



Environment
Agency

nuclear sector plan

Environmental
sector plan
for the
nuclear industry

Issue 3



We are the Environment Agency. We protect and improve the environment and make it **a better place** for people and wildlife.

We operate at the place where environmental change has its greatest impact on people's lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate.

Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local authorities, other agencies, civil society groups and the communities we serve.

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Environmental sector plan for the nuclear industry

Issue 3

Foreword

Since 2005 the Environment Agency has published Sector Plans in partnership with some sectors of industry. The Nuclear Sector Plan was one of the first that we produced.

The purpose of Sector Plans is to build a shared understanding and approach with industry, to identify priority issues and protect the environment beyond minimum regulatory standards. The plan-making process is a major opportunity to strengthen relationships with the sector's principal stakeholders.

This is the third version of the Nuclear Sector Plan. To produce it we have worked together with the nuclear industry to identify a small set of well defined objectives, and goals. We have also set out performance measures and targets. We will report progress against these annually.

This sector plan sets out the main environmental issues facing the nuclear industry over the next few years and identifies ways that the industry can work with us to address them. It encourages nuclear operators to voluntarily take ownership of environmental issues and solutions, to improve environmental performance, and therefore reduce the need for further regulation. It commits the Environment Agency to improving aspects of the way we regulate nuclear sites.

Logos of organisations participating in this initiative are shown below.



Introduction

The Nuclear Sector Plan was first published in 2005. Its main aims were to:

- build a shared understanding with industry of priority environmental issues
- improve the environment beyond the minimum standards of regulation
- provide a basis on which to set performance targets.

This is the third version of the Nuclear Sector Plan (NSP). It builds on and updates the first and second sector plans to reflect future priorities. The Environment Agency and the nuclear industry have worked together to identify a number of well-defined objectives and goals. Where it makes sense to do so, these include performance measures and targets. We will report on progress against these annually.

This sector plan sets out the main environmental issues facing the nuclear industry over the next few years and the ways in which we can work with the industry to address them. It encourages nuclear operators to continue to be responsible for environmental issues and to further improve their environmental performance. This will reduce the need for regulation. It also commits the Environment Agency to improve how it regulates nuclear sites.

Overview of the nuclear industry

The nuclear industry covers a wide range of operations and products. These include generating electricity, developing medical applications that help us to understand and treat human illness, national defence and decommissioning of redundant nuclear facilities.

Since 2005, the Nuclear Decommissioning Authority (NDA) has been responsible for overseeing the clean-up of the UK's civil nuclear legacy. The NDA is responsible for 16 of the 33 nuclear sites in England and Wales.

In 2008, the Government announced its support for building new nuclear power stations in the UK [1], recognising that 'new nuclear power stations could make a material contribution to tackling climate change and ensuring security of supply.' For the last four years the Environment Agency and the Office for Nuclear Regulation (ONR) have been carrying out a Generic Design Assessment of candidate designs of reactors. This is nearing completion.

Several consortia are seriously considering proposals to build new nuclear power stations in England and Wales. Although it will be some time before the first new nuclear power station is generating electricity these consortia will be encouraged to participate in the NSP.

Environmental leadership and sharing best practice

Over the period that we have been reporting against the Nuclear Sector Plan, successive annual reports have shown that standards of environmental performance in the nuclear industry are good overall, and have improved in recent years.

This success is not a basis for complacency; we and the industry want to see environmental performance continue to improve.

Issue 3 of the NSP builds on Issue 2, with greater focus on environmental management and leadership, including developing the opportunity to use the reporting arrangements in place to improve sharing of good environmental practice. This is addressed further under Objective 4 below.

Main environmental issues for the nuclear sector

The Environment Agency and the nuclear industry have agreed seven environmental objectives for the nuclear sector:

1. Minimise resource consumption and carbon footprint.
2. Minimise discharges to air and water.
3. Promote use of the waste hierarchy.
4. Demonstrate environmental management and leadership.
5. Progress decommissioning and manage land quality.
6. Maintain or improve a very high level of regulatory compliance.
7. Further implement better regulation.

Some of these objectives are voluntary undertakings by the nuclear industry, while others are key regulatory or policy requirements. Each is addressed in more detail below.

Objective 1: Minimise resources consumption and carbon footprint

Energy and water are important resources. The amount used very much depends on the particular operations at each site. For example, there are big differences between the amount of water and energy a generating power station, a research establishment and a large chemical works like Sellafield use. Resource use will also change with time. For example, more water or energy may be used during decommissioning.

The requirement to minimise resource usage will apply at all times and operators should continue to look for opportunities to minimise usage by improving the efficiency of processes. The ability to do this will depend upon the type of operations, although a good starting point is to understand the amount of resources different operations use and then focus effort on those operations that use the most.

It is now widely accepted that greenhouse gases (GHGs) contribute to climate change. GHGs are produced directly from using energy, from process emissions and transportation. The Government has recognised this in introducing the Climate Change Act 2008, which commits the UK to making at least an 80per cent cut in greenhouse gas emissions by 2050.

The generation of electricity from nuclear power stations is a significant part of the nuclear sector. Nuclear power currently provides about 17 per cent of the UK's electricity (7.5 per cent of total UK energy). Compared to electricity produced from fossil fuels such as coal or gas, nuclear power produces significantly less carbon dioxide emissions¹ - if this electricity had been generated by fossil fuels it would have released around 26 million tonnes of CO₂.

Objective 1: Minimise resources consumption and carbon footprint		
Improvement goals	Target dates	Performance indicators
Minimise energy use	-	Energy use (TJ/y)
Minimise water use	-	Water use (m ³ /y)
Minimise the amount of greenhouse gases generated	-	CO ₂ and other greenhouse gases generated (te CO ₂ equivalent)

¹ Existing UK coal fired power stations have life cycle carbon emissions of around 900 gCO₂eq/kWh. Equivalent figures for gas fired stations are around 500 gCO₂eq/kWh and most international estimates for nuclear stations are below 26 gCO₂eq/kWh [2].

Objective 2: Minimise discharges to air and water

Most sites in the nuclear sector discharge radioactive waste into the air and/or water. Permits issued by the Environment Agency place conditions on how this waste is managed. A key requirement is to apply 'best available techniques' (BAT) to reduce discharges to the environment. BAT is equivalent to 'best practicable means' (BPM), and the related best practicable environmental option (BPEO) process².

The UK has made a commitment, under the OSPAR Convention for the Protection of the Marine Environment in the North-East Atlantic, to continue to reduce radioactive discharges to the sea. The targets within the UK Strategy for Radioactive Discharges 2006-2030 [3] will be used to set the targets related to the performance indicators for this objective.

Objective 2: Minimise discharges to air and water		
Improvement goals	Targets	Performance indicators
Minimise discharges to water, meeting targets in the UK Strategy for Radioactive Discharges 2006-2030 values		Annual liquid alpha discharges Annual liquid beta/gamma discharges (excluding tritium) Annual liquid tritium discharges Annual technetium-99 discharges from reprocessing
Minimise discharges to air	-	Total annual radioactive discharges to air
Minimise critical group doses	-	Critical group doses due to discharges (retrospective assessment)

² The term BAT has replaced BPM and BPEO in England and Wales under radioactive substances regulation. The term BPM continues to be used in Scotland and Northern Ireland.

Objective 3: Promote use of the waste management hierarchy

Like many other industries, operational and decommissioning activities in the nuclear sector generate a range of different wastes. In this sector, much of the waste is radioactive. Decommissioning and clean up of sites produces large amounts of waste, most of which will be lightly contaminated building materials or soils.

The waste management hierarchy³ applies to all waste, whether it is radioactive or not. In managing waste it is particularly important to:

- minimise the amount of all types of waste produced
- reuse or recycle waste as much as practicable
- ensure that the main waste management sites, particularly the low level radioactive waste repository ('LLWR') near Drigg, do not receive waste which could be dealt with in another way. This will help preserve valuable disposal capacity.

The NDA has published a national strategy [4] for the management of LLW from nuclear sites. This strategy takes account of the recent Government policy on low level radioactive waste (LLW) [5], which opened up alternatives to sending LLW to the LLW repository near Drigg. In particular, it encouraged use of recycling routes and disposal of quantities of lower activity LLW at specified landfills. The LLWR, working on behalf of the NDA, tracks and reports on progress in implementing this strategy through its national LLW programme⁴. We are working with the NDA and others to help develop other indicators for tracking progress, likely to include issues such as the availability of waste routes, the development of Joint Waste Management Plans from across the nuclear industry. We will report these here when agreed.

Objective 3: Promote use of the waste management hierarchy		
Improvement goals	Target dates	Performance indicators
Operators implement waste management hierarchy effectively minimising disposals to LLWR	-	% LLW sent for: <ul style="list-style-type: none"> • reuse or recycling • disposal to routes other than LLWR (such as incineration, disposal as HV VLLW to landfill) • disposal to LLWR
Non-radioactive waste management – operators implement waste management hierarchy effectively	-	% inert and non-hazardous (non-radioactive) waste reused or recycled: <ul style="list-style-type: none"> • operational waste • decommissioning waste

³ A preferentially ranked series of waste management options of which reduce, reuse, recycle are key.

⁴ Details of the National Programme are available at: <http://www.llwrsite.com/national-programme>

Objective 4: Demonstrate environmental management and leadership

Over the period that we have been reporting against the Nuclear Sector Plan, successive annual reports have shown that overall standards of environmental performance in the nuclear industry are good, and have improved in recent years. This is not a basis for complacency; we and the nuclear industry want to see the industry demonstrate good environmental management and leadership, and continue to improve its performance.

All nuclear operators have formal environmental management arrangements at their sites; most have been independently certified to an international standard (ISO 14001), while others have chosen alternative arrangements to equivalent standards. ISO 14001 provides a systematic approach to management of operational environmental impacts. Proposals strengthening this standard are currently being considered by the International Organization for Standardization (ISO). Changes, due to be implemented in 2015, may include more focus on strategic risks, supply chain impacts and performance improvements. These are all aspects that this version of the sector plan seeks to address.

The arrangements through which nuclear operators work with the Environment Agency to produce and collate information used in the Sector Plan and the annual environmental performance report is unique in that it is the only group covering the full breadth of environmental issues affecting the nuclear industry. Operators have requested the opportunity to use the networking opportunities and reporting arrangements in place in order to better share good environmental practice.

Objective 4: Demonstrate environmental management and leadership		
Improvement goals	Target dates	Performance indicators
Operators to: <ul style="list-style-type: none">- have long term strategic environmental goals and- report progress against them	End 2013 From end 2014	Statement of progress against or completion of targets
Demonstrate environmental awareness at all levels of the organisation: <ul style="list-style-type: none">• Operators share information on what they are doing to enhance staff environmental awareness (for example accredited training⁵, awareness raising initiatives• Identify and commit to introducing useful ideas for environmental awareness raising	End 2013 End 2014	Statement of progress against or completion of targets

⁵ For environmental professionals, operators should support CPD leading to relevant qualification e.g. through IEMA or CIWEM, or as Radioactive Waste Advisers.

<p>Operators encourage and support management systems as a tool for environmental risk management by retaining a management system accredited to ISO14001 or equivalent standard</p>	-	-
<p>Operators continue to develop sustainable procurement via the supply chain by:</p> <ul style="list-style-type: none"> • Sharing information with other operators on what they are doing to address this • Having in place appropriate policies, process or requirements for suppliers 	<p>End 2013</p> <p>End 2014</p>	<p>Statement of progress against or completion of targets</p>
<p>Operators share good environmental practice.</p> <ul style="list-style-type: none"> • Organisations to provide a short précis of one example of innovation or good practice annually as part of sector plan NSP reporting 	<p>Annually</p>	-

Objective 5: Progress decommissioning and manage land quality

The UK has a major nuclear legacy, representing the largest, most important environmental restoration programme in Europe. The challenges range from Sellafield, a large and complex site with a wide range of facilities, to smaller sites containing nuclear research facilities. Activities cover fuel and materials management, waste retrieval and packaging, the dismantling of redundant facilities and buildings and remediation of contaminated land and groundwater. This is a long-term challenge; some sites will not reach their planned end state for many decades.

This objective has greater emphasis for decommissioning sites and reporting under the sector plan will focus on progress on some of the major issues over the next few years. For example, on progressing decommissioning on high hazard plant and assets that are in a deteriorated condition due to an historic lack of investment.

For less critical sites, or new facilities, progress against environmental objectives will not be reported nationally but left as an issue for local discussion.

To track progress across such a mix of sites and issues, we are working with ONR, as lead regulator for decommissioning activities, and the NDA to construct a ‘basket’ of indicators appropriate for reporting against in this sector plan. When agreed these will be added to the sector plan.

Plans for decommissioning the sites rely upon the availability of waste disposal routes. For higher activity wastes, the UK Government’s chosen solution is for deep geological disposal, and the availability of a repository is key. Some sites are already retrieving and packaging legacy waste for future disposal in such a repository, or are planning to do so.

Issue 2 of the Nuclear Sector Plan included a goal for all sites to have land quality management plans in place by the end of 2012. These cover the management of all types of contaminated land - radioactive and chemical. They should set out the key objectives, milestones, timescales and responsibilities for the site, indicating priority areas for characterisation and remediation.

<i>Objective 5: Progress decommissioning and manage land quality</i>		
Improvement goals	Target dates	Performance indicators
Operators to continue to retrieve and package ‘ILW’.	-	% ILW by volume packaged for final disposal, with a Final ‘Letter of Compliance’ (FLoC)
Operators record progress in land quality management through management arrangements and can confirm that: <ul style="list-style-type: none"> • Site management systems have arrangements for managing land quality which 	Ongoing	Statement of progress against or completion of targets

<p>are recognised in corporate procedures.</p> <ul style="list-style-type: none">• Land quality competent persons can be identified.• There is a register of known / potential land quality hazards on site and a process for reviewing these.• There is an action list for dealing with the hazards, and a means of prioritisation.• There is a system for keeping land quality records up- to- date and readily retrievable.• Land quality is reported to the public, at least annually.		
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Objective 6: Maintain or improve a very high level of regulatory compliance

As demonstrated in recent annual environmental performance reports provided under the Nuclear Sector Plan, the standard of regulatory compliance is high in the nuclear industry. The aim of this objective is to ensure that this continues.

The Environment Agency has schemes for classifying⁶ and recording 'non-compliances' with environmental permit conditions. The categories have been defined to provide consistency across different regulatory regimes and a basis for comparison with other sectors.

Objective 6: Maintain or improve a very high level of regulatory compliance		
Improvement goals	Targets	Performance indicators
None	-	Annual number of non-compliances for all environmental permits.
None	-	Number of prosecutions and enforcement notices ⁷ .

⁶ Non-compliances (breaches) are classified from category one to four, with category one being the most serious. They are classified in the Compliance Classification Scheme (CCS) on their potential impact. For example, a CCS category two breach of permit has or could have a significant impact on the environment and a category four breach has no potential to have an effect. The system applies to all types of environmental permit issued by the Environment Agency (*for example* EPR permits, water discharge consents, etc).

⁷ Enforcement notices are legally binding notices, issued under environmental legislation. They are issued in response to identified problems and require certain steps to be taken by prescribed dates in order to rectify the problems.

Objective 7: Further implement better regulation

In line with the Coalition Government's better regulation strategy, the Environment Agency is committed to further improving how it regulates in order to minimise the impact on business.

Current intentions under this objective are listed below.

Objective 7: Further implement better regulation		
Improvement goals:	Target dates	Performance indicators
Reduce requirements for data, information and reports from operators	Ongoing	-
Work with operators to rationalise/streamline permit requirements on records retention by operators	End 2015	-
Provide guidance on the information and demonstrations we expect operators to maintain under RSR permits, allowing operators to use and reference information provided for other purposes.	End June 2013	-
Work with operators to review requirements for discharge monitoring and environmental monitoring, to remove requirements that don't add value	End 2015	-
All non-compliances to be classified and recorded in CCS and the actions needed to make improvements and prevent such a non-compliance happening in the future to be fed back to operators within two months of notification of the event.	-	Percentage fed back to operators within 2 months of notification (unless extension agreed between operator and regulator for complex cases)
Listen to and respond to the views of our customers: <ul style="list-style-type: none"> Respond to actions in recent Environment Agency Customer Service Survey (Feb 2012) Repeat Customer Service Survey 	Mid-2013 By end 2013	

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4. *UK Strategy for the Management of Solid Low Level Radioactive Waste from the Nuclear Industry*. NDA. August 2010. <http://www.nda.gov.uk/documents/upload/UK-Strategy-for-the-Management-of-Solid-Low-Level-Radioactive-Waste-from-the-Nuclear-Industry-August-2010.pdf>
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