

Environmental Permitting Regulations (England and Wales) 2010

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Regulatory Guidance Series, No RSR 2

**The regulation of radioactive
substances activities on nuclear
licensed sites**

Record of changes

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1.0	April 2010	Issued for launch of EPR phase 2
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A QUICK GUIDE

This is high level legal and policy guidance on how we regulate radioactive substances activities on nuclear licensed sites under the Environmental Permitting (England and Wales) Regulations 2010. It will change with changes in Regulations, Government guidance and experience of applying the Regulations.

This document complements our other regulatory guidance to describe in more detail how we regulate radioactive substances activities on nuclear licensed sites, where there are requirements specific to radioactive substances regulation (RSR).

We regulate these sites with the primary purpose of protecting the public from harm from the discharges of radioactive waste. We also seek to protect the wider environment. We regulate within a framework of extensive Government Policy, Strategy and Guidance on the management and disposal of radioactive waste. In summary we require operators to protect people and the environment by minimising the generation of radioactive waste, minimising the amount of radioactive waste that has to be discharged into the environment and discharging that waste in ways that minimise the resulting radiological impact on the public and protect the wider environment. We require operators to assess the dose impact on the public.

This document provides an overview of our policy and regulatory approach to nuclear licensed sites and refers out to other documents for more information.

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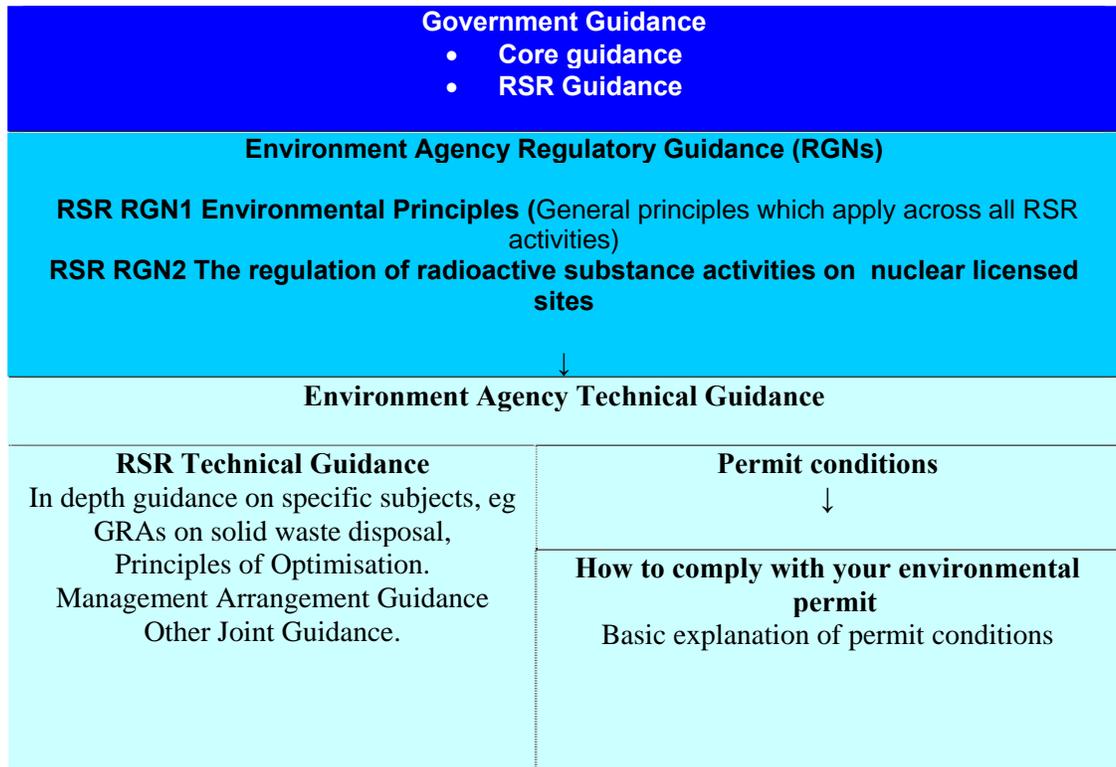
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1 INTRODUCTION

1. The Environment Agency is responsible under the Environmental Permitting Regulations (EPR) for regulating all disposals of radioactive waste on and from nuclear licensed sites (NLS) in England and Wales. “Disposals” of radioactive waste include discharges into the atmosphere, discharges into the sea, rivers, drains or groundwater, disposals to land, and disposals by transfer to another site.
2. We regulate these sites with the purposes of protecting the public from harm from the discharge and disposal of radioactive waste and to protect the wider environment. We regulate within a framework of extensive Government Policy, Strategy and Guidance on the management and disposal of radioactive waste. These are summarised in the [Government Guidance on Radioactive Substances Regulation \(RSR\)](#). In summary we require operators to protect people and the environment by minimising the generation of radioactive waste, minimising the amount of radioactive waste that has to be discharged into the environment, discharging that waste in ways that minimise the resulting radiological impact on the public and protect the wider environment, and using the optimal routes for disposal of solid waste. We require operators of nuclear licensed sites to assess the dose impact to the public
3. The term 'nuclear licensed sites' (NLS) refers to sites that have a nuclear site licence under the Nuclear Installations Act 1965 or where the period of responsibility of the licensee has not come to an end. We also include sites that have applied for, but not yet been granted, such a licence. Activities for which a nuclear site licence is required include nuclear power generation, nuclear fuel manufacturing and reprocessing, uranium enrichment, operation of research reactors, some national defence activities and some radioactive waste processing and disposal. All of these activities create, to a greater or lesser extent, radioactive wastes that must be managed and disposed of, in some cases over a long period of time.
4. The Nuclear Installations Act 1965 (NIA65) and associated site licences cover certain regulatory requirements on nuclear licensed sites that we would otherwise regulate as a radioactive substances activity. These differences depend on whether the operator holds a nuclear licence (the licensee) or does not (a “tenant”). The regulator under NIA65 is the Office of Nuclear Regulation (ONR) and we co-operate with ONR in exercising our respective functions.
5. This guidance is part of series of documents which accompany the Environmental Permitting Regulations. The series consists of [Government Core Guidance for Environmental Permitting \(England and Wales\)](#) and [Government Guidance on the RSR regime](#). We have in turn provided policy and technical guidance on the implementation of the environmental permitting regime in general and, through this document, regulatory guidance on RSR-specific matters in relation to the regulation of nuclear sites. The RSR documents fit together as shown in figure 1.

Figure 1 The structure of RSR Environmental Permitting Guidance



6. We have developed Radioactive Substances Regulation Environmental Principles (REPs) to form a consistent and standardised framework for the assessments and judgements that we must make when regulating radioactive substances. We have published these as guidance document [RSR RGN1 Radioactive Substances Regulations – Environmental Principles](#). We have developed this principles-based approach to regulation based on the International Atomic Energy Authority (IAEA) approach to safety standards, modified to be more relevant to our regulatory role in relation to the protection of the environment rather than safety. We have also written the principles to be consistent, as far as practicable, with the requirements of the ONR safety assessment principles (SAPs), to
 - facilitate a more integrated approach by operators to health, safety and environment issues on nuclear sites, including joint documentation and submissions; and
 - ensure common requirements placed on operators by the HSE and us, where appropriate.
7. The introduction to the REPs describes how we developed them and how, in general terms, we shall apply them in practice. In time we aim to develop further technical guidance to support the consistent application of the principles in practice.

8. In this document we cover
 - the permitting process for nuclear licensed sites (chapter 2) ;
 - the principles of radiological protection (chapter 3);
 - statutory requirements and government policy in relation to radioactive waste management (chapter 4);
 - operators' radioactive waste management arrangements (chapters 5 and 6);
9. This guidance describes the application of environmental permitting to licensees and tenants on nuclear sites so far as is necessary to present a comprehensive picture of the regulatory requirements for such sites. It does not cover the process for staged regulation of a geological disposal facility, and we plan to develop that separate guidance in the near future. Tenants should also refer to RSR3 Non-Nuclear Sites in relation to the “keeping or use” of radioactive materials.
10. We also provide separately more detailed guidance on matters such as how assessments and determinations are carried out, the technical standards to be achieved, and specific legal and policy considerations. There is also separate detailed guidance on [near surface](#) and [deep geological](#) disposal of solid radioactive waste. The RSR guidance is published on our website under “[environmental permitting for RSR activities on nuclear sites](#)”.

2 THE PERMITTING PROCESS

11. [The Government's Core Guidance](#) and our generic regulatory guidance notes describe the operation of environmental permitting¹. The permitting of nuclear sites follows the same model, with some RSR-specific considerations. We describe these RSR-specific considerations in this chapter.
12. Under RSR in general, we regulate the keeping and use of radioactive materials, and the accumulation and disposal of radioactive waste. We do not regulate other matters associated with the carrying-on of a radioactive substances activity, for example, noise and vibration, or energy efficiency. In some cases, we may set conditions in relation to the conventional (ie non-radioactive) properties of radioactive substances in order to replicate provisions of other legislation that would apply if the material were not radioactive, for example in relation to wastes being disposed of to land.

Licensees and Tenants

13. On a number of nuclear licensed sites, tenants occupy some buildings and conduct activities involving the use of radioactive materials and the production and disposal of radioactive waste. ONR regulates under the nuclear site licence on the basis that the licensee remains in control of and supervises such activities. In contrast, we must permit the “operator” as defined in the Regulations and as set out in our [“Understanding the meaning of operator” \(RGN1\)](#). We must therefore consider who is conducting the undertaking in which the tenant is engaged. In some cases we may be able to agree that the undertaking is that of the licensee, and that the licensee is in control and making disposals under its authorisation. However, if after consideration, we believe the tenant is conducting its own undertaking, controlling the use of radioactive materials and disposing of radioactive waste, then we shall require the tenant to hold a permit for the relevant activities described in the next section. The judgement on whether to separately regulate a tenant is made by our Nuclear Regulation teams on a case by case basis.

What activities do we regulate on a Nuclear Licensed Site?

14. In the Regulations the term “regulated facility” means generically all types of facilities permitted under the regulations and the term “activity” refers to the specific types or classes of activity permitted, for example "radioactive substances activity " or "water discharge activity", ie the activities provide the definitions of the operations, process etc subject to regulation.

¹ The introduction of RSR into environmental permitting in 2010 (replacing the Radioactive Substances Act 1993) resulted in some changes in terminology and definitions, and some changes to the application and permitting process. It did not affect: standards for the protection of people and the environment from radioactive substances; the respective responsibilities of ONR and the Environment Agency on nuclear licensed sites or how we work together; the nature or scope of what we regulate under RSR.

15. The radioactive substances activities are defined in schedule 23 of the Regulations. For a licensee, the principal radioactive substances activities are:

“where a person uses premises for the purposes of an undertaking and

- *disposes of radioactive waste on or from those premises (Schedule 23 Part 2 11 (2(b)))*
- *receives radioactive waste for the purposes of disposing of that waste. “ (Schedule 23 Part 2 11(4)*

We shall normally grant a permit to include both of these activities, to allow the transfer of wastes between sites for ease of disposal, unless the operator chooses not to be permitted for the receipt of waste.

16. The “keeping or use” of radioactive materials and the “accumulation” of radioactive waste (schedule 23 11 2(a) and 2(c)) on a NLS by a licensee are not activities regulated under the Regulations, since these are regulated by ONR under the NIA site licence. Licensees do, however, need an environmental permit for any off-site use of “mobile radioactive apparatus”, which is defined as:

“any apparatus, equipment or appliance or other thing which is radioactive material and

- (a) is constructed or adapted for being transported from place to place : or*
- (b) is portable and is designed or intended to be used for releasing radioactive material into the environment or introducing it into organisms. “(Schedule 23 Part 2 11 (5)).*

17. The accumulation of radioactive waste on a NLS by a tenant is not an activity regulated under these Regulations but tenants do need a permit if they:

- *keep or use radioactive material;*
- *receive radioactive waste for the purposes of disposing of that waste;*
- *dispose of radioactive waste on or from the premises; or*
- *use mobile radioactive apparatus.*

18. Schedule 23 Part 2 11 (6) and (7) provides for the early regulation under RSR of exploratory and development work in relation to geological disposal of radioactive waste, namely:

“(6)...where a person carries out intrusive investigation work or other excavation, construction or building work

- (a) to determine the suitability of any premises, or*
- (b) to enable the use of any premises,*

as a place that may be used wholly or substantially for underground disposal of solid radioactive waste, subject to an environment permit allowing such disposal”.

(7) In sub-paragraph (6)—

“intrusive investigation work” means the drilling of boreholes into, or excavation of, sub-soil or rock to determine geological or hydrogeological conditions; and “underground disposal” means—

(a) the disposal of solid radioactive waste in an engineered facility, or in part of an engineered facility, which is beneath the surface of the ground, and

(b) where the natural environment which surrounds the facility acts, in combination with any engineered measures, to inhibit the transit of radionuclides from the facility to the surface,

and does not include the disposal of radioactive waste in a facility which is beneath the surface of the ground only by virtue of the placing of rocks or soil above it.

Water Discharge or groundwater activities carried on as part of an RSR activity

19. Discharges of radioactive waste to controlled waters will not be treated as a water discharge activity, where the discharge comprises only radioactive waste. But if the final discharge contains other effluents, these will not be regarded as part of the RSR activity and will need to be permitted as a water discharge activity or installation as appropriate. For example, on a nuclear power station there may be discharges of liquid radioactive waste to controlled waters. However, in practice the liquid radioactive waste will normally be discharged with other non-radioactive discharges, such as cooling water. The cooling water discharge does not arise from the RSR activity and therefore will require a permit as a discrete water discharge activity (or installation). In this situation it would be sensible to treat any non-radioactive components of the radioactive waste as part of the water discharge activity, in particular where these are common to both discharges. If there is only an RSR activity, then the permit for that will need to consider any non-radioactive components of the discharge.
20. Discharges of radioactive substances to groundwater will normally constitute a “groundwater activity” within the Regulations and Schedule 22 sets out the relevant provisions. In general, a groundwater activity occurs only where there is a planned and **permitted** direct or indirect discharge of radioactive wastes to groundwater (eg direct injection into groundwater or discharge to a soakaway with subsequent percolation to groundwater). The disposal of radioactive waste by burial is considered to be a groundwater activity.
21. The following do not constitute a groundwater activity under the Regulations
 - potential and actual accidental releases, whether of radioactive substances or waste, into groundwater
 - existing contamination of groundwater, whether on- or off-site.

The regulation of any accidental release of radioactive material to groundwater falls to ONR.
22. Given the complexity of the provisions in the Regulations, Nuclear Regulatory Group staff must consult RSR National Technical Services if they consider that an operator on a NLS may be undertaking a groundwater activity as defined in schedule 22 of the Regulations.

Premises and site

23. The regulations require that permits *“must include a map, plan or other description of the site showing the geographical extent of the site of the facility”*. This requirement does not apply to permits in force before the 6th April 2010 unless and until these are replaced by a consolidated permit². Chapter 6 of the [Core Guidance](#) and [RGN2 \(Understanding the meaning of regulated facility\)](#) provide more information on the meaning of regulated facility and site.
24. The definitions of radioactive substances activity refer to the “premises used for the purpose of an undertaking”. “Premises” is defined in the Regulations (schedule 23 Part 2 1) as *“premises” includes any land, whether covered by buildings or not, including any place underground and any land covered by water*. “Premises” may be interpreted as including all the land used by the operator for the purposes of the undertaking in question. (This was the approach formerly adopted under the Radioactive Substances Act 1993). “Undertaking” refers to the wider business, process or activity undertaken by the operator, not just the use of radioactive substances or the disposal of radioactive waste.
25. The “regulated facility” should include systems used for the disposal of radioactive waste up to the point of discharge to the environment (for example pipelines to sea or controlled waters) or where they become the responsibility of another (for example up to the point of connection to the public sewer).
26. For licensees, the geographical extent of the regulated facility for the purposes of regulations should normally be taken to include:
 - the area of the licensed site - on the basis that this is licensed as a whole for the use of radioactive substances with the potential to generate and dispose of radioactive waste throughout;
 - any adjacent systems (eg pipelines) outside the NLS used for the disposal of waste from the NLS; and
 - any other adjacent areas outside the NLS used for radioactive substances activities, to the extent these are carried out by the same operator and can reasonably be regarded as forming a single premises.
27. For tenants “site” will be defined by the extent of the premises used for their undertaking, including any systems for the disposal of radioactive waste.
28. For licensees or tenants, the definition of "site" may be restricted to the land/buildings on which the radioactive substances activities take place. If adopting this more restrictive approach to the definition of site, the operator must ensure that the description of the site includes all the land used for the RSR activities, from receipt of radioactive materials, through their use, to accumulation and disposal of radioactive waste, as relevant. This is to allow for the ready movement of radioactive substances within the site between areas where radioactive substances are received, stored, used and disposed of.

² A consolidated permit reflects variations made to an earlier permit and replaces that earlier permit.

29. Where ONR has issued more than one site licence to the same operator on contiguous sites, we shall normally treat these as a single site and issue a single permit, unless the operator prefers to treat these as separate sites with separate permits.
30. The purpose of the above arrangements is to define the area of the regulated facility (ie the site) as required under the Regulations. Within that area, we only regulate those aspects of the facility for which we have regulatory vices.
31. The above paragraphs describe the approach to defining the site for an RSR activity. Each class of regulated facility (eg installation, waste operation) has its own approach to defining "site". Where a permit covers more than one regulated facility, the total site is made up of the footprints of the individual regulated facilities. However, we do not expect to issue consolidated permits covering RSR activities and other regulated facilities.
32. The site of the regulated facility is defined through a permit condition and to change the boundary of the site, an operator must apply for:
 - a variation to increase the size of the site, or
 - surrender, or partial surrender, to decrease the size of the site.

We describe the provisions in relation to surrender below.

Application forms

33. The Regulations require applications to be made on the forms we provide. We have developed a general purpose application form for the nuclear sector and a specific form for near surface burial. We shall consider, where appropriate, developing forms tailored to specific types of application, eg in relation to a geological disposal facility. There is supporting guidance to the application forms which explains the information and demonstrations to be supplied in an application, The forms are on the website under ["environmental permitting for RSR activities on nuclear sites"](#).
34. We have designed the RSR activity application forms to facilitate the use of supporting documentation that may have been prepared for other purposes. An applicant may decide to submit an application form and supporting documentation in electronic form, hard copy or both. We encourage submissions of the same documents to both ONR and ourselves, where practicable.

Consultation on applications

35. The [Public Participation Statement](#) and [RGN 6 \(Determinations involving sites of high public interest\)](#) describe our policy on consultation and we have "working together agreements" with a number of bodies, describing when we shall consult them. We shall advertise and consult on all applications for new permits except for those aspects where national security or commercial confidentiality restrictions apply. We may decide to do additional consultation, for example on a proposed (or "minded to") decision, with the extent of any additional consultation depending on the significance of the site and the nature of the application.

36. We shall decide whether to consult on applications for variations, and if so to what extent, having regard to the significance of the site and the nature of the application. . We do not consult on applications for the transfer or surrender of permits.

Time limits for determining applications

37. For a NLS, there is no statutory time limit for the determination of applications for new permits or transfers of permits by licensees or tenants. This is because we need to co-ordinate our work with ONR's work in assessing licence applications. The timescales for other applications are as follows:
- three months for an application to surrender a permit or vary it (other than where public participation is required);
 - four months for an application to vary a permit where public participation is required;
 - or such longer time periods as we may agree with the operator.

Surrender of permits

38. The Regulations enable an operator to apply to surrender a permit, on permanent cessation of the regulated activities - although there is no obligation to do so. An operator may apply to surrender the permit for all the regulated activities or partial surrender covering only the regulated activities that have ceased. If an operator wishes to reduce the extent (area) of the permitted site, then it must apply for partial surrender to do so.
39. Schedule 5, 14(1) sets out two tests in relation to surrender:
- (a) to avoid a pollution risk resulting from the operation of the regulated facility; and
 - (b) to return the site of the regulated facility to a satisfactory state, having regard to the state of the site before the facility was put into operation
40. These tests have been dis-applied for radioactive substances activities on nuclear licensed sites, for both licensees and tenants, on the grounds there is a site delicensing process, to which we are consultees. De-licensing is a separate process from surrender and our role in that is not covered by this guidance. For radioactive substances activities, operators on NLS will not be required to make and keep a site condition report as defined in [RGN9 \(showing that land and groundwater are protected\)](#) and [H5 \(Site condition report – guidance and templates\)](#) and will not need to meet the above specific tests for surrender of a RSR environmental permit. This dis-application applies, in relation to RSR activities, to the regulated facility as a whole, including any parts of the facility which may be outside the NLS boundary.

Disposal of radioactive waste by burial

41. There is separate guidance on [near surface](#) and [geological](#) disposal of solid radioactive waste by burial.

3 PRINCIPLES of RADIOLOGICAL PROTECTION

42. In this section we describe the principles of radiological protection, based on the recommendations of the International Commission on Radiological Protection (ICRP). The DECC RSR guidance explains how these principles are incorporated into European and UK law and we describe how these are implemented in practice through the EP regime in chapter 4. We have described these principles here because they, and the relevant legislation and Government policies, lead to a number of RSR-specific regulatory requirements and approaches to the permitting of RSR activities in general and nuclear licensed sites in particular
43. The current legislation and practices are based on the *1990 Recommendations of the International Commission on Radiological Protection (ICRP60)*. ICRP is a non-governmental scientific organisation which has been publishing recommendations for protection against ionising radiations for several decades. These were re-affirmed, and their application to disposals of radioactive waste clarified, by ICRP Publication 77 (*Radiological protection policy for the disposal of radioactive waste, adopted by ICRP in May 1997*).
44. In December 2007, ICRP published its 2007 Recommendations, which update the 1990 Recommendations. The new Recommendations do not present a change in radiological protection objectives but aim to take account of new biological and physical information and of trends in setting radiation safety standards. ICRP has also aimed to improve and streamline the presentation of the Recommendations. The Health Protection Agency (HPA) has reviewed and published its conclusions on the ["Application of the 2007 ICRP recommendations to the UK"](#). The 2007 Recommendations have not at present been adopted into UK policy and legislation.
45. For all human actions or practices that add to radiation exposure, the system of protection recommended by ICRP in its 1990 Recommendations is based on the following principles:
- a) no practice involving exposure to radiation should be adopted unless it produces sufficient benefit to the exposed individuals or to society to offset the radiation detriment it causes (the justification of a practice). ICRP 60 states that: 'The Commission recommends that, when practices involving exposure, or potential exposure, to radiation are being considered, the radiation detriment should be explicitly included in the process of choice. The detriment to be considered is not confined to that associated with the radiation - it includes other detriments and the costs of the practice. Often, the radiation detriment will be a small part of the total. The justification of a practice thus goes far beyond the scope of radiological protection. ICRP77 states that: 'The Commission's definition of the justification of a practice requires only that the net benefit of the practice, including the waste management, be positive. The selection of the most appropriate practice goes beyond the scope of the Commission's recommendations.'" In the UK decisions on justification are a matter for Government under the "Justification of Practices involving ionising radiation regulations 2004" SI 1769 – see para 1.9 and 3.11 of the Government RSR Guidance. We shall only grant a permit if the practice has been accepted as "justified" by the Government.

- b) in relation to any particular source within a practice, the magnitude of individual doses, the number of people exposed, and the likelihood of incurring exposures where these are not certain to be received should all be kept as low as reasonably achievable, economic and social factors being taken into account. This procedure should be constrained by restrictions on the doses to individuals ('dose constraints'), or the risks to individuals in the case of potential exposures ('risk constraints'), so as to limit the inequity likely to result from the inherent economic and social judgements (the **optimisation** of protection);
 - c) the exposure of individuals resulting from the combination of all the relevant practices should be subject to dose limits, or to some control of risk in the case of potential exposures. These are aimed at ensuring that no individual is exposed to radiation risks that are judged to be unacceptable from these practices in any normal circumstances. Not all sources are susceptible to control by action at the source and it is necessary to specify the sources to be included as relevant before selecting a dose limit (individual dose and risk **limits**).
46. Dose limits are set at a level intended to prevent those radiation effects in humans which are known to occur above a certain level or threshold of dose (deterministic effects) and to ensure that the incidence of those radiation effects for which it is assumed that there is no threshold and that the risk of causing the effect increases with the level of the radiation dose (stochastic effects) is not at an unacceptable level. Application of the optimisation principle and the use of constraints, which are set below dose limits, further reduces this risk to as low as reasonably achievable
47. ICRP uses the term 'intervention' to describe those human activities which decrease overall exposure to radiation by removing existing sources of exposure, modifying pathways of exposure, or reducing the number of exposed individuals (e.g. actions to deal with an accident that has released radioactive material to the environment, or with unacceptably high levels of natural radiation). Intervention can be either at the source of the exposure or in the environment, where it may for instance restrict individuals' freedom of action. The system of protection recommended by ICRP for such situations is based on the following principles:
- a) the proposed intervention should do more good than harm, i.e. the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including social costs, of the intervention;
 - b) the form, scale, and duration of the intervention should be optimised so that the net benefit of the reduction of dose, i.e. the benefit of the reduction in radiation detriment, less the detriment associated with the intervention, should be maximised.
48. The document [Principles for the Assessment of Prospective Public Doses](#) sets out principles and guidance for the assessment of ionising radiation doses to the public arising from planned discharges to the atmosphere and to the aquatic environment. The results of assessments undertaken in accordance with these principles and guidance will be used as an input into the process of determining whether discharges of radioactive waste to the environment should be authorised. This document has been developed by the Environment Agencies in collaboration with the HPA and the Food Standards Agency (FSA).
49. In addition, we shall also carry out an assessment of the doses to reference flora and fauna that might arise from discharges at the proposed limits.

50. A full framework for radiological protection of non-human species is still under development. In the meantime, we have developed, in collaboration with English Nature (now Natural England) and the Countryside Council for Wales, an interim assessment approach. This uses models of the behaviour and transfer of radionuclides within ecosystems to predict environmental concentrations, from which the radiation doses to reference organisms can be estimated. The approach is set out in: - *Impact Assessment of Ionising Radiation on Wildlife* (Environment Agency R&D Publication 128, 2001 (updated March 2003)); and *Habitats Regulations for Stage 3 Assessments: Radioactive Substances Authorisations* (Environment Agency R&D Technical Report P3-101/SP1a, 2003).
51. These doses can then be compared to 'guideline values' to assess the level of risk to flora and fauna. The EC funded FASSET project concluded that the threshold for statistically significant effects on individual organisms is about 100 microGy/hour. The interim assessment approach was developed primarily to enable us to meet our obligations under the Habitats Regulations but can also be used to demonstrate that proposed discharges will not have a significant impact on other designated areas and ecosystems in general. The more recent EC funded ERICA project has developed the approach further. The results of the ERICA project are being incorporated into our assessment framework. The outputs from the ICRP's Committee 5 will also be taken into consideration during our assessments.

4 STATUTORY REQUIREMENTS AND GOVERNMENT POLICY

52. In this section we describe how the principles of radiological protection, that is justification, optimisation and compliance with limits, are implemented through the environmental permitting regulations, and how other statutory considerations and Government policy are taken into consideration

Justification

53. The Justification of Practices Involving Ionising Radiation Regulations 2004 ('the Justification Regulations') are not part of the Environmental Permitting regime. But if an application for an environmental permit relates to a practice under Council Directive 96/29/EURATOM (the Basic Safety Standards Directive - BSSD), we can only grant a permit if the practice is justified. The Government has published information on the [Justification of Practices](#).

Optimisation

54. Part 4 of Schedule 23 of the Regulations states :

1 In respect of a radioactive substances activity that relates to radioactive waste, the regulator must exercise its relevant functions to ensure that—

(a) all exposures to ionising radiation of any member of the public and of the population as a whole resulting from the disposal of radioactive waste are kept as low as reasonably achievable, taking into account economic and social factors; and

(b) the sum of the doses resulting from the exposure of any member of the public to ionising radiation should not exceed the dose limits set out in Article 13 of the Basic Safety Standards Directive subject to the exclusions set out in Article 6(4) of that Directive.

2(1) In exercising those relevant functions in relation to the planning stage of radiation protection, the regulator must have regard to the following maximum doses to individuals which may result from a defined source—

(a) 0.3 millisieverts per year from any source from which radioactive discharges are first made on or after 13 May 2000; or

(b) 0.5 millisieverts per year from the discharges from any single site.

(2) In exercising those relevant functions, the regulator must observe the following requirements of the Basic Safety Standards Directive—

(a) in estimating effective dose and equivalent dose, Articles 15 and 16;

(b) in estimating population doses, Article 45; and

(c) in relation to the responsibilities of undertakings, Article 47

55. These requirements are placed on the regulator. We give effect to these requirements through permit conditions. The optimisation requirement (ALARA) is achieved through the use of the following permit conditions. These are based on Government's requirements set out in the [Statutory Guidance](#) concerning the regulation of radioactive discharges into the environment.

2.3.1 The operator shall use the best available techniques to minimise the activity of radioactive waste produced on the premises that will require disposal of on or from the premises.

2.3.2 *The operator shall use the best available techniques in respect of the disposal of radioactive waste pursuant to this permit to:*

- (a) *minimise the activity of gaseous and aqueous radioactive waste disposed of by discharge to the environment;*
- (b) *minimise the volume of radioactive waste disposed of by transfer to other premises;*
- (c) *dispose of radioactive waste at times, in a form, and in a manner so as to minimise the radiological effects on the environment and members of the public.*

and

3.1.3 *Subject to condition 3.1.1, the operator shall dispose of each form of solid and non-aqueous liquid radioactive waste by an optimised disposal route for that waste form.*

56. These conditions, taken together with any specific conditions in relation to the use of best available techniques, deliver the provisions in the Regulations about optimisation and the corresponding provisions of the BSSD. We use other permit conditions to give effect to the other requirements arising from Article 47 of the BSSD (schedule 23 Part 4 2 (2)).
57. We describe the measures or techniques that an operator uses or proposes to use to achieve an optimised outcome as “best available techniques” (BAT). (BAT has replaced the predecessor terms of “best practicable means” (BPM) and “best practicable environmental option” (BPEO) in England and Wales, but is intended to produce equivalent outcomes.
58. There is no statutory definition of BAT as it applies to RSR activities. The [Statutory Guidance](#) explains that Ministers consider the Pollution Prevention and Control (PPC) and Oslo and Paris Convention (OSPAR) definitions of BAT to be essentially the same. The DECC RSR guidance adopts the OSPAR BAT definition and we shall use that definition in our permits. Annex A provides the OSPAR definition.
59. Although using the same terminology and very similar definitions, it is worth noting that there are differences between how BAT is determined in PPC and RSR. This reflects the different legal and policy requirements of these regimes. There is also a wide body of detailed technical standards developed for PPC through the European “BREF Notes”, which are a requirement of the PPC Directive. Such European standards are not currently available for RSR. In RSR, we use a principle-based approach and are developing this further through the REPs and other supporting guidance.

What does “optimisation” involve in practice?

60. The principle of optimisation applies specifically to radiological risks to people in every situation where radiation could cause damage or harm. ‘Optimisation’ (keeping exposures as low as reasonably achievable) applies only to radiological risks to people. Other living organisms must also be protected from radiological hazards but there is no optimisation requirement.
61. Optimisation decisions balance the detriment or harm associated with the radiological risk, together with other benefits and detriments (economic, human, societal, political, etc.) associated with disposing of the radioactive waste, both at the time the decisions are taken and in the future, and the resources available for protecting people and the environment. Optimisation decisions are constrained by the circumstances prevailing at

the time and must take into consideration and be consistent with the relevant legislation and Government policies. Optimisation needs to be viewed as part of a bigger picture, recognising that there will be competing claims for limited funds, and that there is no completely risk free way of managing radioactive waste. The result of optimisation provides a radiological risk at a suitably low level, but not necessarily the option with the lowest possible radiological risk. Dose limits and constraints are aimed at ensuring that the radiological risk is at a suitably low level.

62. 'Optimisation' means that judgements have to be made about the relative significance of various issues, including:
- the number of people (workers and the public) and other environmental targets that may be exposed to radiological risk;
 - the chance they could be exposed to radiation, where exposure is not certain to happen;
 - the magnitude and distribution in time and space of radiation doses that they will or could receive;
 - nuclear security and safeguards requirements;
 - issues similar to those above, but relating to non-radiological hazards;
 - economic, societal and environmental factors;
 - technical viability;
 - uncertainties in any of the above.
63. Within the wider field of radiological protection, different regimes use different terminology and have their own guidance on this topic, eg reducing risks as low as reasonably practicable (ALARP) (ONR), use of best practicable means (BPM) and best practicable environment option (BPEO) (previously in the UK but now only in Scotland and Northern Ireland) and now best available techniques (BAT) in England and Wales. However, all of the above involve the same process, ie making a judgement between options by comparing benefits in terms of safety, environmental protection etc, and costs in terms of time, effort or money.

Scope of optimisation: scope of conditions 2.3.1 and 2.3.2

64. The requirement for optimisation covers all aspects of the carrying-on of an activity leading to the generation and disposal of radioactive waste, both now and in the future and BAT means the "*technology used and the way in which the installation is designed, built, maintained, operated and dismantled*". Therefore in principle these conditions apply to all aspects of nuclear site processes - not just waste management processes - which have a bearing on radioactive waste production and which thus relate either to current disposals or to foreseeable disposals of radioactive wastes at some stage.
65. For example, these conditions would cover:
- the chemical conditioning of the primary coolant within a water-cooled nuclear reactor. This water is used to transfer heat from the nuclear fuel to the steam generators in the power station, and its precise chemical composition (which can be controlled by adding chemicals to it) can significantly affect corrosion within the reactor, and hence the radioactive waste arisings;

- the choice of materials used for the various component parts of a nuclear reactor. Although it is essential that the materials perform satisfactorily on safety and operational grounds, nevertheless there may be alternative materials for specific parts of a reactor which are both acceptable on those grounds and which can have a significant effect on the activity in the radioactive wastes that the reactor produces;
 - the operation and maintenance of a pond water conditioning plant at a nuclear power station. (The pond is used to store irradiated nuclear fuel which has been discharged from the reactor, and it is not part of a waste disposal system). Good pond water chemistry and cooling are important with regard to BAT for the minimisation of waste: if the chemistry is wrong or the temperature increases then there is increased potential for fuel to corrode, so releasing activity into the pond water that will ultimately have to be removed through chemical treatment plant and/or filters, or by discharging it into the environment;
 - maintenance of infrastructure such as plant and equipment, including storage vessels. Leaks from containment can generate additional radioactive waste (where the material would not otherwise become waste), increase the amounts of secondary waste and restrict operators' ability to dispose of waste in optimal ways;
 - remediation of contaminated land or groundwater. Contaminated land and groundwater are not directly subject to RSR but, once remediation or restoration operations that will give rise to radioactive waste for disposal begin, BAT applies to those operations.
66. Condition 2.3.2 also applies to the manner of the disposal of waste, whether directly discharged to the environment or by transfer to other sites. For example liquid and gaseous discharges should be done in a way (ie stack height, or location of sea outfall) and, where appropriate, at times which minimise the radiological impact. Under this condition, LLW should be transferred for disposal by the optimal route taking account of relevant statutory requirements and policy considerations. The optimisation requirements for burial of radioactive waste are defined in the near surface and geological GRAs.
67. We shall apply these conditions within our vires on nuclear sites and as set out in Memoranda of Understanding and other agreed ways of working with ONR. That is, we shall apply these conditions only in relation to the goal and purpose of keeping exposures from waste disposals "as low as reasonably achievable".
68. Our guidance "[RSR Principles of Optimisation](#)" sets out how operators should approach optimisation and the selection of BAT. There is also separate detailed guidance on [near surface](#) and [geological](#) disposal facilities for solid radioactive waste. Operators have produced guidance on BAT in "Best Available Techniques (BAT) for the Management of the Generation and Disposal of Radioactive Wastes: A Nuclear Industry Code of Practice"
69. In relation to higher activity wastes we operate as set out in the "[Fundamentals of the management of radioactive waste: An introduction to the management of higher-level radioactive waste on nuclear licensed sites](#)" and associated guidance. This work is

done through the ONR site licence: we shall not duplicate this work through application of the BAT conditions.

Dose limits and constraints

70. Schedule 23 Part 4 1 (b) specifies dose limits to members of the public from the impact arising from the disposal of radioactive waste. We cannot permit any disposal which would exceed that limit. We assess the impact of discharges and publish the results in our annual reports on radioactivity in food and the environment ([RIFE](#)).
71. We limit discharges of radioactive waste based on the use of BAT by operators to minimise disposals and their impact as described in the [Statutory Guidance](#), and having regard to the dose constraints specified in Schedule 23 Part 4 2(1). We aim to set limits at the minimum necessary levels to allow “normal” operation of a facility, where “normal” operation includes the relevant operational fluctuations, trends and events that are expected to occur over the likely lifetime of the facility. We have produced separate guidance on limit setting.

Other statutory requirement and government policy

72. In making our decisions under EPR, we need to take account of a wide range of other statutory requirements. These are summarised in [RGN 4 Setting standards for environmental protection](#). We also need to take account of relevant Government policy in relation to radioactive waste. This is summarised in the Government Guidance “[Environmental Permitting Guidance: Radioactive Substances Regulation](#)”.

5 RADIOACTIVE WASTE MANAGEMENT ARRANGEMENTS

73. Chapter 4 describes the statutory requirements and policy applying to RSR, which may be summarised as :

operators must ensure and demonstrate that

- radioactive waste is managed and disposed to reduce the radiological impact to a level that is as low as reasonably achievable (ALARA) ; and
- the environment is protected;
- while taking account of a range of other statutory requirements and Government policy considerations.

We require, through the permit conditions described in chapter 6, operators to have arrangements to achieve the above. For convenience we call these “radioactive waste management arrangements” (RWMAs). This chapter describes the purpose, scope and content of these arrangements and some key requirements. Chapter 6 provides guidance on the framework for the implementation of such arrangements within the RSR environmental permit

Purpose, scope and content of radioactive waste management arrangements

74. The purpose, scope and content of operators’ radioactive waste management arrangements are defined by Government policy and ONR’s and the Environment Agency’s respective roles on nuclear sites.
75. It is Government policy that operators maintain radioactive waste strategies or plans for the management of radioactive waste, including its disposal. There are also policies addressing specific areas such as decommissioning and LLW waste, which set out detailed expectations on these matters. These policies and the associated strategies and plans cover a broad range of issues, with different aspects regulated by ONR and the Environmental Agencies. The NDA is also involved (although not as a regulator or licence/permit holder) through its responsibility for decommissioning in general and for various specific aspects of waste disposal.
76. ONR regulates and authorises the operation of nuclear facilities in general and the management of radioactive material and waste on-site in particular and requires operators to produce safety cases and more specific documentation such as Radioactive Waste Management Cases (RWMCs), decommissioning strategies and plans, etc. We are consultees to ONR on these matters and advise them of the waste management implications of operators’ proposals. In relation to RWMCs, specifically, we advise on the long-term disposability of conditioned wastes, ensuring waste is managed in sustainable ways, taking account of long term considerations.
77. In parallel to ONR requirements, operators should ensure and demonstrate, through their radioactive waste management arrangements, that the management of the

generation and disposal of radioactive waste within their current and future operations will achieve the aims summarised at the beginning of this chapter. That is the purpose of radioactive waste management arrangements.

78. The scope of the radioactive waste management arrangements can be summarised as
- how wastes will arise, be managed and disposed of during the lifecycle of the facility;
 - the quantification of those waste arisings;
 - their radiological impact;
 - how the production, discharge and disposal of these wastes are being managed to reduce their radiological impact on people to a level that is ALARA and to protect the environment;
 - the operator's management arrangements (in relation to the management of the generation and disposal of radioactive waste).
79. This is basically the same scope of information that is required in an application for a new permit, although we do not use the term "operators' radioactive waste management arrangements" in the application form. The supporting guidance to the application form and other guidance describe these requirements in more detail.
80. It follows that the radioactive waste management arrangements can also be regarded as the body of procedures, information, governance, quality assurance, specifications and records, etc setting out how the operator has complied, is complying and intends to comply with the conditions of the permit over the lifetime of the facility. The scale of these arrangements will vary depending of the size and complexity of the permitted site and will vary over time as the nature of operations on the site changes.
81. Operators' radioactive waste management arrangements should cover all aspects which bear on the management of the generation and disposal of radioactive waste over the lifetime of the facility or site, insofar as these relate to impact, including current and future activities such as:
- operational plant (including maintenance);
 - waste handling and treatment³;
 - decommissioning;
 - site restoration, including remediation of contaminated land or ground water.

The arrangements should cover the prospective generation and disposal of radioactive waste so far as is reasonably practicable over the remaining lifetime of the facility – where lifetime extends to the eventual surrender of the permit. Where the future generation and disposal of wastes is unknown (eg from dealing with contaminated land), the arrangements should contain plans with timescales setting out how operators intend to address such issues.

82. Through these arrangements, operators should maintain up to date information on all radioactive wastes which have been or will be generated that will require disposal. In particular we expect operators to have in place the necessary arrangements before the

³ Including HA wastes in interim storage

production of any new radioactive waste stream. This includes the on-site storage of raw higher activity wastes (HA wastes⁴) pending the development of a disposal route.

83. The arrangements should demonstrate the use of BAT in relation to reducing the impact of such disposals over the lifetime of the permit, specifically in relation to:

- preventing and minimising (in terms of radioactivity) the creation of radioactive waste⁵;
- minimising (in terms of radioactivity) discharges of gaseous and aqueous radioactive wastes;
- minimising the impact of those discharges on people, and adequately protecting other species;
- minimising (in terms of mass/volume) solid and non-aqueous liquid radioactive wastes;
- selecting optimal treatment and disposal routes (taking account of the waste hierarchy and the proximity principle) for those wastes;
- the suitability for disposal of any wastes for which there is no currently available disposal route (HA wastes) and how these will be managed in the interim so as not to prejudice their ultimate disposal;
- the management of materials that may become waste in the future.

And operators should demonstrate how this has been done in an integrated and strategic way covering all wastes over the lifetime of the facility – see the section on integrated waste management below.

84. For larger sites comprising more than one facility operators should consider facilities separately, as we expect BAT to be applied at the facility level. But operators should also consider interactions and dependencies between facilities and demonstrate how BAT is applied across the site as a whole.
85. We will use information held in the radioactive waste managements arrangements to advise ONR and operators on whether proposals for future operation are likely to meet RSR requirements (ie comply with the permit conditions) when eventually implemented.
86. The radioactive waste management arrangements include the totality of documented information and arguments developed by the operator which substantiates the environmental performance of the facility as relevant to the management of the disposal of radioactive waste. The arrangements are not a one-off series of documents prepared to obtain a permit or variation but an on-going framework which underpins all radioactive waste related decisions made by the operator. The arrangements must be kept up to date. The implications of proposed facility and other waste related changes must be examined against the arrangements and, when necessary, additional demonstrations of environmental performance must be provided. Accordingly, the requirements to produce and maintain radioactive waste management arrangements are a condition of the RSR environmental permits. This is considered further in chapter 6.

⁴ This means HLW, ILW, and such LLW that cannot be disposed of at present

⁵ This is not relevant if the facility solely manages (eg by treatment or disposal) radioactive wastes created elsewhere.

87. The [Government RSR Guidance](#) summarises Government policy for various forms of waste and activities. We expect operators' radioactive waste management arrangement to take account of these policies insofar as they are relevant to RSR. Government policies refer to waste management strategies in general and to other more specific requirements, e.g. LLW plans and decommissioning strategies and plans. We do not require operators to maintain such specific strategies or plans as separate documents or separate arrangements: instead operators' radioactive waste arrangements should demonstrate how the substantive requirements of these policies have been implemented and hence waste managed on an integrated and long-term basis

Integrated waste management strategy

88. We require to operators to demonstrate strategic planning for the management of all wastes, ie both radioactive and non-radioactive [Directive] waste in an integrated way, that is an integrated strategy, to address the various statutory, Government policy and ONR requirements covering these wastes. Such planning must take into account all current and anticipated future arisings of waste, including the management of material that will become waste in the future, and their radiological and non-radiological properties. Operators should thereby maintain a clear strategic oversight of how they intend to manage the generation and disposal of waste over the lifetime of the facility.
89. Such an integrated approach is necessary to ensure that statutory requirements are addressed in an integrated and efficient way and to ensure that people and the environment and properly protected against both the radiological and conventional properties of waste.
90. As part of their radioactive waste management arrangements operators must therefore have a strategy which
- describes how operators optimise their approach to waste management in an integrated way;
 - covers all wastes, both radioactive and non radioactive waste (ie "Directive waste") and in all forms (gaseous, liquid and solid), over the lifetime of the site

Operators must keep this strategy under review and identify and implement any actions necessary to improve their approach to waste management

Gaseous and aqueous discharges

91. The specific Government policy in relation to gaseous and aqueous discharges is set out in the [statutory guidance](#) and the [United Kingdom Strategy for Discharge Reduction](#).

Solid wastes

92. On nuclear licensed sites, the Environment Agency regulates the disposal of solid waste (as well as liquid and gaseous discharges). ONR regulates the on-site waste arisings and the storage of waste from a health and safety perspective.

LLW

93. For LLW (including VLLW), the Government policy requirements are set out in the [LLW policy](#). The operator's radioactive waste management arrangements should cover all the relevant aspects. That is, operators must demonstrate that their current disposals and their proposals for future disposals of LLW represent an optimised approach based on:
- use of a risk based approach to ensure safety and protection of the environment;
 - minimisation of waste arisings (both activity and mass);
 - forecasting of future waste arisings, based on fit for purpose characterisation of waste and materials that may become wastes;
 - consideration of all practicable options for the management of LLW;
 - a presumption towards early solutions to waste management;
 - appropriate consideration of the proximity principle and waste transport issues; and
 - in the case of long term storage or disposal facilities, consideration of the potential effects of future climate change.
94. The policy covers both those who generate and dispose of LLW by transfer to other sites, and those who receive the waste for treatment, recycling or re-use or for final disposal (eg by burial) and the above factors must be considered as relevant to the type of operation involving LLW. There is separate guidance on [near surface](#) disposal of solid radioactive waste by burial

HA Wastes

95. The management of the interim storage and treatment of HA wastes is regulated by ONR, for example through the RWMC process. The regulators have produced [joint guidance on the regulation of radioactive waste](#). ONR also considers the future disposability of such HA wastes: we are consultees to ONR on these issues. The operator's radioactive waste management arrangements should cover the outcome of the RWMC work and describe how the interim storage and treatment of HA wastes is consistent with RSR requirements in general. In particular, the operator's arrangements should demonstrate the use of BAT, etc, in relation to any secondary wastes (gaseous, liquid, LLW wastes etc) arising from the storage, handling and treatment of HA wastes, preparatory to their disposal, including confirmation of the eventual disposability of the waste.

NDA strategy and NDA sites

96. NDA has responsibility for ensuring that the sites it owns are properly decommissioned and has developed a national strategy which has been consulted upon and been approved by Government. NDA provides strategic direction to sites via strategic and client specifications to inform sites of the assumptions and objectives to support development of their lifetime plans. NDA does not need to demonstrate that the national strategy, as whole, or the strategic directions for individual sites, meet our requirements. However, we expect such decisions to consider regulatory requirements, amongst other things, to ensure that the strategy can be implemented within the legal framework. Operators will need to demonstrate, within their radioactive waste management arrangements, that their tactical decisions in implementing NDA strategic direction (ie how they do it) are compliant with RSR requirements.

Assessment of radioactive waste management arrangements

97. We will assess operators' radioactive waste management arrangements against our RSR environmental principles and other guidance, as relevant. RSMDP1, as supported by other principles and guidance, sets out our high level expectations for radioactive waste management arrangements, although using the term "waste strategy". We expect operators when developing and implementing "radioactive waste management arrangements" to take account of RSMDP1 and other relevant REPS and guidance.

6 FRAMEWORK for RWMA⁶

98. This chapter describes the framework for an operator's management arrangements for radioactive waste, including:
- structure
 - permit conditions;
 - change management provisions;
 - records.

Structure

99. We do not require operators to produce specific documents. Operators can therefore structure their radioactive waste arrangements as they choose, subject to the requirements set out below. This allows operators the necessary flexibility to take an integrated approach across all the policy and legal requirements, and to make use of documentation etc, prepared for other purposes. The arrangements, however structured, must ensure that the relevant information is kept and the demonstrations made in a clear, comprehensive and integrated manner for the site as a whole, and in a manner compliant with the permit conditions. If the operator is making use of information set out in other documentation, then it must be clear which specific information is being relied on and for what purpose, and how the information makes the necessary demonstrations. For example, there may be a need for an overview, or signposting, document which references the underlying documents which make up the arrangements and explains how they demonstrate compliance with the RSR requirements. Operators should discuss and agree the structure with their local regulator.
100. We encourage operators to make use of information and documentation prepared for other purposes, e.g. RWMCs, IWSs and LTPs (prepared by NDA sites). These documents are prepared against the guidance or specifications of ONR or NDA. We would encourage operators when preparing RWMCs, IWS etc to also have regard to RSR (and other requirements) and to consider how these documents can be used for RSR purposes. If relying on such documents, it is the operator's responsibility to show how they contribute to the relevant demonstrations required under RSR.

Permit requirements

101. We regard the radioactive waste management arrangements and associated information and records as covered principally by conditions 1.1.1 and 1.1.2 of the permit.

1.1.1 The operator shall manage and operate the activities:

- (a) in accordance with a written management system that is sufficient to achieve compliance with the conditions of this permit; and*

⁶ This chapter is written with reference to the EPR format permit and its conditions. Older RSA93 authorisations will have differently worded (and numbered) conditions. Operators holding RSA93 authorisation condition should discuss the transition to the EPR format with their site regulator.

(b) using sufficient competent persons and resources.

1.1.2 The operator shall maintain records demonstrating compliance with condition 1.1.1

102. Other permit conditions relate to certain more specific aspects, such as monitoring techniques and the recording of disposals, and, for burial, there is an additional specific condition requiring an “environmental safety case”. Operators’ management arrangements should, therefore, cover how operators will

- develop, maintain and keep under review the radioactive waste management arrangements;
- identify and implement actions necessary to improve their approach to waste management; and
- keep the relevant records, information and demonstrations and, specifically for burial, the environmental safety case.

Change management

103. The operator should review and revise the radioactive waste management arrangements in the following circumstances:

- whenever the operator makes a change to the management arrangements that could have significant repercussions for the management of the generation and disposal of radioactive waste (**management system changes**);⁷
- whenever the operator proposes to modify the facility, the process carried on or the nature or activity of radioactive substances on site, and that modification could have significant repercussions for the management of the generation and disposal of radioactive waste (**modifications**);
- whenever necessary because there are changes in legislation or policy, or new facts or there is new knowledge about the management of the generation and disposal of waste (**new facts or knowledge**).

Paragraph 103 below considers the meaning of “significant” repercussions.

104. “Modifications” includes any change in the operation of a facility which has a potential bearing on the management of the generation and disposal of radioactive waste including:

- changes in use of a facility, eg from operational to decommissioning;
- changes in the design of the facility, eg changes in processing or abatement equipment, rerouting of ventilation or liquid discharge systems;
- changes in plant throughput;
- new or changed activities⁸.

105. A change may have “significant repercussions” with respect to the management of the generation and disposal of waste where it:

⁷ For clarity, this includes changes such as manning levels, or changes to environment policies, assessment procedures etc, which may affect future decisions about the management of radioactive waste

⁸ For clarity, this may include temporary cessation or slow down in activities generating radioactive waste and the restart of previously suspended activities.

- results in the generation and disposal of new waste forms;
 - results in the need to apply for a variation to disposal limits or any other condition of the permit;
 - affects control measures (BAT) put in place to ensure that impacts remain ALARA and the environment is protected;
 - alters the amount and timing of the generation and disposal of radioactive waste.
106. Note that changes may be both positive and negative: such changes are not restricted to those which increase disposals or their impact. Annex B gives examples of the changes which might have significant repercussions on the management of the generation and disposal of radioactive waste
107. Where proposed changes do not have significant repercussions and, hence, there is no need to revise arrangements, the operator should record this. We do not require operators to review their entire radioactive waste management arrangements at any given set frequency. But operators should have arrangements to identify whether changes, which did not individually have significant repercussions, when taken together mean revision of the arrangements , in whole or in part, becomes necessary
108. The operator's management arrangements should, therefore, include change management provisions to identify when review, and where necessary revision, is necessary and when to notify us of changes. Permit condition 4.3.5 requires notification of such changes on the basis that the radioactive waste management arrangements are part of the operator's management system:
- "Where the operator proposes to make a change in the management system or resources, which might have, or might reasonably be seen to have a significant impact on how compliance with the conditions of this permit is achieved:
- (a) the operator shall notify the Environment Agency at least 28 days before making that change, or where that is not possible, without delay; and
- (b) shall include in the notification a description of the proposed changes."
109. Operators must notify us whenever they decide that it is necessary to revise their radioactive waste managements. The notification should be accompanied by a description of the proposed changes with supporting evidence that the proposed changes represent the use of BAT, etc. These notifications and associated material will be placed on the public register. This notification requirement also applies to changes which may have implications for the operators' environmental safety case for the burial of radioactive waste.
110. Operators should review and, where appropriate, revise and notify us at the same time as they are considering proposals and making decisions. This is to ensure that we are aware of proposals that may have significant repercussions and can comment on and influence them at the time they are under development. Operators should do this for all proposals under consideration, including those which may not affect how waste is managed and disposed of until many years into the future.

Records

111. Part 3D of the joint guidance on "[managing information and records relating to radioactive waste management in the United Kingdom](#)" relates specifically to HA wastes (and the RWMC process). The general principles are applicable to other forms of radioactive waste and we therefore require operators to apply them appropriately and proportionately, to records held in accordance with the RSR permit.

7 NEW NUCLEAR POWER STATIONS

112. It is likely that any application we receive for a new nuclear power station will relate to a design that has been through, or is going through, our Generic Design Assessment (GDA) process (as described in our *Process and Information Document for Generic Assessment of Candidate Nuclear Power Plant Designs*). By introducing GDA, we have, effectively, split our assessment process for new nuclear power stations into two phases: the first – GDA – addressing generic design matters, and the second dealing with applications for a specific site. The outcome of our GDA is a 'Statement of Design Acceptability' (SODA), which may have "assessment findings" associated with it. Where there are also 'GDA issues' to be resolved, we may issue an 'interim Statement of Design Acceptability' (iSODA). We shall take full account of the SODA or iSODA in considering an application for a specific site. This means that we shall not repeat work already done in GDA, but shall focus on operator-specific and site-specific matters, any relevant changes to the design, and how the applicant has addressed any issues and findings associated with the statement.

ANNEX A: DEFINITION OF BAT

BAT is defined as

The use of the best available techniques shall emphasise the use of non-waste technology, if available.

The term "best available techniques" means the latest stage of development (state of the art) of processes, of facilities or of methods of operation which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste. In determining whether a set of processes, facilities and methods of operation constitute the best available techniques in general or individual cases, special consideration shall be given to:

- a) comparable processes, facilities or methods of operation which have recently been successfully tried out;*
- b) technological advances and changes in scientific knowledge and understanding;*
- c) the economic feasibility of such techniques;*
- d) time limits for installation in both new and existing plants;*
- e) the nature and volume of the discharges and emissions concerned.*

It therefore follows that what is "best available techniques" for a particular process will change with time in the light of technological advances, economic and social factors, as well as changes in scientific knowledge and understanding.

If the reduction of discharges and emissions resulting from the use of best available techniques does not lead to environmentally acceptable results, additional measures have to be applied.

"Techniques" include both the technology used and the way in which the installation is designed, built, maintained, operated and dismantled.

ANNEX B CHANGES THAT COULD HAVE SIGNIFICANT REPERCUSSIONS

Changes that could have significant repercussions	
Management system changes	<ul style="list-style-type: none"> • reorganisation of the management structure; • contractorisation, delayering, demanning, or multi-skilling in relation to the operation or maintenance of the facility; • changes in environment policy, procedures, standards, aims, objectives or priorities.
Modifications	<p>modifications which may alter or affect the techniques used for</p> <ul style="list-style-type: none"> • preventing and minimising (in terms of radioactivity) the creation of radioactive waste⁹; • minimising (in terms of radioactivity) discharges of gaseous and aqueous radioactive wastes; • minimising the impact of those discharges on people, and adequately protecting other species; • minimising (in terms of mass/volume) solid and non-aqueous liquid radioactive wastes; • selecting optimal disposal routes (taking account of the waste hierarchy and the proximity principle) for those wastes; <p>or</p> <ul style="list-style-type: none"> • which may alter or affect the suitability for disposal of any wastes for which there is no currently available disposal route (HA¹⁰ wastes) and how these will be managed in the interim so as not to prejudice their ultimate disposal .
New facts and knowledge	<ul style="list-style-type: none"> • changes in Government policy in relation to radioactive waste; • advances in techniques that might render parts of the arrangements out of date; • new scientific or technical research, or other advances; • ageing plant and associated performance; • population changes off site [including changing habits affecting dose uptake]; • changes in the land-use of surrounding areas; • changes in the conservation designation of surrounding land; • changes in the availability of treatment and disposal routes.

⁹ This is not relevant if the facility solely manages (eg by treatment or disposal) radioactive wastes created elsewhere.

¹⁰ This means HLW, ILW, and such LLW that cannot be disposed of at present

GLOSSARY AND ACRONYMS

Term	Meaning
Activity	A generic title for the practices or operations which require to be permitted (unless exempted from the need for a permit).
ALARA	As Low as Reasonably Achievable (economic and social factors being taken into account). Radiation doses comply with ALARA when they have been reduced to a level that represents a balance between dose and other factors (including economics). This is a statement of the optimisation principle.
BAT	Best Available Techniques - see annex for full definition
BSSD	Basic Safety Standard Directive (96/29/EURATOM)
DECC	Department of Energy and Climate Change This is the Government Department with policy responsibility for Radioactive Substances Regulation in England and Wales.
Defra	Department for the Environment, Food and Rural Affairs This is the Government department with specific responsibilities for EPR.
EPR	Environmental Permitting Regulations
FSA	Food Standards Agency.
GDA	Generic Design Assessment (of new reactors) : part of the facilitative work in support of the new nuclear reactors.
GRA	Guidance on Requirements for Authorisation Environment Agency guidance detailing the environmental objectives which an underground facility for the permanent disposal of radioactive waste must achieve. There are two versions of the GRA: one for geological disposal of higher activity radioactive waste; and one for near-surface disposal of lower activity radioactive waste.
GW	Groundwater (specifically in relation to a groundwater activity under the Regulations)
HA wastes	Higher Activity wastes as defined in the joint guidance on radioactive waste management
HPA	Health Protection Agency
ICRP	International Commission on Radiological Protection
ILW	Intermediate Level Radioactive Waste
Justification	The benefits and detriments of any practice which could result in exposure to ionising radiation must be assessed prior to the practice being permitted. If the benefits outweigh the detriments, the practice is justified.
LLW	Low Level Radioactive Waste

Term	Meaning
VLLW	Very Low Level Radioactive Waste
Licensee	An operator licensed under NIA65
NIA65	The Nuclear Installations Act 1965
NII	Nuclear Installations Inspectorate now part of ONR
NLS	Nuclear Licensed Site : a site licensed under the Nuclear Installations Act 1965.
ONR	Office for Nuclear Regulation
Options assessment	Any formal and recorded method by which the 'best' solution is determined from a number of possible alternatives.
OSPAR	Oslo and Paris Convention for the protection of the marine environment in the north-east Atlantic. The UK is a signatory to this Convention, which commits the UK to reducing discharges of pollution, including radioactive substances, to the sea and hence reducing marine concentration of pollutants.
Proximity principle	This means enabling waste to be disposed of in one of the nearest appropriate installations by means of the most appropriate methods and technologies in order to ensure a high standard of protection to the environment and public health.
Regulated facility (RF)	A collective term for the range of activities permitted under the Environmental Permitting Regulations
REP(s)	Radioactive Substances Regulation – Environmental Principles. Environment Agency guidance which sets out, at a high level, the principles which the Environment Agency applies to RSR.
RSR	Radioactive Substances Regulation
RWMA	Radioactive Waste Management Arrangements : operators' arrangements for the management of the generation and disposal of radioactive waste under an RSR permit.
SAP(s)	Safety Assessment Principles . HSE guidance which sets out, at a high level, the principles which the HSE applies to safety cases.
Sustainable Development	Development which meets the needs of the present without compromising the ability of future generations to meet their own needs. Specific to radioactive waste, the Government's policy is to 'ensure that radioactive waste is managed safely and that the present generation, which receives the benefit of nuclear power, meets its responsibilities to future generations'.
Tenant	An operator on a nuclear licensed site but who is not a licensee.
Waste Hierarchy	A principle of waste management which requires that (in order of preference) wastes be: <ul style="list-style-type: none"> • Avoided • Minimised • Reused • Recycled • Disposed of