Department of Energy
February 2002

"A timeline of 70 years means decades of treading water on environmental hazards that need to be eliminated not just managed. It is not fair to tell people who live near these sites that if everything works right, maybe their Grandchildren will live in communities that are risk free".
Secretary of Energy, Senator Spencer Abraham
US Department of Energy
February 2002

Problems in the US have focussed on the relatively small proportion of the environmental budget that is actually spent on cleaning-up sites. Since the Environmental Management Program began in 1989 only one third of the programme's \$60 billion expenditure has been spent on real clean-up. Not surprisingly Bush's review team concluded that without a fundamental change in the Energy Department's contracting strategy, nuclear clean-up timescales and costs would inevitably increase to more than \$300 billion and lead to unnecessarily prolonged and potentially severe public health and environmental risks; something which echoes in the UK where last year BNFL's long term clean-up liabilities exceeded its assets, precipitating action by the Government to create a Nuclear Decommissioning Authority (NDA) to manage the UK's own nuclear clean-up.

Accelerated Clean-Up

In March President Bush sought a record \$7.24 billion from Congress to begin an accelerated clean-up of US nuclear sites, aiming to halve the 70 year remediation timescale and in doing so save \$50 billion in total lifecycle costs. At the heart of Bush's new strategy is a shift away from Management and Operation (M&O) contracts, where fees are paid largely on the contractor's level of effort, towards performance-based contracting using fixed-outcomes and clear end-points that need to be achieved. Surprisingly, in Britain the DTI is aiming for a hybrid *base fee* approach, where the contract remuneration scheme will generally provide for cost recovery but the profit element will depend upon contractor performance. Overall Bush's policy review concluded that clean-up work should be prioritised to achieve the greatest risk reduction at an accelerated rate, and that performance-based contracting is the single best opportunity for enhancing delivery. But interestingly DoE also recognised that fees for contractors may not have been adequate to attract best-in-class contractors. DoE's share of the environmental management market in the US has dropped from 12% in 1997 to around 8%.

UK Horizon

In Britain the DTI seems to be taking these lessons to heart as its Liabilities Management Unit develops contract structures designed to encourage innovation, leading to reduced cost and schedule. The challenge for potential nuclear site operating companies is to turn innovative environmental performance into a differentiating source of competitive advantage.

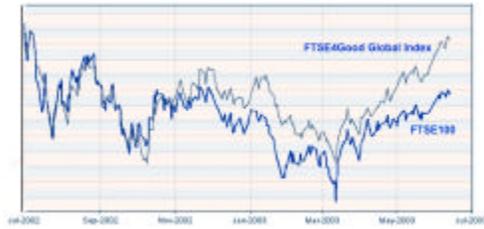
Developing a Contracting Strategy for the Nuclear Decommissioning Authority

- Innovation will be the driver based on an agreed *scope, cost* and *schedule*.
- Successful performance is safe accomplishment of an agreed scope, and *innovation* leading to reduced cost and schedule.
- A confident contractor may wish to risk all of his fee on *performance* and have no *base fee*.

Doris Heim
DTI LMU Contracts Manager
April 2003

Does this mean that existing UK experience counts for nothing? Far from it. In July 2001 the London-based FTSE developed a share price index - *FTSE4Good* - comparing the environmental performance of companies listed on the London Stock Exchange with their financial performance. The results have been encouraging, with companies listed in *FTSE4Good* generally outperforming the *FTSE100* over the past 2 years. *FTSE4Good* was launched in an effort to demonstrate that superior environmental management could also deliver better financial performance. Perhaps FTSE missed the wider point; environmental performance is just another indicator of business success. Well managed companies simply deliver better performance across all business functions, not just environmental management activities.

FTSE4Good vs FTSE100



What sets these leading companies apart seems to be an ingrained commitment to innovation. It's no surprise that a visit to any AstraZeneca or GlaxoSmithKline site reveals clean, well managed, highly productive and environmentally conscious manufacturing facilities. The pharmaceutical and biotechnology industries, strong performers in FTSE4Good, have much in common with the nuclear sector at strategic level; both are high added value industries operating in tight regulatory environments where large amounts of money are spent on projects with significant corporate risks. The pharmaceutical sector would be a good starting point for would-be nuclear contractors to borrow best-in-class ideas.

Innovative Regulation

Innovation also applies to regulation. The best known example is the US Environmental Protection Agency's *Project XL* (eXcellence and Leadership) initiative established by US President Bill Clinton. Project XL is a voluntary scheme which offers participating companies reduced regulatory inspections, simpler licensing and an enforcement amnesty for minor licence breaches, in return for superior environmental performance. Project XL began in 1995 and has been so successful that it is being continued under the Bush Administration. More recently the UK Environment Agency has published similar proposals under its *Frameworks for Change* initiative. At heart both Project XL and Frameworks for Change are collaborative approaches that focus more on the specific environmental outcomes that need to be achieved, and less on the regulatory methods needed to deliver them.

Flexibility is the key. Innovation is stifled when regulators define business processes in great detail.

Innovation - Not Invention

The strategist Richard Koch points out that innovation is not the same thing as invention. Innovation recombines *already existing* ideas and technologies but in different ways. The more familiar the parts, the more striking the new whole. The essence of innovation is to look beyond your immediate business environment to solve problems. And even then innovative ideas probably won't be born with an automatic business case attached.

Final Thoughts

Innovation is fundamentally about change. The intention of this article is to offer ideas on ways and means not musts and shoulds. The important thing is to make sustainable change - real change that will stick after you move on to your next project.

Ian Jackson
July 2003

Further Reading

1 *Draft Nuclear Sites and Radioactive Substances Bill* (now published as Chapters 1 and 2 of the Energy Bill) June 2003. <http://www.dti.gov.uk/nuclearcleanup/>

2 *A Review of the Environmental Management Program*. Top-To-Bottom Review Team.

US Department of Energy. February 2002. Further details of the Department of Energy's clean-up reform initiative are at <http://www.em.doe.gov>

About the Author

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