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1. INTRODUCTION

This sub-chapter describes the overall purpose and scope of the Pre-Construction Environmental Report (PCER), which is part of the Safety Security and Environmental Report (SSER), within the scope of the Generic Design Assessment (GDA) process. It also describes the structure and layout of the PCER, and provides an outline Table of Contents. This PCER introduction complements the overall introduction to the SSER.

2. PURPOSE OF THE PCER

The purpose of the PCER is to focus on the environmental design and impacts of the UK EPR and in so doing it provides the information requested by the Environment Agency (EA), in their guidance Process and Information (P&I) Document [Ref-1], in order to enable them to undertake the detailed assessment stage of the GDA [Ref-1]. The results of the GDA will be taken into account during the site-specific phase.

The PCER has been updated for from the submission made in March 2011 to include: additional information following detailed assessment from the EA and the EA GDA consultation; the conclusions of the resolution of the relevant GDA Issues (for example, reactor chemistry and Fukushima); minor revisions to ensure consistency within between PCER and PCSR; revisions to provide further clarity; and corrections (such as revisions to the collective dose results detailed in Chapter 11).

Following the Fukushima event in March 2011, analyses have been carried out and are presented in PCSR Sub-chapter 16.6.

3. CONTEXT FOR THE EPR

The EPR is derived from the latest generations of reactors built in France (N4 Reactors) and in Germany (Konvoi Reactors) and combines the safety experience and knowledge acquired from operating reactors.

The main safety design features of the EPR were presented to the French and German Safety Authorities and were the subject of detailed technical examinations by their technical support organisations between 1993 and 2000. Examination by the French Safety Authority continued after 2000 and resulted in the formation of a number of Standing Groups of experts on nuclear reactors which included German participation. In their letter of 28/09/2004, the French Safety Authority communicated the position of the public authorities by indicating that the safety options adopted for the EPR reactor “totally satisfy the objective set to generally improve safety” subject to certain confirmatory analyses to be carried out through a number of detailed design studies.

Environmental impacts of EPR reactor are reduced compared to previous designs by a reduction of the amount of waste and effluents produced relative to the energy. The use of the Best Available Techniques (BAT) in terms of minimisation, production, discharge and disposal of waste leads to these improvements.

Indeed the EPR design reflects the environmental policy and commitments of the EDF group and AREVA.

The EDF Group strives to meet the sustainable development principles defined at the Rio Summit in 1992 and confirmed in Johannesburg in 2002. The EDF Group has made commitments to:

- save non-renewable resources;
- reduce pollution and limit greenhouse gas emissions;
- improve health and safety performance; and
- contribute to economic and social development via electricity provision.

Since its creation, AREVA has been fully engaged into controlling its environmental impacts and improving its environmental performance and this is reflected in several commitments which apply to all nuclear, industrial and service sector sites that AREVA operates.

The EDF Group and a vast majority of AREVA sites are ISO 14001 certified. Further details about quality management are given in Chapter 2 of the PCER.

During the construction phase, a construction environmental management plan will be implemented which will aim to reduce the occurrence of accidents and incidents which could impact upon the environment.

During the operation phase, an environmental management system will be implemented which will seek to contribute to the reduction in impact upon the environment of the UK EPR.

The ISO 14001 certifications and the commitments above reflect the importance placed on environmental compliance, goals, and sustainability by EDF and AREVA. These priorities are reflected in the proposed EPR design.

4. STRUCTURE OF THE PCER

4.1. LAYOUT

The content of the PCER is based on the layout of the Table 1 of the P&I Document [Ref-1]. Nevertheless, in order to improve the understanding of the PCER some rearrangements have been judged to be necessary.

4.2. CONTENTS

The PCER contains the following elements:

- General description of the nuclear and conventional plant facilities and their main features (Chapter 1);
- Description of the management systems applied for EPR design and PCER production (Chapter 2);

- Identification of plants, systems and processes having a bearing on the overall environmental impact during the operation phase (Chapter 3). Even if most of the construction activities are site dependent and therefore difficult to assess within the GDA phase, information is also provided in order to give an outline of the potential environmental impacts (Chapter 4). The processes associated with the decommissioning phase are presented (Chapter 5);
- Identification of installations and processes having a bearing on conventional and radioactive waste (solid, liquid and gaseous) generation, treatment, measurement, assessment and disposability (Chapters 3, 5, 6 and 7). This identification includes the design basis estimates for:
 - Gaseous and liquid radioactive discharges and the proposed annual limits. Information about monthly discharges are also given; and
 - Radioactive solid wastes.

Quantities of non radioactive species contained in liquid discharges and in air emissions are provided.

A reference case strategy for UK EPR radioactive wastes and spent fuel based on expected waste generation and management practices including possible options within the reference case:

- Analysis showing that the EPR environmental protection measures use Best Available Techniques in terms of the minimisation, production, discharge and disposal of wastes (Chapter 8);
- Principles and methods used for environmental approach at the design stage (Chapter 9); and
- Description of the environmental impacts of an EPR unit and presentation of the results of environmental studies (Chapters 10, 11 and 12) taking into account:
 - Specific UK requirements and practices (assumptions, methodologies);
 - Site environmental characteristics: methodologies being used for the baseline studies during the site specific phase. Typical assumptions suitable for potential UK sites are taken into account when technically feasible (i.e. where an envelope can be easily defined) and when useful to minimise information to be submitted into a future site-specific application; and
 - Radiological and non radiological impact assessments including studies carried out at a generic level when feasible and specifying in detail the assumptions used. Where environmental impact studies are considered not relevant at the generic design assessment stage, the proposed methodology is described.

The table of contents for the PCER including the cross references to requirements mentioned in Table 1 of the P&I Document [Ref-1] is presented in Sub-chapter 1.1 - Table 1.

In addition, a road map is given in Sub-chapter 1.1- Table 2 in order to make the PCER easily readable. The information given is clearly signposted to the relevant requirement within the P&I Document [Ref-1] in the chapter and/or in the sub-chapter of the PCER.

Sub-chapter 1.1 - Table 1: Table of contents for the PCER

Chapter of PCER	Title
1	Introduction and general description
2	Quality and Project Management
3	Aspects having a bearing on the environment during operation phase
4	Aspects having a bearing on the environment during construction phase
5	Design principles related to decommissioning
6	Discharges and waste – chemical and radiological
7	Measures for monitoring the discharges
8	Best Available Techniques
9	Principles and methods used for environmental approach at the design stage
10	Site environmental characteristics
11	Radiological impact assessment
12	Non radiological impact assessment

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Sub-chapter 1.1 - Table 2: Road Map of PCER to EA's P&I Document

P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
1.1	<p>A description of the requesting party's Management System for the development of the design and production of the submission. The management responsibilities for the development of the design and the submission should be identified.</p> <p>The management arrangements should include those for:</p> <ul style="list-style-type: none"> - maintaining records of design and construction, and - control and documentation of modifications to the submitted design before and after we have completed our assessment and any statement of acceptability is issued. <p>A description of the requesting party's expectations of the operating utility's Management System to cover the reactor's operations throughout its lifecycle.</p>	-	Chapter 2
1.2	<p>General information relating to the facility including:</p> <ul style="list-style-type: none"> - an outline description; - schematic diagrams; - the main facility features, plants, systems and processes; 	-	Chapter 1 Sub-chapter 1.2
	<ul style="list-style-type: none"> - identification of plants, systems and processes which have a bearing on the overall environmental impact of the facility; 		Chapter 3 Chapter 4
	<ul style="list-style-type: none"> - identification of plants, systems and processes which have a bearing on conventional and radioactive waste (solid, liquid and gaseous) generation, treatment, measurement, assessment and disposal. 		Chapter 6 Sub-chapter 6.2 Sub-chapter 6.4 Sub-chapter 6.5

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
1.3	The Generic Site Characteristics that the requesting party wishes us to take into account when assessing the environmental impact of the reactor design. If we issue any statement of acceptability after our assessment it would be on the basis of these characteristics. A range of generic sites might be addressed with coastal, estuarine and inland characteristics.		<p>Chapter 9</p> <p>Chapter 10</p>
		<p>Information lacking</p> <p>1. The characteristics of the environs of the site/sites that are used to assess the environmental impact of the design. A critical group/groups should be defined with its habits. A sensitive habitat should be defined for non-human species. The Environment Agency report "Initial Radiological Assessment Method SC030162" should be referenced. Examples of recent assessments are given in "Decision on the future regulation of disposals of radioactive waste from British Energy Generation Limited's Nuclear Power Stations in England" published March 2007.</p>	Chapter 10

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
1.4	<p>A proposed waste and spent fuel strategy based on the expected waste generation and management practices throughout the facility lifecycle. This strategy should have regard to</p> <ul style="list-style-type: none"> - the <i>UK Government's Sustainable Development Strategy (March 2005) Cm 6467</i>; - the objectives of the <i>UK strategy for radioactive discharges 2001-2020, Defra</i>; - the <i>Review of Radioactive Waste Management Policy, Final Conclusions, Cm2919 July 1995</i>; - <i>The Decommissioning of the UK Nuclear Industry's Facilities</i> (decommissioning policy); and - our <i>Radioactive Substances Regulation Environmental Principles (REPs)</i>. <p>Further background on UK radioactive waste management policies can be found at RWPG.</p>		<p>Chapter 5</p> <p>Chapter 6 Sub-chapter 6.2</p>
		<p>Information provided as an overview, lacking in detail</p> <ol style="list-style-type: none"> 1. A definitive strategy shall be proposed for both radioactive and non-radioactive wastes. 2. Information provided to support the strategy will need to include design information for the ancillary facilities required, i.e. waste treatment or storage. 3. A review of the strategy shall be provided to demonstrate that the strategy has encompassed relevant UK requirements, as listed in the P&I Document. 	<p>Chapter 6 Sub-chapter 6.2 Sub-chapter 6.3 Sub-chapter 6.4 Sub-chapter 6.5</p>

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
1.4		4. The strategy for non-radioactive wastes will need to demonstrate that the Waste Framework Directive, Waste Management Licensing Regulations 1994, Pollution Prevention and Control Regulations and Duty of Care requirements have been considered and will be satisfied.	Chapter 3 Sub-chapter 3.3 Chapter 4 Sub-chapter 4.3
1.5	<p>An analysis should be provided that includes an evaluation of options considered and shows that the Best Available Techniques will be used to minimise the production and discharge or disposal of waste.</p> <p>This should include:</p> <ul style="list-style-type: none"> - a description of the means used by each significant waste generating and management process to minimise waste arising and discharged or disposed of and a demonstration that these are the best practicable; - a review of design features, including those of fuel usage, such as burn-up and rating, that facilitate minimisation of arisings and disposal of waste during operation of the reactor; - a review of design features that facilitate decommissioning and minimise the arisings of decommissioning waste. <p>Reference should be made to:</p>		Chapter 8 Chapter 5
	<ul style="list-style-type: none"> - all periods of "operation", for example at power, shutdown, maintenance and refuelling (including related tasks such as fuel and flask handling); 		Sub-chapter 8.2 Section 3.3.1.2

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
1.5	- transitory periods (e.g. returning to power following shutdown);		Sub-chapter 8.2 Section 3.3.1.2
	- issues relating to minimising radioactivity source terms (for example materials of construction and coolant chemistry);		Sub-chapter 8.2 Sections 3.2.1; 3.2.2; 3.3.1; 3.4.4
	- abatement issues (for example optimising resin types and usage in treatment systems);		Sub-chapter 8.2 Sections 3.3.1; 3.3.2; 3.3.3; 3.4.2; 3.4.5
	- process control and monitoring arrangements including fault detection;		Sub chapter 8.4 PCSR – Sub-chapter 12.3
	the selection of materials and physical features to minimise activation and contamination, facilitate decontamination, removal of components etc; and		Sub-chapter 8.2 Sections 3.3.1; 3.4.3; 3.4.5
	- practices at other existing and proposed facilities.		Sub-chapter 8.2 Section 4.2

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
1.5		<p>Information on proposed techniques provided but no BAT assessment</p> <p>1. A formal BAT assessment is required for each significant waste stream: an options appraisal for prevention or, if prevention not possible, reduction to the minimum emission. The appraisal should then be used to justify the chosen technique.</p> <p>The Environment Agency PPC guidance note H1 "Environmental appraisal and assessment of BAT" provides an indication of the approach we would prefer.</p>	Chapter 8
		<p>2. Design features that facilitate decommissioning and minimise arisings of decommissioning wastes are an important consideration for us and need consideration in detail.</p>	Chapter 5 Sub-chapter 5.2
		<p>3. The P&I Document indicates a number of issues "that reference should be made to". It is not clear these that issues have been addressed, you should ensure that further information does address these issues and is clearly signposted to facilitate assessment against each issue.</p>	Chapter 8 (See details above)

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
2.1	<p>A description of how radioactive wastes will arise, be managed and disposed of throughout the facility's lifecycle.</p> <p>This should include:</p> <ul style="list-style-type: none"> - sources of radioactivity and matters which affect wastes arising; - gaseous, liquid and solid wastes; - discharge points for gaseous wastes and discharge routes for liquid wastes; - disposal routes for solid wastes (including any proposals for incineration of combustible waste). 		<p>Chapter 3</p> <p>Sub-chapter 3.3</p> <p>Sub-chapter 3.4</p> <p>Chapter 5</p> <p>Chapter 6</p> <p>Sub-chapter 6.1</p> <p>Sub-chapter 6.2</p> <p>Sub-chapter 6.4</p> <p>Sub-chapter 6.5</p>
		<p>Information provided but additional detail required</p> <p>1. An assessment of waste arisings during decommissioning phase to be included.</p>	<p>Chapter 5</p> <p>Sub-chapter 5.2</p>
		<p>2. A single gaseous discharge stack is proposed, information on this stack, i.e. height, diameter, flows etc is lacking.</p>	<p>Chapter 6</p> <p>Sub-chapter 6.2</p>
		<p>3. Detail on the management, handling and disposal of solid wastes is required – this supports the strategy provided in 1.4 above and should answer 1.4.2 above.</p>	<p>Chapter 6</p>

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
2.2	<p>Design basis estimates for monthly discharges of gaseous and liquid radioactive waste (for each radionuclide identified in <i>EU Commission Recommendation 2004/2/Euratom</i>). Such estimates should be fully supported with the reasons for, and extent of, any variability being identified.</p> <p>The consideration of variability should take into account the results of a fault analysis and include events such as start-up, shutdown, maintenance, steam generator leaks and leaking fuel, for example. The design basis estimates should be compared with the performance of other comparable facilities.</p>	<p>No information provided</p> <p>1. The monthly profile of emissions over longer periods including operating cycles is important for our assessment. It enables us to assess short-term impacts for any peak emissions. It enables us to compare the design with current operating power stations across the world.</p>	<p>Chapter 3</p> <p>Sub-chapter 3.3</p> <p>Sub-chapter 3.4</p> <p>Chapter 6</p> <p>Sub-chapter 6.3</p>
2.3	<p>Proposed annual limits with derivation for radioactive gaseous and liquid discharges consistent with the information of 2.2 above and taking account of <i>Development of Guidance on Setting Limits on Radioactive Discharges to the Environment from Nuclear Sites</i>, (Science Report: SC010034/SR, Environment Agency, December 05) (see Publications Catalogue). Where the requesting party feels it relevant, they may additionally propose limits to reflect an operating cycle i.e. campaign limits.</p>	<p>Information provided – more detail required</p> <p>1. You have provided maximum emissions and we have taken these, at this stage, as proposed annual limits. You will need to justify these against your “realistic” emissions using the Environment Agency report referenced in the P&I Document.</p> <p>2. The derivation of emissions with supporting data will need to be audited by us, this could be met in part by inspection at offices/stations.</p>	<p>Chapter 3</p> <p>Sub-chapter 3.3</p> <p>Sub-chapter 3.4</p> <p>Chapter 6</p> <p>Sub-chapter 6.3</p>

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
2.4	<p>Design basis estimates and substantiation of annual arisings of solid radioactive waste during operation and decommissioning. Wastes should be identified in terms of category (HLW, ILW, LLW), 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 (e.g. total alpha), mass and volumes.</p> <p>The requesting party should obtain, and provide, a view from the Nuclear Decommissioning Authority (NDA) (as the UK authoritative source in providing such advice) on the disposability of any proposed arisings of ILW or HLW.</p>		<p>Chapter 3 Sub-chapter 3.3</p> <p>Chapter 5 Sub-chapter 5.2</p> <p>Chapter 6 Sub-chapter 6.3 Sub-chapter 6.5</p>
		<p>Some information provided as an overview – more detail required</p> <ol style="list-style-type: none"> 1. Wastes arising during decommissioning need to be assessed as well as during operation. 2. The physico-chemical characteristics of wastes are important to us so that we can assess the suitability of your proposed treatment, storage and disposal proposals. 3. Quantification of radionuclides within wastes is again important to us for the same reasons as 2. above. 4. You are strongly recommended to approach the Nuclear Decommissioning Authority regarding your disposal proposals and provide us with their views. 	<p>Chapter 5 Sub-chapter 5.2</p> <p>Chapter 6 Sub-chapter 6.3 Sub-chapter 6.5</p>

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
2.5	<p>A description of how spent fuel will be managed and the quantities that will arise throughout the facility's lifecycle.</p> <p>This should include:</p> <ul style="list-style-type: none"> - new fuel composition and characteristics; - expected fuel burn up and ratings; - short and long term management proposals including any for off site management or disposal. <p>If the management options include direct disposal, the requesting party should obtain, and provide, a view from the Nuclear Decommissioning Authority (NDA) (as the UK authoritative source in providing such advice) on the disposability of the spent fuel.</p>	<p>Some information provided as an overview – more detail required</p> <ol style="list-style-type: none"> 1. Quantities of spent fuel over the station lifetime and estimates of short-term storage quantities in the cooling ponds are required. 2. Longer term spent fuel management plans need to be detailed and supported with design of any storage facility. 3. Your plan for final disposal is required. As with 2.4 above you are recommended to approach the Nuclear Decommissioning Authority regarding your disposal proposals and provide us with their views. 	<p>Chapter 3 Sub-chapter 3.3</p> <p>Chapter 6 Sub-chapter 6.2 Sub-chapter 6.3 Sub-chapter 6.5</p>

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
2.6	<p>A description of and supporting reasoning for the sampling arrangements, techniques and systems proposed for measurement and assessment of discharges and disposals of radioactive waste. This should :</p> <ul style="list-style-type: none"> - include consideration of whether these are sufficient and adequate to determine all discharges and disposals from the facility at the levels of detection specified in EU Commission Recommendation 2004/2/Euratom; - include details of in-process as well as final discharge arrangements; - identify how a decision on the adequacy of the arrangements has been reached; and - show that they represent the best practicable means for such analyses. <p>The requesting party is directed towards our Guidance on Monitoring: M11 (monitoring releases to atmosphere) and M12 (monitoring releases to water).</p>		<p>Chapter 7 Sub-chapter 7.1 Sub-chapter 7.3</p> <p>Chapter 8</p>
		<p>Some information provided as an overview – more detail required</p> <p>1. General arrangements for monitoring have been described but lack consideration of the issues raised by the P&I Document:</p> <p>1.1 Adequacy against EU Commission Recommendation 2004/2/Euratom;</p>	<p>Chapter 7 Sub-chapter 7.1 Sub-chapter 7.3</p>

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
2.6		1.2 How a decision on adequacy of arrangements has been reached;	Chapter 7 Sub-chapter 7.1 Sub-chapter 7.3
		1.3 Justification that the monitoring represents the Best Available Techniques.	Chapter 8
		2. Design details of monitoring points and the specific radionuclides to be measured at each should be included.	Chapter 7 Sub-chapter 7.1 Sub-chapter 7.3
		3. Accurate flow monitoring is considered to be good practice. Refer to the Environment Agency standard for measuring flow (MCERTS): M18.	Chapter 7 Sub-chapter 7.1 Sub-chapter 7.3 Sub-chapter 7.4
		4. Compare your proposals to our guidance on monitoring: M11 and M12.	Chapter 7 Sub-chapter 7.1 Sub-chapter 7.3
2.7	Prospective dose assessment for the generic site at the proposed limits for levels of discharge. This should include:	Initial information provided – detailed assessment required	-

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Sub-chapter 1.1 - Table 2: Road Map of PCER to EA's P&I Document (continued)

P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
2.7	<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 critical group for the facility; 	<p>1. Information using our screening methodology was requested by our TQ EPR000008. This will need to be developed by a detailed assessment to answer issues in the P&I Document, in particular:</p> <p>1.1 Annual dose from direct radiation;</p>	Chapter 11 Sub-chapter 11.1
	<ul style="list-style-type: none"> - potential short-term doses, including via the food chain, based on the maximum anticipated short-term discharges from the facility in normal operation; - a comparison of the calculated doses with the relevant dose constraints; and 	<p>1.2 Short-term doses – will need to relate to 2.2 above; and</p>	Chapter 11 Sub-chapter 11.1
	<ul style="list-style-type: none"> - 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. 	<p>1.3 Build-up of radionuclides in the environment including at sensitive non-human habitats.</p>	Chapter 11 Sub-chapter 11.1

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
2.7	<p>All assumptions made should be set out and reasons for their validity given.</p> <p><i>See: Authorisation of Discharges of Radioactive Waste to the Environment, Principles for the Assessment of Prospective Public Doses, Interim Guidance</i> (Environment Agency et al, Dec 2002) (see Publications Catalogue).</p> <p>The appropriate use of the exposed groups, exposure pathways, habit data, and radionuclide dispersion/transfer parameters specified in <i>Initial radiological assessment methodology – part 1 user report</i> (Science Report SC030162/SR1, Environment Agency, May 2006) and <i>Initial radiological assessment methodology – part 2 methods and input data</i> (Science Report SC030162/SR2, Environment Agency, May 2006) (see Publications Catalogue) is likely to produce a cautious, but not unrealistic, generic dose assessment.</p>	<p>2. The methodology used for detailed assessment needs to be defined and proposals given for how this methodology will be expanded for specific site assessments in the future. Computer models used will need full definition so that we may assess whether appropriate for use in England and Wales.</p>	<p>Chapter 9</p> <p>Chapter 11 Sub-chapter 11.1 Sub-chapter 11.3</p>
2.8	<p>Collective dose assessments for discharges from the facility truncated at 500 years to the UK, European and World populations. Assumptions made in carrying out these assessments should be set out.</p>	<p>No information provided</p> <p>1. Refer to P&I Document and complete all requirements.</p>	<p>Chapter 9</p> <p>Chapter 11 Sub-chapter 11.1 Sub-chapter 11.3</p>
2.9	<p>Sufficient assumed data for others to be able to carry out all dose assessments including as relevant :</p> <ul style="list-style-type: none"> - radionuclide composition of each release; - gaseous release points (including heights, effective heights and volumetric flow rates); - liquid release points; 	<p>Some information provided – some P&I Document issues not addressed</p> <p>1. Refer to P&I Document and tabulate all assumed data to enable independent dose assessments to be made.</p>	<p>Chapter 9</p> <p>Chapter 11 Sub-chapter 11.1 Sub-chapter 11.2</p>

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
2.9	<ul style="list-style-type: none"> - fractions of releases made via each release point (including incinerators); - release rate; - information used to estimate incinerator releases (i.e. expected quantities of wastes to be incinerated, expected radionuclide composition and concentrations, and retention factors for any abatement provided; and - hydrographic data (mean volumetric flow for any inland water courses, such as rivers, or volumetric exchange rate for estuaries/coasts that receive discharges). <p>Additionally, detail of assumptions made concerning the following will be helpful to enable others to refine any assessment made:</p> <ul style="list-style-type: none"> - dose receptor points; - weather data; - chemical form of the activity discharged; - deposition velocities, washout coefficients and surface roughness factors; - dose per unit intake factors; - food consumption rates; - critical group habits data; - nearest food production location; and - nearest habitation(s). 		Sub-chapter 11.3

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
2.10	<p>The requesting party should provide an assessment of the likely impact of the radioactive discharges on non-human species.</p> <p>A methodology for carrying out such an assessment is provided in <i>Impact Assessment of Ionising Radiation on Wildlife</i> (R&D Publication 128, Environment Agency, June 2001). For a generic radiation dose assessment, it could be assumed that all the reference organisms specified in that report for terrestrial ecosystems are present at the site boundary and that all those for the appropriate aqueous ecosystem are present close to the point of discharge. Further developments in this methodology are expected following the output of the ERICA programme in early 2007 and these should be taken into account.</p>	<p>Information provided as an overview, lacking quantitative assessment</p> <p>1. We will need to assess impact to flora and fauna within any sensitive habitat (Habitats Directive). Detailed quantitative assessment will be needed for us to carry out our own appropriate assessment.</p>	<p>Chapter 9</p> <p>Chapter 11 Sub-chapter 11.2 Sub-chapter 11.3</p> <p>Chapter 12 Sub-chapter 12.3</p>

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
3.1	<p>An analysis of the environmental impact of a range of cooling options relevant to the generic site characteristics considered at 1.3 above, including seawater abstraction, river water abstraction, conventional cooling towers and hybrid cooling towers.</p> <p>The analysis should include, where appropriate, relevant consideration of :</p> <ul style="list-style-type: none"> - abstraction inlet fish deterrent schemes; - options for beneficial use of the waste heat produced; - the environmental impact, including thermal, of any proposed water abstraction and consequential water and aerial discharges. <p>As part of the analyses provided in response to this item and the following item (3.2), consideration should be given to the relevant requirements of the EU's <i>Directive 2000/60/EC establishing a framework for Community action in the field of water policy</i> (the Water Framework Directive) and <i>Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora</i> (the Habitats Directive) and to relevant water quality standards.</p>		<p>Chapter 3</p> <p>Sub-chapter 3.1</p> <p>Sub-chapter 3.2</p> <p>Sub-chapter 3.4</p> <p>Chapter 4</p> <p>Chapter 9</p> <p>Chapter 12</p> <p>Sub-chapter 12.2</p>
		<p>Information provided as an overview – more detail required</p> <p>1. You will be using seawater cooling and have provided an estimate of flow required and return temperature. We need further information:</p> <p style="margin-left: 20px;">1.1 On inlet fish deterrent schemes;</p>	<p>Chapter 12</p> <p>Sub-chapter 12.2</p>

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
3.1		1.2 Options for beneficial use of waste heat;	Chapter 12 Sub-chapter 12.4
		1.3 Example assessment of heat impact for typical UK coastal scenario;	Chapter 12 Sub-chapter 12.2
		1.4 As noted in 2.10 above the impact on sensitive habitats is an important part of our assessment and we will need quantitative data against typical UK sea species.	Chapter 12 Sub-chapter 12.3

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
3.2	<p><u>Non-radioactive Species in Liquid Discharges</u></p> <p>An analysis of how liquid waste streams will arise, be managed and disposed of throughout the facility's lifecycle.</p> <p>This should include consideration of:</p> <ul style="list-style-type: none"> - sources and quantities of contaminants (including disinfectants and biocides), highlighting dangerous substances; - identification and control of the effluent and surface water runoff streams contributing to the overall discharge; - identification of potential options and associated environmental impact for disposal of each individual effluent stream; and - means of control in the event of detection of unplanned radioactive or other contamination of the discharge. 		<p style="text-align: center;">Chapter 3</p> <p style="text-align: center;">Sub-chapter 3.2</p> <p style="text-align: center;">Sub-chapter 3.4</p> <p style="text-align: center;">Chapter 4</p> <p style="text-align: center;">Sub-chapter 4.3</p> <p style="text-align: center;">Chapter 6</p> <p style="text-align: center;">Sub-chapter 6.3</p> <p style="text-align: center;">Sub-chapter 6.4</p> <p style="text-align: center;">Chapter 7</p> <p style="text-align: center;">Sub-chapter 7.4</p> <p style="text-align: center;">Chapter 9</p> <p style="text-align: center;">Chapter 12</p> <p style="text-align: center;">Sub-chapter 12.2</p> <p style="text-align: center;">Sub-chapter 12.3</p>

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
3.2		Basic information provided but more detail needed against UK regulatory requirements	
		1. Provide information on the presence on site of List 1 and List 2 substances defined in the Groundwater Regulations; and	Chapter 12 Sub-chapter 12.2
		2. Demonstrate that BAT is used to prevent direct or indirect discharges of these to groundwater.	Chapter 8
		3. Define ground information to be gathered before construction, the use of a Conceptual Site Model is recommended.	Chapter 10 Sub-chapter 10.3
		4. Specify in general terms a monitoring programme for the life of the installation including use of boreholes.	Chapter 12 Sub-chapter 12.6
		5. Provide information on the discharge of listed dangerous substances and their concentrations in the receiving waters, required by the Environment Agency to assess whether Environmental Quality Standards could be exceeded.	Chapter 12 Sub-chapter 12.2
		6. Present an options appraisal to demonstrate that BAT has been used to prevent or minimise emissions of pollutants from each significant effluent stream.	Chapter 8
		7. Detail measures to contain unplanned emissions of effluents, spillages, firewater and localised floodwaters.	Chapter 3 Sub-chapter 3.3
		Chapter 8	

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P&I Document Requirement	Information required in the P&I Document	EA Preliminary Assessment (bold text) and Information required in the P&I Document (normal text)	PCER Chapter
3.3	<p><u>Standby Generation and Incineration</u></p> <p>Standby generation capacity in excess of 50 MWth in total or in excess of 20 MWth for an individual unit, and on-site incinerators may require to be considered under The Pollution Prevention and Control (England and Wales) Regulations 2000 and relevant EU Directives. The requesting party should define the scope of any PPC installation. The proposed technology should be compared with that in our relevant PPC Sector Guidance Notes and the environmental aspects addressed by comparing them with the Environment Agency's published criteria for low-impact installations. In particular, the impact of emissions of polluting substances should be assessed using the methodology given in our guidance note IPPC Environmental Assessment and Appraisal of BAT, IPPC H1 (Environment Agency, July 2003).</p>	<p>Assessment against PPC not provided</p> <p>The preliminary submission indicates that a PPC combustion activity permit will be required.</p> <ol style="list-style-type: none"> 1. Provide relevant application information to enable the Environment Agency to assess whether a permit could be issued for the generic site. 	<p>Chapter 3</p> <p>Sub-chapter 3.2</p> <p>Sub-chapter 3.3</p> <p>Chapter 7</p> <p>Sub-chapter 7.4</p> <p>Chapter 8</p> <p>Chapter 9</p> <p>Chapter 12</p> <p>Sub-chapter 12.1</p>
3.4	<p>The requesting party should identify the need for the on-site storage of substances above the qualifying thresholds in The Control of Major Accident Hazards Regulations 1999.</p>	<p>Assessment against COMAH not provided</p> <ol style="list-style-type: none"> 1. List all relevant COMAH materials with their maximum installation storage quantities and compare with COMAH qualifying thresholds. 2. State whether COMAH will apply and, if so, how compliance with the COMAH Regulations will be achieved, e.g. provide a draft Major Accident Prevention Policy (MAPP). <p>Materials may include: Hydrogen, Hydrazine, Fuel Oil, etc.</p>	<p>Chapter 3</p> <p>Sub-chapter 3.3</p>

SUB-CHAPTER 1.1 – REFERENCES

External references are identified within this sub-chapter by the text [Ref-1], [Ref-2], etc at the appropriate point within the sub-chapter. These references are listed here under the heading of the section or sub-section in which they are quoted.

The following reference is used throughout this sub-chapter:

[Ref-1] Process and Information Document for Generic Assessment of Candidate Nuclear Power Designs. The Environment Agency. January 2007. (E)