



Process and Information Document for Generic Assessment of Candidate Nuclear Power Plant Designs

Version 3 (October 2016)

We are the Environment Agency. We protect and improve the environment.

Acting to reduce the impacts of a changing climate on people and wildlife is at the heart of everything we do.

We reduce the risks to people, properties and businesses from flooding and coastal erosion.

We protect and improve the quality of water, making sure there is enough for people, businesses, agriculture and the environment. Our work helps to ensure people can enjoy the water environment through angling and navigation.

We look after land quality, promote sustainable land management and help protect and enhance wildlife habitats. And we work closely with businesses to help them comply with environmental regulations.

We can't do this alone. We work with government, local councils, businesses, civil society groups and communities to make our environment a better place for people and wildlife.

Document history

Version	Date	Change
1	January 2007	Issued for first tranche of GDA
2	March 2013	Revised for second tranche of GDA reflecting: - legislative changes - experience from first tranche
3	October 2016	Updated to reflect: - legislative changes - creation of Natural Resources Wales - changes to references and hyperlinks

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Summary

As the principal environmental regulator in England, the Environment Agency regulates various aspects of the operation of nuclear power stations, primarily under the Environmental Permitting Regulations 2010.

Since 2007, our process for the consideration of new nuclear power stations has been split into two phases. The first phase addresses generic design matters and the second deals with applications for permits for specific sites.

This document sets out our process for the first phase, that is, when assessing the acceptability of a candidate nuclear power station design. It also specifies the information that needs to be included in a submission for assessment. It focuses primarily on radioactive waste matters, since this, historically, has been the aspect with the longest lead time when permitting new nuclear power stations. Separate guidance is available in relation to permit applications.

Natural Resources Wales (NRW) has the same regulatory functions for nuclear power stations in Wales. NRW may choose to participate in the GDA process, in which case any statement of design acceptability may be issued jointly by both regulators and used to support site-specific applications in Wales.

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1 Introduction

Regulation of nuclear power stations

The Environment Agency regulates several aspects of the operation of nuclear power stations in England including those listed below.

- The disposal of radioactive waste requires a permit under 'The Environmental Permitting (England and Wales) Regulations 2010' (EPR10) (GB Parliament, 2010).
- The discharge of aqueous effluents (such as from cooling, or dewatering during construction) requires a permit under EPR10.
- Some conventional plant (for example combustion plant used as auxiliary boilers and emergency standby power supplies, and incinerators used to dispose of combustible waste) may require a permit under EPR10. Some combustion plant may also need a permit under 'The Greenhouse Gas Emissions Trading Scheme Regulations 2005' (as amended) (GB Parliament, 2005).
- The disposal of waste by depositing it on or into land, including excavation materials from construction, and other waste operations may require a permit under EPR10.
- The abstraction of water (for example, for cooling or process use) from inland waters or groundwater, except in some specific circumstances, requires a licence under 'The Water Resources Act 1991' (WRA91) (GB Parliament, 1991). Inland waters include rivers, ponds, estuaries and docks, amongst others.
- The construction of new or enhanced flood defence structures, or modification of existing ones, requires a permit under EPR10 (from April 2016 – previously a flood defence consent under WRA91 was required).
- The Environment Agency, the Office for Nuclear Regulation (ONR) and the Health and Safety Executive together form the competent authority for 'The Control of Major Accident Hazards Regulations 2015' (COMAH15) (GB Parliament, 2015a). On-site storage of certain substances may fall under these regulations.
- The Environment Agency is an enforcing authority for 'The Fluorinated Greenhouse Gases Regulations 2015' (GB Parliament, 2015b), 'The Ozone-Depleting Substances Regulations 2015' (GB Parliament, 2015c) and the EU Regulations referenced therein. Any refrigeration or similar equipment containing such substances, if included in the design, will fall under these regulations.

Two phase permitting process

In 2007, in the light of Government and industry expectation that plants of almost the same design might be built on a number of sites and potentially be run by different operating companies, we split our process for assessing and permitting the operational stage of new nuclear power stations into two phases.

In the first phase, generic design assessment (GDA), we carry out a detailed assessment of the features of a generic design that can affect those aspects of its environmental performance that we regulate. This approach allows us to get involved at the earliest stage, where we can have most influence and where lessons can be learned for site-specific designs and applications. Our assessment takes account of a generic site description, defined by the requesting party (that is, the organisation(s) submitting its reactor design for assessment), that we expect to reflect the relevant

constraints of potential sites in England (and Wales if NRW are participating in the GDA). When we complete our planned assessment of a GDA submission¹, we will:

- provide a Statement of Design Acceptability (SoDA) if we are **fully** content with the environmental aspects of the generic design
- issue an interim Statement of Design Acceptability (iSoDA) that identifies the GDA Issues (that is, significant but resolvable outstanding matters), if:
 - we are **largely** content with the environmental aspects and
 - the requesting party provides a credible resolution plan addressing each GDA Issue
- not issue any SoDA or iSoDA if:
 - we are **not** content with the environmental aspects or
 - there are GDA Issues and the requesting party does not provide a credible resolution plan

If we issue an iSoDA, GDA then continues as the requesting party carries out its resolution plans and we assess the outputs. If and when all the GDA Issues are addressed to our satisfaction and we are fully content with the environmental aspects of the generic design, we issue a full SoDA.

In the second phase, we receive applications for environmental permits for specific sites. In determining these applications, we take full account of the work we have done during GDA, so that our efforts are focused on operator-specific and site-specific matters, including how the operator has addressed any relevant matters arising from GDA. Any proposed changes to the design affecting the environmental aspects would need to be reassessed.

The requesting party should be mindful that, to maximise the value of the GDA, the information they provide for GDA needs to be capable of forming part of any subsequent site-specific permit applications without any substantial rewriting of the GDA submission.

We recognise that potential operators will want to make site-specific applications at an appropriate time for their project. This might be prior to completion of the GDA phase - for example, a potential operator may wish to coordinate applications for environmental permits with an application to the Planning Inspectorate for a development consent order. We expect a potential operator, together with the requesting party, to discuss such proposals with us in advance. To draw significant benefit from GDA, we would not expect site-specific applications to be made until we have, at least, begun consultation on our preliminary view of the acceptability of the design (see section 2.4).

We believe that, overall, this two-phase approach provides a streamlined process for site-specific applications, whilst ensuring robust and transparent scrutiny of proposals and delivering proper protection of people and the environment. It should help potential operators to bring forward site-specific proposals with greater confidence in cost and time schedules, because key regulatory issues have been identified and resolved prior to construction beginning.

It should be noted that, since GDA is not a legal requirement, and in order to ensure our resources are used appropriately, we only carry out GDA for those designs that the Department of Energy and Climate Change asks us to consider.

¹ We refer in this document to 'a GDA submission' - this is likely to comprise a number of individual documents.

Although GDA is not a legal requirement, we carry out our GDA work in accordance with the statutory principles of good regulation (GB Parliament, 2006) and the associated Regulators' Code (GB Parliament, 2014a).

Purpose of this document

The purpose of this document is to set out, for all interested parties but primarily those requesting an assessment, the process we work to during the first phase, GDA. The process is detailed in chapter 2. The information that a requesting party is required to provide in a submission for assessment of the acceptability of a candidate nuclear power station design is also identified in this document, in chapter 3.

What GDA covers

Our GDA process and, hence, this document focus primarily on matters relevant to the disposal of radioactive waste. This is for two reasons:

- the generation of radioactive waste is intrinsically linked to the detailed design of a nuclear reactor and its associated plant
- permitting the disposal and discharge of radioactive wastes has, historically, been the area of regulation having the longest lead time for our permitting of new nuclear power stations

Apart from flood defence, which is necessarily site specific, we also, as far as is practicable at a generic level, address aspects of the candidate design related to the other regulatory requirements listed above.

In carrying out GDA, we take into account all relevant statutory, policy and regulatory matters and constraints, except where they can only be addressed on a site-specific basis.

Status of SoDA

GDA is carried out under an agreement with the requesting party, made under section 37 of 'The Environment Act 1995' (EA95) (GB Parliament, 1995). The SoDA or iSoDA is provided as advice to the requesting party, under section 37, and has no other formal legal status. It does not guarantee that a site-specific proposal based on the design will receive environmental permits in the future. However, it gives a strong indication to the requesting party of whether such a proposal will, in principle, be acceptable in England (and Wales if NRW are participating in the GDA), with respect to the matters that we regulate.

The SoDA or iSoDA is issued against a defined 'reference design configuration' and a defined set of submission documentation. It remains valid for the specified design for 10 years from the date of issue, subject to no significant new information arising that might call into question our assessment of the design. At the end of this 10-year period, the requesting party may seek renewal of the SoDA by reviewing, updating and resubmitting its documentation. Our assessment of this will focus on whether the updated design continues to represent the use of the best available techniques to minimise the production, discharge and environmental impact of radioactive waste.

Cost recovery

We also use the section 37 agreement to recover our costs for the work that we do in GDA from the requesting party.

Working with other regulators

ONR is responsible for licensing any new nuclear power station under the Nuclear Installations Act 1965 (NIA65) and for regulating its security and conventional safety arrangements. ONR also conducts generic assessments of candidate designs, issuing a Design Acceptance Confirmation (DAC) if it considers a design is acceptable. Our GDA processes are aligned and complementary, and we work in a co-operative and co-ordinated way. The regulators' working arrangements are set out in a joint document, 'New Nuclear Power Stations Generic Design Assessment - A Guide to the Regulatory Process' (ONR & Environment Agency, 2013 (currently under revision)). We do not issue a SoDA if ONR are unable to issue a DAC, since any changes to the design required by ONR could affect the environmental aspects. Similarly, we don't expect ONR to issue a DAC if we are unable to issue a SoDA. We coordinate the issue of any SoDA and DAC to ensure that both documents refer to the same reference design configuration and the same set of submission documentation.

Where a design has the potential to be built in Wales, NRW will partner the Environment Agency in the GDA process. In this case, any SoDA will be issued jointly by both regulators and used to support site-specific applications in both England and Wales.

We also liaise with other relevant regulators and government bodies, such as the Scottish Environment Protection Agency and the Food Standards Agency (FSA), where appropriate.

Public involvement

Jointly with ONR, we expect requesting parties to:

- make the written information in their GDA submission available to the public (preferably on their website), other than sensitive nuclear information and commercially confidential information (as described in Appendix 1)
- publicise the fact that they have made a submission and invite the public to make comments on safety, security and environmental matters

To enable us to respond more easily to requests for information, we also ask requesting parties to provide all the publicly available information on electronic media (such as memory sticks), and summary documents in paper form.

Additionally, as part of our assessment of the GDA submission, we, the Environment Agency, carry out a wide public consultation. NRW, if participating in GDA, carry out a similar consultation in Wales. This is followed by more locally-focused public consultation on any ensuing site-specific application.

2 Our GDA process

Introduction

Our process for GDA generally has six main elements, with a seventh when we issue an iSoDA. (Figure 1 in 'A Guide to the Regulatory Process' (ONR & Environment Agency, 2013 (currently under revision)) shows how these line up with ONR's 4 step process.)

1. **Initiation**, when we make an agreement with the requesting party under section 37 of EA95 and provide advice on the development of a submission.
2. **Initial assessment**, when we receive the submission and examine it at an outline level, to identify whether:
 - further information is required
 - there are any matters that are obviously unacceptable
 - any significant design modifications are likely to be required
3. **Detailed assessment**, when we examine the submission in detail to come to a preliminary view on whether:
 - a SoDA might be issued
 - an iSoDA with associated GDA Issues (see box overleaf) might be issued
 - the design is unsuitable and no statement should be issued

In the first two cases, we also identify any potential 'assessment findings' (see box overleaf).
4. **Consultation**, when we consult widely on our preliminary view following detailed assessment. We provide a consultation document explaining the reasons for our preliminary view.
5. **Post consultation review**, when we carefully consider all relevant responses to the consultation and complete our assessments.
6. **Decision and statement**, when we decide whether or not to issue a SoDA or iSoDA. We publish a decision document explaining the reasons for our decision.
7. **Resolution of GDA Issues**, when we assess the further information provided to clear the GDA Issues and, if satisfied, issue a full SoDA.

We conduct our assessments in an open and transparent manner, subject to the requirement to protect sensitive nuclear information and commercially confidential information as described in Appendix 1.

We have regard to the Government Cabinet Office's 'Consultation Principles' (GB Parliament, 2016) when consulting on our preliminary view following detailed assessment.

A '**GDA Issue**' is an unresolved issue considered by regulators (ourselves or ONR) to be significant, but resolvable, and which requires resolution before nuclear island safety-related construction of the reactor could be considered.

An '**assessment finding**' is an unresolved issue of lesser significance, not considered critical to the decision to start nuclear island safety-related construction. In many cases, resolution of the issue will rely on one or more of the following:

- site-specific information
- operator design choices
- operator-specific features, aspects or choices
- operator choices on organisational matters
- the plant being at some stage of construction or commissioning
- the level of detail of the design being beyond what can reasonably be expected in GDA (eg manufacturer or supplier input is required, or areas where the technology changes quickly such that early choices could lead to obsolescence of design)

It will need to be addressed, as normal regulatory business, either by the designer or by a future operator, as appropriate, during the detailed design, procurement, construction or commissioning phase of the new build project. Issue of a final SoDA is, thus, not dependent on clearance of assessment findings. We may address assessment findings in site-specific permits, by means of pre-operational conditions or improvement and information requirements.

Timeline

An approximate timeline for the overall process is set out in Appendix 2. An indicative period of 36 to 48 months from receipt of a submission to issue of a SoDA is envisaged. This assumes:

- we receive a good quality, complete application at the beginning of the process
- the requesting party responds in a timely and effective manner to any questions and concerns we might raise
- we do not raise any GDA issues

Where there are GDA Issues, the time taken to resolve them (element 7) will depend very much on the nature of those issues; the estimate of 12 months in Appendix 2 can only be indicative.

Our experience to date of GDA has shown that the design and submissions continue to evolve during the period of assessment, often to take account of UK expectations and learning from other relevant projects. This can extend the overall timescale for GDA.

2.1 Initiation

Section 37 agreement

We establish an agreement under section 37 of EA95 with a potential requesting party. This sets out that:

- the requesting party will provide the information specified in chapter 3 of this document

- we will assess the information and provide our conclusions as described in this document
- the requesting party will pay our costs for the work that we do on the assessment, including any advice we give to assist with production of the submission

Once the agreement is in place, we develop, with the requesting party, a project plan and other project management arrangements for this work.

Information requirements

The starting point for our assessment is the information provided by the requesting party. The key items to be addressed include:

- plant and process descriptions
- the definition of the 'generic site'
- the management arrangements for the development of the design and production of the submission
- how best available techniques will be used throughout the lifecycle of the plant (design, construction, commissioning, operation and decommissioning) to minimise the arisings and impact of radioactive wastes
- the quantities and types of waste (gaseous, liquid and solid) and spent fuel that are likely to arise
- the likely impact on people and the environment of any proposed discharges of gaseous and liquid radioactive wastes, and the disposability of any solid radioactive waste arisings
- the environmental impact of 'conventional' aspects of the design

More detailed information requirements are set out in chapter 3 of this document.

We recognise that full engineering details of the design may not be available at the GDA stage, as it is normal to finalise some of these as part of the procurement and construction programme or once site-specific requirements are known. However, once a section 37 agreement is in place, we provide advice to the requesting party to assist it in producing a submission that is sufficient in scope and detail to enable us to carry out a meaningful GDA. As it can take considerable time to prepare the detailed information required, we may accept a submission for initial assessment where some aspects are only covered at an assertion or commitment level, provided that:

- we are confident that the requesting party can provide the detailed supporting case in time for the start of our detailed assessment
- the detailed case is provided for, at the very least, the three items identified in 2.2 below

If the supply of information on the design and its environmental aspects is inadequate, it follows that we will not be able to provide a SoDA.

The requesting party needs to identify any aspects that it considers cannot be specified at the generic level and that thus need to be excluded from the scope of the GDA.

Receipt of a submission

GDA formally begins when a submission is received by the regulators' Joint Programme Office. Where relevant, we consider the requesting party's case for designating information as commercially confidential. We ensure that the submission is publicised, that its content is made available to the public (subject to restrictions for sensitive nuclear information and agreed commercial confidentiality, as described in Appendix 1), and that comments are invited from the public. The Joint Programme Office co-ordinates the handling of submissions and public comments, on behalf of ourselves and ONR.

2.2 Initial assessment

Purpose and extent

The purpose of the initial assessment is to seek to identify whether:

- further information is required
- there are any matters that are obviously unacceptable
- any significant design modifications are likely to be required

At this stage, we generally carry out only a very limited scrutiny of the evidence that substantiates the claims and arguments made in the submission. However, we look in more detail at the requesting party's management arrangements for production and management of the submission (see item 2 in Table 1). This is to give us confidence in the quality of the submission. We may also look in more detail at:

- the generic site description (see item 1 in Table 1), to ensure it appropriately reflects the relevant constraints of potential sites
- the assessment of the impact of proposed discharges (see item 7 in Table 1), to give early assurance that dose constraints will be complied with

We seek clarification from the requesting party where necessary.

Involvement of others

We consider any relevant comments received from the public or interested organisations and any responses to those comments made by the requesting party.

We consult ONR, particularly on matters having both environmental and safety aspects, and seek expert advice from other regulators and government bodies, including the FSA, where necessary.

Initial Assessment Report

On completion of the initial assessment, we issue a report and make it publicly available. This lists any additional information required, any issues where design change might be required, and any matters that have been identified for particular scrutiny during the detailed assessment.

We aim to publish our report within six months of the receipt of a submission.

2.3 Detailed assessment

Nature of assessment

We carry out a detailed assessment of the submission. This involves close scrutiny of the detailed evidence that substantiates the claims and arguments made. We don't examine all matters at the same level of detail, but take a risk based 'sampling' approach to seek confidence in the submission overall. We consider both radioactive and conventional pollution aspects. Our assessment is guided by our 'Radioactive Substances Regulation Environmental Principles' (REPs) (Environment Agency, 2010a).

Involvement of others

We expect the requesting party to make available, for public comment, any additional information provided to us following our initial assessment (subject to restrictions for sensitive nuclear information and commercial confidentiality, as described in Appendix 1). We publish details of any key issues that we raise with the requesting party and their plans for the resolution of these.

We consider any relevant comments received on the submission and additional information, together with any responses provided to those comments by the requesting party. We consult ONR and liaise with other regulators, government bodies and the requesting party, as appropriate.

Preliminary view

At the end of this stage, we come to a preliminary view on whether, or not, a statement, or interim statement, of design acceptability might be issued, and, if so, identify any possible GDA Issues and assessment findings. To assist prospective operators in making a complete application, we also identify our 'expectations for site-specific permitting', that is, those items that have not been addressed, or not fully addressed, in GDA. As well as the GDA issues and assessment findings, these would include matters agreed as out of scope of GDA, any extension to the scope of GDA (including choice of a site outwith the generic site envelope), any changes or developments to the design (not covered by GDA issues or assessment findings) that might affect environmental performance, and other operator-specific and site-specific matters.

2.4 Consultation

Consultation document

We prepare a consultation document that sets out the matters that we have taken into account and the outcome of our detailed assessment, and may include a draft SoDA or iSoDA. We ask consultees for their views on our preliminary conclusions. These will usually include discharge limits that we would expect plants of the candidate design to be able to meet.

Who and when we consult

We consult widely with other regulators, Government Departments and bodies, non-governmental organisations, other interested bodies and the public. We notify consultees by appropriate means - these include issuing press releases and contacting people on our national and local databases. We ensure that our consultation documents are well publicised in those localities where new power stations might be sited (that is, those listed as potentially suitable in 'The National Policy Statement for Nuclear Power Generation' (GB Parliament, 2011)) including, in particular, any localities where it has been proposed to build the specific design undergoing GDA.

We expect to begin consultation within 18 months of receiving the required additional information (or of issuing our Initial Assessment Report, if no additional information is required). We determine the consultation period in accordance with the Cabinet Office's 'Consultation Principles' (GB Parliament, 2016) - this may be up to twelve weeks.

2.5 Post consultation review

We carefully consider all the responses we receive during the consultation period. If issues arise which fall outside of our principal responsibilities, we pass them to the appropriate regulator, Government Department or other public body.

Where we need advice from other organisations having expertise on specific topics, we seek the expert views of the Government Department or official public body concerned, for example, Public Health England's Centre for Radiation, Chemical and Environmental Hazards, which is the Government's adviser on radiological protection. Similarly, if necessary, we seek further information or clarification from the requesting party.

We also consider any matters relevant to our interests that may arise from ONR's continuing assessment.

2.6 Decision and statement

In the light of all the information obtained, including that received during and after consultation, we decide whether a statement (SoDA or iSoDA) should be issued or not, and finalise any GDA Issues, assessment findings, and expectations for site-specific permitting.

We publish a document that provides the background to, and basis for, our decision and that includes a copy of any SoDA or iSoDA. This document, or a summary of this document, is sent to consultation respondents as appropriate. Where an iSoDA is issued, the requesting party publishes its resolution plan(s) for the associated GDA issue(s).

We expect to publish our findings within 9 months of the end of the consultation period.

2.7 Resolution of GDA Issues

We assess the information provided by the requesting party as it implements its resolution plan, and close GDA Issues once we are satisfied that they have been appropriately dealt with. Once all GDA Issues are closed, we issue a full SoDA. Where appropriate, we may carry out a further consultation, prior to issuing a full SoDA.

3 Information requirements

Extent of information required

For us to carry out a GDA, we need the requesting party to provide the information specified in Table 1. We recognise that full engineering details of the design may not be available at the GDA stage, but the information should be at a level of detail sufficient to enable us to carry out a meaningful assessment of the environmental effects of a design including, in particular, whether the design represents the use of the best available techniques to minimise the production, discharge and environmental impact of radioactive waste. The use of the best available techniques is a fundamental requirement for a radioactive substances permit to be issued under EPR10; the requesting party must provide a full assessment showing how their design meets this requirement (see item 4 in Table 1). The REPs and references listed in the final column of Table 1 should assist the requesting party to identify the level of detail required. However, this list is not intended to be exhaustive and the requesting party should take account of embedded references and other relevant guidance and standards (for example, relevant IAEA guidance).

Where little or no information is available on a topic, it may be excluded from the scope of the GDA - in this case it will need to be fully addressed at the site-specific permitting stage. However, if we consider too many topics have been excluded to enable a meaningful GDA to be carried out, or that a critical topic has been excluded, we will not proceed with an assessment.

Although we initially identify any additional information requirements in our Initial Assessment Report, it is likely that we will identify further requirements as we undertake our detailed assessment. We may, therefore, request clarification and additional information at any point during our assessment.

The requesting party should provide the best available information, citing, where possible, the actual performance of any similar plants in operation, and identifying uncertainties, where appropriate. The requesting party may provide details of relevant assessments made by regulators from other countries and evidence from similar facilities, in support of their submission.

The information may be provided as a single submission covering the requirements of both regulators. In that case, the requesting party should provide a guide or 'route map' which shows where the response to each of our specified requirements is set out.

Public availability

We expect the requesting party to make the submitted information available to the public, as far as possible. Any information that the requesting party considers should be withheld on the grounds that it is sensitive nuclear information or commercially confidential information (see Appendix 1), should be placed in separate, clearly-marked annexes to the submission. It should be marked in accordance with the UK Government Protective Marking Scheme, as described in 'HMG Security Policy Framework' (GB Parliament, 2014b). The requesting party should also give their reasons for designating any information as commercially confidential.

The requesting party should, as far as possible, provide the information in electronic format. It should also provide all the publicly available information on electronic media (such as memory sticks), and summary documents in paper format. This will enable us to respond more easily to requests for information.

Table 1 - Information to be provided

Item	Information required	Key REPs & Refs
1	<p>General information relating to the requesting party and the design. Include:</p> <ul style="list-style-type: none"> • Brief details about the requesting party, including its experience of reactor design and plants in service. • A simple, outline description of the design including schematic diagrams. • A brief history of the design, identifying predecessor plant and the main design changes. • Identification of discharge points to the environment for gaseous and aqueous radioactive wastes. • Description and characteristics of the generic site (or sites) that the requesting party will use to provide its dose assessment (see item 7 below). Any statement of acceptability we issue after our assessment will be on the basis of these characteristics. A range of generic sites might be chosen with coastal, estuarine and inland characteristics. • A summary of the proposed discharges of radioactive waste and their potential impact on members of the public and non-human species at the generic site. • A summary of the 'conventional' environmental impacts (see item 8 below) of the facility. <p>Note: this item is intended to provide a top-level description that should be understandable by a reasonably intelligent member of the public.</p>	
2	<p>A description of the requesting party's management arrangements and responsibilities for:</p> <ul style="list-style-type: none"> • developing the design • managing the GDA project • establishing the methodology for identifying the 'best available techniques' (BAT - see 4 below) and ensuring their use in the design • producing and maintaining the submission • ongoing communications with the regulators and responding to matters raised by them during GDA • maintaining records of design and construction • controlling and documenting design modifications, both during and after completion of GDA • transferring information to potential operators and providing ongoing support to them throughout the reactor's lifecycle 	<p>REPs: MLDP1, 2, 3, 4 and 5</p> <p>Refs: Environment Agency, 2010b HSE & Environment Agency, 2010</p>

Item	Information required	Key REPs & Refs
3	<p>Detailed information relating to the design. Include:</p> <ul style="list-style-type: none"> • A technical description of the facility's main plants, systems and processes, supported by process diagrams. • Identification of the plants, systems and processes which have a bearing on: <ul style="list-style-type: none"> - radioactive waste (solid, liquid and gaseous) generation, treatment, measurement, assessment and disposal - the conventional environmental impacts (see item 8 below) of the facility. 	
4	<p>A detailed description of the radioactive waste management arrangements. Include:</p> <ul style="list-style-type: none"> • Identification of the strategic considerations with respect to radioactive waste management which underpin the design. • A description of how radioactive wastes and spent fuel will arise throughout the facility's lifecycle (including decommissioning) and the plans for how they will be managed and disposed of, to encompass: <ul style="list-style-type: none"> - sources of radioactivity and matters which affect wastes arising - gaseous, aqueous and other wastes • A description of how the production, discharge and disposal of radioactive waste will be managed to protect the environment and to optimise the protection of people. <ul style="list-style-type: none"> - Describe the optimisation process used and identify and justify the proposed techniques as BAT. - In identifying techniques, address both the technology to be used and the way the facility is designed and will be built, maintained, operated and dismantled. - In justifying techniques as BAT, address the following, in respect of wastes arising throughout the lifetime of the facility: <ul style="list-style-type: none"> ▪ preventing and minimising (in terms of radioactivity) the creation of radioactive waste ▪ 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 	<p>REPs:</p> <p>RSMDP1 DEDP1 and 2</p> <p>RSMDP3, 4, 5, 6, 7, 8, 9 and 10 ENDP3, 4, 5, 6, 7, 8, 9, 11, 14, 15 and 16 DEDP3 CLDP1</p> <p>Refs:</p> <p>Environment Agency, 2012a Environment Agency, 2010c</p>

Item	Information required	Key REPs & Refs
	<ul style="list-style-type: none"> ▪ minimising (in terms of mass/volume) solid and non-aqueous liquid radioactive wastes and spent fuel ▪ selecting optimal disposal routes (taking account of the waste hierarchy and the proximity principle) for those wastes ▪ the suitability for disposal of any wastes and spent fuel for which there is no currently available disposal route and how they will be managed in the interim so as not to prejudice their ultimate disposal (this should take account of the view of RWM (as the UK authoritative source in providing such advice) on the disposability of such wastes and spent fuel) 	
5	<p>Quantification of radioactive waste disposals.</p> <p>Provide quantitative estimates for normal operation of:</p> <ul style="list-style-type: none"> • discharges of gaseous and aqueous radioactive wastes • arisings of combustible waste and disposals by on-site or off-site incineration • arisings of other radioactive wastes (by category and disposal route (if any)) and spent fuel <p>'Normal operation' includes the operational fluctuations, trends and events that are expected to occur over the lifetime of the facility, such as start-up, shutdown, maintenance, etc. It does not include increased discharges arising from other events, inconsistent with the use of BAT, such as accidents, inadequate maintenance, and inadequate operation.</p> <p>For gaseous and aqueous radioactive wastes, estimate the monthly discharges:</p> <ul style="list-style-type: none"> • on an individual radionuclide basis for significant radionuclides • on a group basis (for example 'total alpha' or 'total beta') for other radionuclides • via each discharge point and discharge route <p>'Significant ' radionuclides are those which:</p> <ul style="list-style-type: none"> - are significant in terms of radiological impact for people or non-human species - are significant in terms of the quantity of radioactivity discharged (that is, numerically high) 	<p>REPs:</p> <p>RSMDP12</p> <p>Refs:</p> <p>EU, 2004 Environment Agency, 2009a Environment Agency, 2012b</p>

Item	Information required	Key REPs & Refs
	<ul style="list-style-type: none"> - have long half-lives, may persist and/or accumulate in the environment, and may contribute significantly to collective dose - are significant indicators of facility performance and process control <p>The radionuclide selection should be consistent with reference EU, 2004.</p> <p>For combustible and other radioactive wastes, estimate the annual arisings and disposals during operation and give an indication of the likely arisings during decommissioning. Identify wastes in terms of their category (HLW, ILW, LLW, VLLW), physico-chemical characteristics and proposed disposal route (if any). Quantification should be in terms of activity of key individual radionuclides and overall groupings of radionuclides (for example, total beta), together with mass and / or volume.</p> <p>Estimates of discharges and disposals should clearly show the contribution of each constituent aspect of normal operations, including:</p> <ul style="list-style-type: none"> • routine operation (that is, typically, the design basis or "flowsheet design" and the minimum level of disposals) • start-up and shutdown • maintenance and testing • infrequent but necessary aspects of operation, for example, plant wash-out; and the foreseeable, undesired deviations from planned operation (based on a fault analysis) consistent with the use of BAT, for example, occasional fuel pin failures <p>Support your estimates with performance data from similar facilities and explain, where relevant, how changes in design or operation from those facilities affect the expected discharges and disposals. Demonstrate that discharges and waste arisings will not exceed those of comparable power stations across the world (as required by UK Government policy (GB Parliament, 2008)).</p> <p>Provide proposed limits for:</p> <ul style="list-style-type: none"> • gaseous discharges • aqueous discharges • disposal of combustible waste by on-site incineration <p>Provide proposals for annual site limits (on a rolling twelve months basis) for gaseous and aqueous discharges, and monthly limits for disposals by on-site incineration, and describe how these were</p>	

Item	Information required	Key REPs & Refs
	derived. If desired, additionally propose limits to reflect an operating cycle, that is, 'campaign' limits.	
6	<p>A description of the sampling arrangements, techniques and systems for measurement and assessment of discharges and disposals of radioactive waste.</p> <p>Include:</p> <ul style="list-style-type: none"> • details of in-process monitoring arrangements • details of arrangements for monitoring final discharges of gaseous and aqueous wastes • details of arrangements for monitoring disposals of non-aqueous liquid and solid wastes • a demonstration that the proposals represent the best available techniques for monitoring • confirmation that the sensitivity is sufficient to: <ul style="list-style-type: none"> - readily demonstrate compliance with the proposed limits - meet the levels of detection specified in reference EU, 2004 • a description of the facilities provided for independent periodic sampling (by the regulator) of final discharges of gaseous and aqueous wastes 	<p>REPs:</p> <p>RSMDP9 and 13 ENDP10 and 14</p> <p>Refs:</p> <p>EU, 2004 Environment Agency & SEPA, 2010 Environment Agency, 2010d Environment Agency, 1999a Environment Agency, 1999b Environment Agency, 2014 Environment Agency, 2015</p>
7	<p>A prospective radiological assessment at the proposed limits for discharges and for any on-site incineration.</p> <p>Include:</p> <ul style="list-style-type: none"> • annual dose to most exposed members of the public for liquid discharges* • annual dose to most exposed members of the public for gaseous discharges (identifying separately the dose associated with on-site incineration where applicable)* • annual dose to the most exposed members of the public for all discharges from the facility* • annual dose from direct radiation to the most exposed member of the public • annual dose to the representative person for the facility • potential short-term doses, including via the food chain, based on the maximum anticipated short-term discharges from the facility in normal operation 	<p>REPs:</p> <p>RPDP2, 3 and 4</p> <p>Refs:</p> <p>Environment Agency <i>et al</i>, 2012</p>

Item	Information required	Key REPs & Refs
	<ul style="list-style-type: none"> • a comparison of the calculated doses with the relevant dose constraints • an assessment of whether the build-up of radionuclides in the local environment of the facility, based on the anticipated lifetime discharges, might have the potential to prejudice legitimate users or uses of the land or sea • collective dose truncated at 500 years to the UK, European and world populations • dose-rate to non-human species* <p>State which models were used to calculate these doses and why they are appropriate, and set out all the data and assumptions (with reasoning) used as input to the models. For those items marked with an asterisk (*), we recommend the use of our Initial Radiological Assessment Tool (available on request), refining the default data to reflect the characteristics of the facility and generic site.</p>	
8	<p>Information relating to other environmental regulations</p> <p>Water use and abstraction</p> <ul style="list-style-type: none"> • Provide details and estimates of fresh water requirements for the design. • Provide details and estimates of cooling water requirements for the design relevant to the generic site. Include consideration of: <ul style="list-style-type: none"> - seawater or river water abstraction - use of conventional cooling towers or hybrid cooling towers - abstraction inlet fish deterrent schemes - fish return systems <p>Discharges to surface waters</p> <p>Provide a description of how aqueous waste streams will arise, be managed and be disposed of throughout the facility's lifecycle. Include:</p> <ul style="list-style-type: none"> • sources and quantities of contaminants (including disinfectant and biocides), highlighting any priority substances (as specified in the 'Priority Substances' Directive (EU, 2008)) • identification of the effluent and surface water runoff streams contributing to the overall discharge and how they are controlled 	<p>Refs:</p> <p>Environment Agency, 2012c Turnpenny <i>et al</i>, 2010 Turnpenny & O'Keeffe, 2005 EU, 2001</p> <p>Environment Agency, 2016b EU, 2001 Environment Agency, 2011</p>

Item	Information required	Key REPs & Refs
	<ul style="list-style-type: none"> • potential options and associated environmental impact for disposal of each individual effluent stream • the means of control in the event of detection of unplanned radioactive or other contamination of the discharge • options for beneficial use of the waste heat produced • environmental impact of thermal discharges <p>Discharges to groundwater</p> <p>If there will be discharges to groundwater, describe the nature and quantity of those discharges and provide an assessment of the impact on groundwater.</p> <p>(Note: 1. Address prevention of accidental discharges of radioactivity to land and groundwater in your response to item 4 above. 2. We do not normally permit discharges to groundwater.)</p> <p>Operation of installations (combustion plant and incinerators)</p> <ul style="list-style-type: none"> • Identify what combustion plant (for example, for standby generation or auxiliary boilers) will be provided. <ul style="list-style-type: none"> - If the aggregate rated thermal input of all combustion plant is greater than 50 MW, provide a comparison of the proposed technology against our sector guidance. - If the aggregate rated thermal input of all combustion plant is greater than 20 MW, describe how greenhouse gas emissions will be monitored. • If the design includes an on-site incinerator with a capacity or 1 tonne or more per hour, provide a comparison of the proposed technology against our sector guidance. <p>Substances subject to the Control of Major Accident Hazards Regulations</p> <p>Identify any need for on-site storage of substances above the qualifying thresholds in COMAH15.</p> <p>If a threshold is exceeded, describe the measures taken in the design to prevent a major accident to the environment.</p> <p>Fluorinated greenhouse gases and ozone-depleting substances</p> <p>Identify whether any equipment included in the design will contain fluorinated greenhouse gases or ozone-depleting substances (as defined in EU, 2014 and EU, 2009, respectively).</p> <p>If so, describe the measures taken in the design to prevent and minimise leakage of such substances.</p>	<p>Environment Agency, 2012c Environment Agency, 2016b</p> <p>Environment Agency, 2016a Environment Agency, 2009b</p> <p>EU, 2012a EU, 2012b</p> <p>Environment Agency, 2016a Environment Agency, 2009c</p> <p>GB Parliament, 2015a HSE, 2015 GB Parliament, 1999 CDOIF, 2015</p> <p>EU, 2014 EU, 2009 Gluckman, 2014</p>

Appendix 1

Publication of information - restriction of sensitive nuclear information and commercially confidential information

We expect all the written information in a submission to be made available to the public (preferably via the requesting party 's website), other than "sensitive nuclear information" (as defined in the 'Anti-terrorism, Crime and Security Act 2001' (GB Parliament, 2001)) or "commercially confidential information" (information which is a trade secret or which, if disclosed, would adversely affect the confidentiality of commercial or industrial information where such confidentiality is provided by law to protect a legitimate economic interest).

The Environment Agency is a public authority for the purposes of the 'Freedom of Information Act 2000' (FOIA00) (GB Parliament, 2000) and the 'Environmental Information Regulations 2004' (EIR04) (GB Parliament, 2004). If we receive a request for information that we hold, including information that has not been made publicly available, we will have to consider the request in accordance with this legislation. We consider that all of the information we hold is likely to be environmental information, which is very broadly defined in Regulation 2 of EIR04. Therefore, it is likely that the information will be considered for release under EIR04 rather than under FOIA00.

A public authority is obliged to release environmental information which it holds unless an exception applies **and**, in all the circumstances of the case, the public interest in maintaining the exception outweighs the public interest in disclosing the information. This means that the Environment Agency may be able to withhold environmental information which is sensitive nuclear information or commercially confidential information, but only where the information fits within an exception under the EIR04 and the public interest test favours withholding the information. (Note: environmental information that relates to information on emissions cannot be withheld on the grounds of commercial confidentiality.)

When considering the public interest factors in relation to sensitive nuclear information, we will be guided by the advice of ONR's Civil Nuclear Security Programme whose role is to ensure the security of civil nuclear installations and to protect the public interest arising from threats to that security. They have provided guidance on the sensitivity of nuclear and related information and its disclosure in 'Finding a Balance' (ONR, 2014).

Any information which is required to be released under EIR04 will be removed from the confidential annexes and added to the publicly available information.

Appendix 2

Approximate timeline for our GDA process

Timeline (months)	Process element (see key)					
	1	2	3	4	5 & 6	7 (if required)
-6 to 0						
0 to +6		◆a				
+6 to +24						
+24 to +27						
+27 to +36					◆b	
(+36 to +48)						◆c

Key

- 1 Initiation – preparation of submission
- 2 Initial assessment – begins with receipt of submission (a). Formal start of GDA
- 3 Detailed assessment
- 4 Consultation
- 5 & 6 Post-consultation review, decision and issue of iSoDA or SoDA (b). End of GDA if SoDA
- 7 Resolution of GDA issues and issue of final SoDA (c)

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List of abbreviations

BAT	Best available techniques
COMAH15	Control of Major Accident Hazards Regulations 2015
DAC	Design Acceptance Confirmation (issued by ONR)
EA95	Environment Act 1995
EIR04	Environmental Information Regulations 2004
EPR10	Environmental Permitting (England and Wales) Regulations 2010
FOIA00	Freedom of Information Act 2000
FSA	Food Standards Agency
GDA	Generic design assessment
HLW	High level waste
ILW	Intermediate level waste
iDAC	Interim Design Acceptance Confirmation
iSoDA	Interim Statement of Design Acceptability
LLW	Low level waste
MW	Megawatt
NIA65	Nuclear Installations Act 1965
NRW	Natural Resources Wales
ONR	Office for Nuclear Regulation
REPs	Radioactive substances environmental principles
RWM	Radioactive Waste Management Ltd
SoDA	Statement of Design Acceptability
VLLW	Very low level waste
WRA 91	Water Resources Act 1991

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