

EVOLUTION AND REVOLUTION OF THE UK'S LONG - TERM RADIOACTIVE WASTE MANAGEMENT PROGRAMME

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ABSTRACT

This paper provides an update on the current status of radioactive waste management in the United Kingdom (UK) from the perspective of Nirex, the organisation responsible for providing safe, environmentally sound and publicly acceptable options for the long-term management of radioactive materials.

In summary, it proposes that:

- the waste exists and must be dealt with in an ethical manner;
- legitimacy is the key to public acceptance of any attempt to solve the waste issue; and
- credible options and a new political will allow, and indeed, compel this generation to deal with it.

The paper takes account of a number of announcements and ongoing developments in the UK nuclear industry, in particular:

- the announcement that Nirex is to be made independent of industry;
- the Department of Environment, Food and Rural Affairs and Devolved Administrations' *Managing Radioactive Waste Safely* consultation exercise;
- the creation of the Committee on Radioactive Waste Management to oversee the next stage of consultation;
- the creation of the Nuclear Decommissioning Authority to manage the civil nuclear site clean-up programme;
- the future of BNFL
- proposals for improved regulation of Intermediate Level Waste conditioning and packaging; and
- proposals by the European Commission for a new radioactive waste Directive.

These institutional and policy changes amount to an evolution of the back-end of the fuel cycle that represents the most radical transformation in the UK nuclear industry for many years. This transformation was made necessary by past failures in trying to impose a solution to the radwaste problem on the general public. Therefore, in order for these changes to provide a successful long-term radioactive waste management programme, it is necessary to pay as much attention to political and social concerns as to scientific and technical ones. It is crucial for all interested parties to act in an open and transparent manner so that the decisions made achieve a high degree of legitimacy and thus public acceptance.

We also believe that the problem must be framed in the correct terms: that the waste exists irrespective of the future of nuclear power and that this is an issue that must be addressed now.

Thus there is a legitimacy of purpose and scope in moving forward that addresses the ethical imperative of this generation dealing with the waste.

Put together with the action the Government is taking to create the necessary institutional framework, Nirex believes that for the first time in a generation the UK has the building blocks in place to find a publicly acceptable, long-term solution for radioactive waste.

INTRODUCTION

Nirex was created in 1982 to take forward the then policy on the management of intermediate level waste (ILW) and low level waste (LLW). Since that time, and indeed before it, there have been a number of setbacks in implementing the policy of the day. The most recent failure was the 1997 decision by the outgoing Government not to allow Nirex to proceed with its proposals to construct a rock characterisation facility, at Sellafield in Cumbria in north-west England, as part of its investigations into a potential repository location.

That decision "stopped the UK programme in its tracks" and prompted much reflection by all parties involved in radioactive waste management, not least Nirex, where we were eager to learn from the mistakes made. As a result of this deliberation, our focus for the future shifted from an entirely scientific viewpoint to encompass social considerations also. This is reflected in our current Mission Statement, agreed in September 2001, which charges us with providing the UK with:

“safe, environmentally sound and publicly acceptable options for the long-term management of radioactive materials”.

Our current role, while final Government policy is decided, is to:

- carry out scientific and engineering research to help develop safe and environmentally sound options for dealing with radioactive waste in the long-term;
- maintain an inventory of radioactive waste in the UK in conjunction with Department of Environment, Food and Rural Affairs (Defra);
- set specifications, standards and advise the industry on how to treat and package radioactive waste;
- communicate with all stakeholders, including the public, to build understanding and develop ways of addressing the wide range of concerns and views surrounding the management of radioactive waste.

With this remit in mind, along with the lessons learned from past attempts to find a solution, we have given much thought as to how the UK can move forward on the long-term management of radioactive waste. This paper reflects Nirex's latest thinking on how to do just this.

LEGITIMACY: THE WAY FORWARD

In our view, of all dialogue with stakeholders we have had and from the international scene, legitimacy emerges as *the* key to public acceptance of any long-term solution. This is something

that has been seen to be lacking in previous attempts to solve the problem, due to a high degree of secrecy and lack of transparency and societal involvement in reaching the solution.

There are also a number of wider factors surrounding the issue of legitimacy in radioactive waste management in the UK:

- **A history of opposition** - the nuclear industry in the UK was born out of war and the issue of nuclear power generation has forever been tied up with nuclear weapons.
- **Secrecy** – similarly, because of its historic association with the strategic deterrent, the UK nuclear industry has a reputation for secrecy that it finds hard to shake off. Also, more widely, there is not the same tradition of freedom of information throughout UK society that is prevalent in some other countries.
- **Science and society** - the traditional trust society places in scientists and ‘experts’ has been eroded in the UK by events such as the Bovine Spongiform Encephalopathy (BSE, sometimes known as "mad cow" disease) crisis, resulting in a more adversarial relationship between science and the general public, and mistrust on the part of society.

To overcome these factors the application of the notion of legitimacy must extend to the:

- **Rationale behind radioactive waste management** – the waste exists and needs to be dealt with, irrespective of the future of new nuclear build.
- **Scope of the problem** – radioactive waste management is an ethical problem and should be value driven.
- **Institutional framework** – all organisations and bodies involved must be completely transparent and accountable.

Similarly the whole manner and nature in which the issue is approached must be underpinned by the absolute need for legitimacy and transparency. These themes must be the driving forces behind all aspects of any attempt to find a solution, specifically in relation to:

- **Structure** – the organisational arrangements and institutional framework must be designed to give issues visibility and place public interest at the heart of long-term management.
- **Process** – the way policy is developed and implemented must be open, transparent and accountable. There must be a stepwise approach, with clear decision points and wide stakeholder consultation and involvement.
- **Behaviour** – the different organisations involved must interact with each other and stakeholders in an informed, open and responsive manner.

The European Commission (EC) Directives on Strategic Environmental Assessment [1] (SEA) and Environmental Impact Assessment [2] (EIA) also address the best way to approach the decision making process. Finally, consideration needs to be given to what actually makes a solution legitimate - what factors must be in place for the general public to accept a decision? We believe these factors fall into three distinct, but overlapping themes:

- **Equity** – the decision must be viewed as ‘fair’ to all involved, that is to the community or communities affected, the UK as a whole, to future generations etc.

- **Competence** – the underlying science and technology must be seen as correct, robust and safe.
- **Efficiency** – there must be a proper balance in the use of resources, i.e. safety as paramount but no 'gold-plating'.

If the above lessons learned are put into practice, and the window of opportunity presented by, amongst other things, the Government's shake-up of the industry, is seized, we firmly believe that a sustainable and publicly acceptable long-term solution can now be put in place.

STRUCTURAL REFORM

UK policy on both medium and long-term radioactive waste management is evolving and final decisions on implementation of long-term policy are not expected before 2006. As indicated above, Nirex believes that appropriate structural arrangements need to be put in place early in the process. We believe that the future nuclear industry should be clearly divided into three sectors, each with a different focus:

- Commercial - fuel fabrication, nuclear power production, plant construction and operation, and other commercial services.
- Decommissioning & Clean-up – short-term focus, with short-term in this context taken to mean up to 150 years.
- Long-term Management – overseeing the Government's chosen long-term solution.

Clear separation between these areas of focus will, amongst other things, allow any conflicts between long and short-term issues to be visible to all interested parties and the general public. This is key to developing legitimacy in the policy by providing accountability for any trade-offs that have to be made between the long and short-term. Such a structure also allows for a clear transfer of the liabilities down the line, from the front end to the back end of the fuel cycle.

As indicated earlier, the Government has already taken several steps in this respect with:

- the announcement, in July 2003, that Nirex will be made independent of industry [3];
- the establishment of a Committee on Radioactive Waste Management (CoRWM) in 2003 [3,4];
- the setting up of the Liabilities Management Unit (LMU) in 2002 to precede the future creation of the Nuclear Decommissioning Authority (NDA) with the introduction of the Energy Bill in November 2003 [5].

The announcements regarding CoRWM and Nirex were made as part of the review of radioactive waste management policy being conducted through the UK Government's Department of Environment, Food and Rural Affairs (Defra) and Devolved Administrations programme 'Managing Radioactive Waste Safely' (MRWS) [6].

MRWS proposed an action programme for reaching and implementing decisions on managing the UK's solid radioactive waste in the long term. The first part of the review was completed in March 2002. The second stage, which will involve research and consultation on different waste management options, started with the first meeting of the Committee in November 2003. A

decision by Government on the recommended strategy will be taken in 2006 and implementation will take place from 2007.

An Independent Nirex

Since its creation in 1982 Nirex has been owned and financed by the nuclear industry, its current shareholders being BNFL, British Energy and the United Kingdom Atomic Energy Authority. These, together with the Ministry of Defence, finance Nirex's activities. However, despite a special shareholding by the DTI, designed to guarantee that Nirex remained free of commercial pressure from the industry, the public see Nirex as compromised by the short-term considerations of the waste producers, to the detriment of it carrying out its long-term mission.

Nirex has therefore argued that it should be made independent of industry, the waste producers and the new NDA. It believes that an independent Nirex will be viewed as more legitimate by the general public and other stakeholders, therefore allowing it to make a more legitimate contribution to policy development. The Government has now supported this view and recently issued a statement, saying that

"It is very important that Nirex stands ready, along with others, to help CoRWM reach its view and inform policy decisions. It is important also that the company can do this from a position where it is, and can be seen to be, independent of industry. The Government will consult Nirex shareholders on the best way of making Nirex independent of industry and under greater Government control, and our aim is to establish and announce the appropriate way forward by autumn of this year." [3].

Nirex welcomed the Government announcement as a "significant and positive step forward" and an "injection of transparency" [7]. Together with the announcement on CoRWM and the establishment of the NDA, this shows that the Government is determined to ensure that this generation takes responsibility for its waste.

Committee on Radioactive Waste Management

This independent body has been created to oversee the second stage of the MRWS consultation on long-term options and to recommend its preferences to Government no later than the end of 2005. Its terms of reference require the consultation to be carried out in an open, transparent and inclusive manner in order to inspire public confidence. See www.corwm.org.uk.

In creating CoRWM the Government acknowledged that even if no nuclear plants are built, the country still has a substantial nuclear legacy which is in store now. The options for dealing with some 500,000 tons of waste, which will arise over the next hundred years, will include consideration of underground disposal and surface storage.

CoRWM will mainly focus on the UK's high and intermediate level waste. As a result of the creation of CoRWM, it was thought that the Radioactive Waste Management Advisory Committee (RWMAC), which has been in existence since 1978, would be disbanded. However, no final decision on that has been taken.

Nirex welcomes the creation of CoRWM as it addresses one of the basic lessons learned on legitimacy of process. It is our view that publicly acceptable long-term management of radioactive waste will require two roles to be performed. These equate broadly to that of “watcher” and “doer”:

- the oversight of the next stage of the process, by CoRWM ("watcher"); and
- continuing work on long-term waste management options/concepts (Nirex), leading to the implementation of a solution ("doer").

Thus there needs to be a body separate from the one undertaking the review of policy to carry out detailed research on waste management options and develop these into acceptable concepts that could be implemented.

The Nuclear Decommissioning Authority

The Liabilities Management Unit, which is part of the DTI, has been set up to establish the Nuclear Decommissioning Authority (NDA). The NDA will ultimately be responsible for ensuring that the UK's civil nuclear legacy is dealt with safely, securely, cost effectively and in ways that protect the environment. For example they will ultimately be responsible for managing UKAEA's and BNFL's liabilities - including the THORP reprocessing plant and the Sellafield MOX Plant.

Legislation was introduced into Parliament in November 2003 which following Royal Assent (probably around May-June 2004) will formally establish the NDA as a legal entity [5]. It is expected it will be fully functional by 2005.

The task that the NDA will undertake in financial terms amounts to costs of about £48bn and the Government saw it as essential that they establish a single publicly accountable body to take control of the clean-up process. Moreover, they saw that the NDA should carry out its remit openly, transparently and with the involvement of a wide range of stakeholders.

Organisational Interactions

Nirex has extensive knowledge of many of the potential options being considered by CoRWM. This is based on its history primarily as an organisation seeking to dispose of long-lived ILW in a deep repository, which in many respects presents much more of a challenge than HLW or spent fuel disposal due to the greater complexity of the wasteform. Thus, Nirex will be able to provide extensive knowledge on many aspects of radioactive waste management which have traditionally been outside its remit.

The Government recognises the importance of Nirex-CoRWM relationship and saw it as a requirement that for this to succeed; Nirex should be made independent of industry.

With the creation of the NDA and an independent Nirex there will be a clear separation between the organisations and less chance of any conflict of interests between short to medium term and long-term goals.

Whilst the NDA's work is focused on the next 150 years, Nirex's work addresses much longer periods of time - up to 100s of thousands of years. However, decisions taken by the NDA will have an impact on the work Nirex does and the long-term waste management options available for the UK. Therefore, the relationship and interactions between Nirex and the NDA will also be very important.

The NDA will be responsible for the conditioning, packaging and storage of most of the legacy wastes in the UK. Nirex will be involved in developing plans for its long-term management. This requires a strong direct relationship between the NDA, Nirex and the regulators to ensure issues are clear for those making decisions.

Regulatory Arrangements

An integral part of the work undertaken by Nirex (and a further argument in favour of it being independent of the waste producers) involves setting standards and specifications and providing a 'Letter of Comfort' to confirm that waste producers treat and package radioactive waste safely. The importance of the Letter of Comfort system – including Nirex's detailed assessment processes against its Phased Disposal Concept [8] is set to increase, as proposals are made for treating and packaging legacy wastes.

The Nuclear Installations Inspectorate (NII), Environment Agency (EA) and Scottish Environment Protection Agency (SEPA) are proposing to improve the regulation of Intermediate Level Waste [9]. There would be increased regulatory scrutiny of waste producers' treatment and packaging proposals, and of the advice provided by Nirex within the Letter of Comfort system.

The regulators have stated that the new process would be staged to provide early regulatory input. This is entirely consistent with the Letter of Comfort process that involves Nirex in packaging proposals from an early stage to ensure long-term issues are addressed throughout. It is also consistent with the principles of early communications favoured by regulators, Nirex and the industry.

THE UK PROCESS AND THE PROPOSED NUCLEAR SAFETY AND RADIOACTIVE WASTE MANAGEMENT DIRECTIVES

The European Commission (Directorate General Environment and Transport) has introduced two proposed Directives dealing with nuclear safety and radioactive waste management [10, 11].

The interest in the proposed Nuclear Safety Directive with respect to radioactive waste management is that it would cover all nuclear installations, not just nuclear power plants and therefore would cover all facilities for the management of spent nuclear fuel and radioactive waste and would encompass repositories.

Of more direct interest to Nirex (and other waste management organisations) is the proposed Radioactive Waste Directive. The objective of the proposed Directive (which is very much inspired by the Joint Convention on the safety of spent nuclear fuel and radioactive waste management, signed under the aegis of the IAEA) is to achieve progress towards safe long-term

management. The proposal includes a number of “basic requirements” for safe management which in summary are:

- radioactive waste should be managed such that individuals (workers and the general public), society and the environment are adequately protected;
- radioactive waste production should be kept to the minimum;
- all necessary legal steps should be taken to ensure safe radioactive waste management;
- establishment of a regulatory body;
- adequate financial resources should be available respecting the “polluter pays” principle; and
- effective public information and participation should take place.

The proposed Directive *inter alia* also requires that “each Member State establishes a clearly defined programme for radioactive waste management” that includes all stages of management including disposal.

Since its first introduction the Directive has undergone a number of amendments by the Council of Ministers. Possibly the most controversial aspects relate to the “imposition” of the disposal option and to the decision points that must be included in the programmes. There are three decision points in the proposed Directive:

- authorisation for development of appropriate disposal site(s) to be granted no later than 2010;
- in the case of short-lived low and intermediate-level waste, authorisation for operation of the disposal facility to be granted no later than 2018; and
- Member States submit their own deep disposal programmes for Peer Review. The repository should be operational 10 years after authorisation for development.

In addition, the proposed Directive allows the shipment of wastes to third countries under strict conditions as an alternative to disposal. Finally, the proposed Directive aims to encourage more research on radioactive waste management.

Nirex, along with the UK Government and others, had a number of concerns about the proposed radioactive waste Directive. However, the main one still outstanding refers to the imposition of disposal as the preferred option. As noted earlier, the MRWS programme is considering options for long-term management and the Government has yet to decide on which one to implement. Thus, there appears to be a conflict between an open transparent discussion process on options and an apparently imposed solution of disposal without discussion. This in turn may lead to the conclusion that an option has already been set which may invalidate the decision-making process that is in place.

Whatever else, the Commission’s proposals have certainly stirred the debate on radioactive waste management in the Community. The latest thinking is that adoption (or otherwise) of the Directives will now take place sometime during the Irish Presidency of the Union (January - June 2004).

CONCLUSION

The UK is undergoing a radical transformation within the nuclear industry which has been made necessary by the failures of the past. Perhaps for the first time in a generation the UK can be seen to have the required political support and leadership in an area of policy that has traditionally been seen as politically difficult. The Government is putting in place the essential building blocks that together with putting into practice the lessons learned and with legitimacy as the key, will allow for the implementation of a publicly acceptable solution to the issue of long-term radioactive waste management.

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