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**Environmental Regulation of the Nuclear Industry in England and Wales
in an era of Restructuring and Accelerated Decommissioning**

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ABSTRACT

In 2005 a large part of the UK Nuclear Industry was restructured with a new national body, the Nuclear Decommissioning Authority (NDA), being responsible for all the assets and liabilities of the nationally owned reactors and fuel cycle facilities. The former owners are now operating and in many cases decommissioning the facilities under contract to the NDA. As the body responsible for enforcing most environmental legislation in England and Wales, the Environment Agency has reviewed its regulatory approach to the Industry. This is to ensure that our responsibility to protect and enhance the environment is met whilst considering appropriately other key drivers impacting on all sectors of environmental regulation.

Factors influencing this review include:-

- Greater public interest and concern over nuclear issues;
- Greater transparency of strategies, plans and decisions in the nuclear industry;
- The need to ensure that sustainable protection of the environment remains a constant feature of environmental regulation;
- The need for a proportionate approach to regulation in the non-prescriptive UK legislative system;
- Being effective and efficient in a period when all types of regulation are under Government and public scrutiny;
- The aim of the NDA to achieve safe, secure, cost-effective, accelerated and environmentally responsible decommissioning and clean up in part by competing the management of the facilities.

This has involved

- Constructive liaison with the NDA both before and after its commencement to ensure we are both aware of each other's concerns;
- Taking a strong influencing role at strategic and operational levels;
- Putting in position arrangements for our involvement in the competitive process;
- Liaison at an early stage with the industry's plans for future work;
- Establishing greater clarity in our strategy and plans, notably with re-examination of the requirements of our authorisations and permits;

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- Establishing a new assessment resource (the Nuclear Waste Assessment Team, NWAT) to enable us to examine proposals for waste management while awaiting the establishment of a national strategy ;
- Seeking the modernising of legislation and exerting pressure on UK government for relevant legislative/policy changes;
- Improved links to safety and security regulators;
- Developing our own Environmental Assessment Principles to assist regulators and the industry on the issues to be addressed ;
- Speeding up, where possible, our processes for determination of applications and transfers of authorisations, to allow industry restructuring.

The position is dynamic and we continue to work with Industry, the NDA and other regulators to ensure we meet our respective goals.

INTRODUCTION

This paper looks at the changing role of the Environment Agency in its interaction with the Nuclear Industry in England and Wales and other key stakeholders. In particular it describes the shift in regulatory role being developed to help ensure there is an enabling framework in place to contribute to the timely clean up of the nuclear legacy in England and Wales whilst providing protection for the environment.

Since 1996 the Environment Agency has been responsible for the regulation of radioactive waste disposals in England and Wales. It is a non-departmental public body with wide responsibilities for protection of the environment. In exercising its statutory role in the regulation of radioactive waste the Environment Agency works within an overriding mission of protecting and enhancing the environment. In doing so it seeks to improve its own effectiveness and efficiency.

We grant authorisations¹ to the companies operating nuclear sites and permit them to dispose of radioactive waste to land, water and air, subject to limitations and conditions. We also monitor the sites to ensure they are not exceeding the limits and that within these they are minimising the release of radioactive waste into the environment. We work closely with the Nuclear Installations Inspectorate (part of the Health and Safety Executive (HSE)), who are in charge of regulating all aspects of nuclear safety and the storage of radioactive waste on these sites.

Authorisations have been issued over the past forty years to a number of operators including the former British Nuclear Fuels plc (BNFL) its then subsidiary Magnox Electric plc, United Kingdom Atomic Energy Authority, British Energy and Amersham plc. UK nuclear sites

¹ Regulatory powers under the Radioactive Substances Act are used to grant authorisations to operators of nuclear sites. Under the Act “Radioactive waste” includes solids, liquids and gases. “Disposal” includes discharge to air and water, incineration, and transfer to other sites, as well as disposal by land burial at the national low-level waste repository and a few other landfill facilities. We also have similar roles for non radioactive wastes.

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include nuclear power stations², uranium processing and reprocessing facilities, and research facilities.

From the 1980s onwards UK Government policy has been for authorisations to be reviewed regularly. Since that time we and our predecessors have aimed, not always succeeding, at carrying out reviews of authorisations at about four year intervals. Such reviews [1] have resulted in limits at levels more closely reflecting actual discharges and thus demanding improved control.

A review initiated shortly after formation of the Environment Agency in 1996 highlighted the need for a holistic approach towards the environment with all disposals of radioactive waste by a single operator on a single site being authorised in a single document [2]. An additional major feature of the new format authorisation introduced is being explicit about what was being required of the operator's management system in terms of goals and overall requirements. Reviews of authorisations commenced since 1998 have resulted in this new type of authorisation.

Many nuclear sites are moving from an operational phase to a decommissioning and clean up phase. Decommissioning and clean up involves not only the current operational facilities but also legacy facilities containing the wastes from earlier operations. In some cases the site lifecycle has already spanned 50 or more years.

The largest structural change in the UK Nuclear Industry for many decades took place in April 2005 when the Nuclear Decommissioning Authority (NDA)³ took ownership of all the publicly owned civil nuclear facilities. In most cases the former operating companies were then appointed as the initial contractors. These new contractors, sometimes with new names (e.g. the new operator of the Sellafield Site is British Nuclear Group Sellafield Ltd – BNGSL), hold the Nuclear Site Licences issued by the Nuclear Installations Inspectorate and Waste Disposal Authorisations issued by ourselves. As a result of these structural changes there has been no change in our statutory regulatory role. The operator is still legally fully responsible for compliance with the law. However there has been a change in the way we interact with the industry.

The aims of the NDA are to deliver a world class programme of safe, cost-effective, accelerated and environmentally responsible decommissioning of the UK's civil nuclear legacy in an open and transparent manner. Overall our aims largely coincide – we support accelerated decommissioning where it can be justified to protect and enhance the environment. The contractors' aims are to profitably meet the terms of the contract they obtain and satisfy the aims of the NDA notably in terms of safety and environmental performance. The opportunity of the major change in the structure of the industry is being taken to examine our practices to ensure they remain consistent with our overall environmental aims.

² Mainly carbon dioxide gas cooled reactors of the Magnox Type - natural uranium metal fuel in a magnesium alloy can and of the Advanced Gas-cooled Reactor type – low enriched uranium oxide fuel in a stainless steel can.

³ The Nuclear Decommissioning Authority (NDA) is a public body of the United Kingdom formed by an Act of Parliament in 2004. Its purpose is to oversee and manage the decommissioning and clean-up of the UK's civil nuclear legacy. The NDA's contractors carry out the work.

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CHANGING APPROACH

Traditional regulation has achieved much. But the nature of regulation has to change to keep pace with changes in the expectations of society and the economy. This is the case not just for the regulation of radioactive waste but for all regimes the Environment Agency is responsible for. We are developing our approach to regulation to improve and protect the environment. Our aim is to be outcome-focused and risk-based, to communicate clearly what we are doing and ensure we deliver our regulation in a consistent manner.

Modern regulation aims to find the right balance – a proportionate, risk-based response, that will drive environmental improvements, reward good performance, but still provide the ultimate reassurance that tough action will be taken on those who fail to meet acceptable standards. Any modern regulatory regime is required to meet five principles set out by the UK Government's Better Regulation Taskforce [3]. It must be:

- transparent – we must have rules and processes which are clear to those in businesses and local communities;
- accountable – we must explain ourselves and our performance;
- consistent – we must apply the same approach within and between sectors and over time;
- proportionate (or risk-based) – we must allocate resources according to the risks involved and the scale of outcomes which can be achieved;
- targeted (or outcome-focused) – the environmental outcome must be central to our planning and in assessing our performance.

We also believe regulations must be practicable. The regulators need to be funded to do their job and businesses must be clear what they have to do.

Mindful of the need to ensure that we are proactive in meeting our aims a new type of interaction is foreseen whereby we can improve our understanding of the industry and give advice on regulatory issues and our environmental goals. It is clearly not a matter of running someone else's business but understanding it better and being able to provide clear and competent advice to both the NDA and the site operators on environmental issues and likely regulatory concerns associated with their activities. This involves a changing role and perhaps a change in culture with early involvement with changes in plant, processes and operations so we and industry understand what we are trying to jointly achieve.

This is a much different role from that of the prescriptive setting limits on operations and monitoring for compliance. We want more than compliance with the law. We expect that as a minimum. However we seek risk based and proportionate improvements to achieve a better performance and outcome for the environment. We expect operators to run their own businesses to reduce their environmental impact, in part through innovation. It is our job to seek continuous improvement. To achieve this the operator must have a continuously questioning approach seeking to follow clear principles in achieving this outcome. To assist the industry in establishing its direction and for our regulators to use when assessing operators' proposals we are currently bringing together and formulating some environmental principles. These principles take account of the objectives and powers given to us under the Environment Act 1995 together with

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Government Policy and Guidance as set out in various policy papers and statutory guidance documents (for instance [4-6]). In addition they take note of international guidance such as the IAEA's draft document on the objectives and principles governing the IAEA Safety Standards [7].

Sector Plan

Part of the new approach is to encourage all sectors of industry (including the nuclear industry) to keep the environment at the centre of their thinking and to identify with us joint objectives. To help achieve this approach, we are now identifying and addressing the priority environmental issues arising in individual sectors and producing sector plans. The Nuclear Sector Plan [8] published in November 2005 includes a generic environmental improvement plan. As a major means by which modern regulation is introduced, the plans aim to:

- focus on the most significant risks and impacts that the sector poses to the environment;
- deliver improvements in the sector's environmental management and performance;
- prioritise and target our effort within and across sectors;
- achieve, through co-operation with sectors, environmental benefits beyond those that can be achieved through direct regulation alone;
- monitor progress in delivering environmental improvements, within and between sectors.

The Nuclear Sector Plan proposes environmental priorities, objectives and indicators of performance covering the next five to ten years. The Plan also includes actions for both industry and us. Some actions can be enforced by regulations, while others are voluntary. We have agreed with the industry that the indicators of performance included in the plan will be used as a basis for reporting on performance of the industry on an annual basis.

We have found the development of the Sector Plan to be a good example of partnership working and have received a lot of support from the industry, who see it as helping with their long term planning by looking at the issues facing the sector from a wider perspective.

Internal Developments

In line with our risk based and proportionate approach is the need to understand and influence the management and disposal of solid radioactive waste. Traditionally this has not been a strong area of regulatory influence for the Environment Agency in part as there are no identified disposal routes for certain categories of solid radioactive waste. In order to fill this regulatory gap we set up in 2003 a team of assessors to assist us with the consideration of the content and nature of waste packages, notably intermediate level waste (ILW). The aim is to ensure so far as is practicable that the packages will be suitable for the long term management option eventually chosen. Our Nuclear Waste Assessment Team provides specialist technical support within the Environment Agency on the management and disposal of radioactive waste in England and Wales. Their main aim is to ensure that radioactive wastes will be disposed of in the most appropriate manner in order to protect the public, the wider environment and to contribute to the UK's aim of sustainable development. The team interacts closely with nuclear operators,

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government departments, the NDA and NIREX⁴. A lot of their work is carried out in partnership with colleagues in the HSE and the Scottish Environment Protection Agency (SEPA).

This work provides a regulatory overview of the work carried out by NIREX in support the industry's proposals. The NWAT has an agreement with NIREX, to scrutinise their process for assessing the suitability of industry proposals against the NIREX Phased Geological Repository Concept (PGRC) to ensure that they meet the required standard.

With our developing framework and resources examples are emerging where the benefits of this modern approach are becoming clear. For example, as part of the Magnox (power station) Decommissioning Acceleration Programme we have been working more closely with the operator, the NDA, other regulators and local stakeholders to achieve a better understanding of issues, give visibility to regulatory challenges and identify environmental drivers. This is involving the practical use of the technical, procedural and cultural changes we have been striving for. In this way we are promoting more innovative approaches to legacy waste management, retrieval and conditioning at these sites and highlighting areas where further work must be undertaken to unlock some of the regulatory challenges we face.

INFLUENCING GOVERNMENT

To enable us to be a fuller partner in contributing to the timely clean up of the nuclear legacy while ensuring protection for the environment and recognising substantial public interest we need to develop our policy and process tools. As a regulator we need to be able to strongly influence government by fully understanding the impact of its policies on the industry we regulate and on the environment. We acknowledge that international commitments, safety, security and the national discharge strategy [9] all provide constraints to work within and we must seek to influence these.

In many cases we have a common aspiration with the Government, NDA and operators. The disposal of low level waste (LLW) and the absence of suitable routes for large volumes of decommissioning waste is one area where the current government policy is seen as having the potential to hinder the acceleration of decommissioning. To facilitate a review of policy, together with the NDA and Industry we have argued for and subsequently participated in a Government Policy Review Group. It is expected that a Government Policy paper on this topic will be issued for public consultation later this year.

Another area where representations have already been successful is in arguing for and obtaining changes to the Radioactive Substances Act to enable a simplified process for the transfer of an authorisation between organisations. Hitherto, under the Act before a different legal entity could take over a site and dispose of radioactive waste it had to apply as a new operator for an

⁴ NIREX is an independent company who develop and provide advice on safe, environmentally sound and publicly acceptable options for the long-term management of radioactive materials in the UK. They have developed a general disposal method for intermediate level waste (ILW) called the Phased Geological Repository Concept (PGRC). The government has directed NIREX to continue to operate a Letter of Compliance (LoC) system, which allows ILW packages to be assessed for suitability against the PGRC to ensure that they meet the required standard.

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authorisation fully supporting the proposed disposals. We were then obliged to conduct a full public consultation process despite the fact that in many cases the essentially same people in just as sound an organisation continued operating using the same arrangements as previously used. This consultation process has taken several years in a number of cases. After changes made to the Act in 2005, transfers may now take place after our consideration solely of the new management structure and the transferee's willingness and ability to comply with the authorisation. This process involves some limited consultation and liaison and for a straightforward acceptable case now takes less than 6 months.

A further area where our influence is needed is the national long-term management option for ILW and high level waste (HLW). The Government has set up an advisory group (CORWM)⁵ to examine this and is due to report back this year after exhaustive public consultation. Without agreed routes for disposal it is difficult for operators to achieve acceleration of decommissioning and obtain significant reduction in costs. We have provided our views to the committee and await its recommendations.

INFLUENCING THE NDA

An area we regard as of particular importance is that of the NDA's own strategies and plans. It is crucial that we understand the NDA's thinking and that we influence its strategies to ensure environmental objectives are properly identified. With this aim we have been included in discussions as the strategies are developing and we have commented in detail on their documents including their first draft strategy [10].

To successfully influence the NDA we have aimed at having good communication and liaison links at all levels within our organisations from Chief Executive/Chairman level to the detailed on-site programme level. We have also further developed and strengthened our already good links with other regulators. We share the commitment of all these organisations to help ensure the NDA has the best possible chance to succeed. We agree that a key to this success is to have very honest and robust discussions on all issues of mutual interest. We consider that this multi-partite working will help provide optimised outcomes in a very visible and defensible way.

Impact of Competition

Competition for the management of the NDA sites is now an accepted feature. Before competition the industry structure is likely to need some changes. The detail of the overall structure being sought is for NDA to determine. We are interacting and advising on the likely impact of these proposals. There will be a need for transfers of authorisations to the new site licensee companies (SLCs) to enable competition for the management of defined sites and resources. As part of our multi-partite working we are clarifying with the NDA and existing/potential SLCs the regulatory issues we see emerging from the changes and the sort of

⁵ The Committee on Radioactive Waste Management (CoRWM) is an independent committee appointed by the UK Government. Its task is to review the options for managing those UK radioactive wastes for which there is no agreed long-term solution. CoRWM has been asked to consult and to make recommendations to the UK Government in 2006. Future decisions and policies will be made by the UK Government.

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authorisation related issues that could develop. In parallel we are reviewing our processes and developing needed new ones and matching our resources to the tasks. We aim to assist the NDA competition to proceed whilst providing visible protection for the environment.

With new contractors in place we would anticipate more applications for variations to authorisations to allow more waste disposal or disposal in differing more innovative ways and by new routes. These will be highly visible as significant variations and will be subject public consultation.

INTERACTION WITH INDUSTRY

While we communicate with individual operators we have also found it invaluable to have a forum for liaison with industry as a whole. To meet this need we have established a Nuclear Industry Liaison Group (NILG) which meets 3-4 times a year. Attendees at this group other than industry representatives include other regulators (NII, SEPA), the NDA and NIREX. This forum provides for early discussion on emerging issues, discussion on developing Government and International policy, on developments in our own policies and processes and in highlighting areas of good practice within the nuclear and other industry sectors. In the recent past we have used this forum to successfully develop and pilot the Nuclear Sector Plan [7], Joint Guidance on the Conditioning of Intermediate Level Radioactive Waste [11] and our Regulatory Principles.

INVOLVEMENT WITH STAKEHOLDERS

As a regulator we have a wide and varied range of stakeholders. We already had frequent and useful engagement with Government, with industry and with other regulators and we have enhanced this engagement. However, traditionally we have practiced a rather episodic involvement with local and regional government, in particular the elected members, with local environmental groups, with work force unions and importantly, the general public.

This meant that these latter groups were often in a position of poor knowledge and understanding of the issues we raised with them when decisions had to be made on well-developed proposals. As a consequence they were often not in a strong position to provide us with informed opinions. This is not a fruitful way of working. We are now developing and implementing longer term engagement plans that are matched with and include as far as possible the operator and NDA stakeholder engagement and that require a more consistent and continuing interaction with these groups. Plans for this engagement have a number of key elements including:

- the building of background understanding on the nuclear industry;
- its actual and potential environmental impact;
- the strategies and regulatory regime we are employing to protect the environment, and,
- rolling information on specific issues and consultations in which we are engaged.

In this way we hope to improve the wider understanding of environmental issues and crucially to be regarded as a trusted and independent view. It is not for us to defend the industry or any

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particular stakeholder group. We are an independent regulator charged to protect the public and the environment but we will do so in what we believe to be the most effective and efficient way.

CONCLUSIONS

The Environment Agency has reviewed its regulatory approach to the nuclear industry in England and Wales in the light of industry restructuring and proposals for accelerated decommissioning. We recognise that traditional regulation has achieved a great deal but changes were necessary to keep pace with the dynamic state of the industry, expectations of society and the economy, while protecting the environment.

The regulatory changes we made have used and enhanced existing good practice and introduced a more proactive, transparent regime. The regime uses the legal requirements in new modern authorisations and a proactive approach to influencing.

The current position is dynamic and we continue to work with the UK Government, other regulators, the NDA, industry and a wide range of stakeholders to help ensure we meet our respective goals.

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