

## Generic design assessment

**UK EPR™ nuclear power plant design by  
AREVA NP SAS and Electricité de France SA**

**Final assessment report**

**Monitoring of radioactive  
disposals**



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

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

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

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

**Published by:**

Environment Agency  
Horizon house, Deanery Road,  
Bristol BS1 5AH  
Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

© Environment Agency 2011

All rights reserved. This document may be reproduced with prior permission of the Environment Agency.

Further copies of this report are available from our publications catalogue: <http://publications.environment-agency.gov.uk> or our National Customer Contact Centre: T: 03708 506506

Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk).

## Generic design assessment

### UK EPR™ nuclear power plant design by AREVA NP SAS and Electricité de France SA

#### Final assessment report - monitoring of radioactive disposals

<b>Protective status</b>	This document contains no sensitive nuclear information or commercially confidential information.
<b>Process and Information Document<sup>1</sup></b>	<p>The following sections of Table 1 in our Process and Information document are relevant to this assessment:</p> <p>1.5 – show that the best available techniques will be used to minimise the production of waste</p> <p>2.6 – describe the sampling arrangements, techniques and systems proposed for measuring and assessing discharges and disposals of radioactive discharges.</p>
<b>Radioactive Substances Regulation Environmental Principles<sup>2</sup></b>	<p>The following principles are relevant to this assessment:</p> <p>RSMDP 13 – Monitoring and Assessment: The best available techniques, consistent with relevant guidance and standards, should be used to monitor and assess radioactive substances, disposals of radioactive wastes and the environment into which they are disposed.</p> <p>ENDP10 – Quantification of Discharges: Facilities should be designed and equipped so that best available techniques are used to quantify the gaseous and liquid radioactive discharges produced by each major source on a site.</p>
<b>Report author</b>	Rowe, J. E., and Allott, R.

1. Process and Information Document for Generic Assessment of Candidate Nuclear Power Plant Designs, Environment Agency, Jan 2007.

<http://publications.environment-agency.gov.uk/pdf/GEHO0107BLTN-e-e.pdf>

2. Regulatory Guidance Series, No RSR 1: Radioactive Substances Regulation - Environmental Principles (REPs), 2010.

<http://publications.environment-agency.gov.uk/pdf/GEHO0709BQSB-e-e.pdf>

## Table of contents

<b>1</b>	Summary .....	5
<b>2</b>	Introduction.....	5
<b>3</b>	Assessment.....	7
	3.1 Assessment methodology .....	7
	3.2 Assessment objectives .....	7
	3.3 EDF and AREVA documentation.....	7
	3.4 Monitoring of gaseous disposals .....	8
	3.4.1 Other matters for monitoring of gaseous disposals .....	8
	3.5 Monitoring of aqueous disposals .....	9
	3.5.1 Other matters for monitoring of aqueous disposals .....	10
	3.6 Monitoring of solid waste disposals .....	10
	3.7 Monitoring of radioactive disposals – review of consultation responses .....	11
	3.8 Compliance with our REPs.....	12
<b>4</b>	Public comments .....	12
<b>5</b>	Conclusion.....	13
	References.....	15
	Abbreviations.....	16

## 1 Summary

1 This report covers the assessment of the sampling arrangements, techniques and systems proposed for measuring and assessing discharges and disposals of radioactive waste for the EDF and AREVA UK EPR™ design as required in Table 1 section 2.6 of our process and information document (P&ID) (Environment Agency, 2007). This assessment covers both gaseous and aqueous effluents and solid waste.

2 It is noted that much of the requested information has not been provided as the designs have not yet been completed.

3 The process for nuclear new build can be divided into; early design, detailed design, procurement, construction or commissioning phases and it has become apparent from the information provided that many of the details requested will only be available at a later stage.

4 The conclusions from this report therefore focus on those matters that need to be incorporated in the early design stage to avoid potentially costly retrospective correction.

5 As the process moves into the detailed design and construction more information will be required on the general monitoring facilities, the samplers / instruments used and measures taken to obtain a representative sample. Then, moving into commissioning and operations, information will be required on analysis, maintenance, management arrangements and quality assurance.

6 Our conclusions are unchanged since our consultation, however, we have reworded our assessment finding.

7 **We are unable to conclude that the UK EPR utilises the best available techniques to measure and assess radioactive disposals.**

8 As part of our assessment, we identified the following assessment finding:

a) Future operators shall provide:

- i) During the detailed design phase, the location and arrangement of sampling and monitoring facilities for solid, gaseous and aqueous wastes supported by an assessment that these represent BAT and will provide representative sampling and monitoring;
- ii) during the detailed design phase and before final equipment selection, the details of equipment and techniques to be used for analysis of gaseous, aqueous and solid wastes supported by an assessment that these represent BAT for monitoring. (UK EPR-AF18)

9 Our findings on the wider environmental impacts and waste management arrangements for the UK EPR reactor may be found in our Decision Document (Environment Agency, 2011).

## 2 Introduction

10 We originally published this report in June 2010 to support our GDA consultation on the UK EPR design. The consultation was on our preliminary conclusions. It began on 28 June 2010 and closed on 18 October 2010.

11 We undertook additional assessment in response to consultation responses. This report is an update of our original report covering assessment undertaken between June 2010 and the end of March 2011 when EDF and AREVA published an update of their submission. Where any paragraph has been added or substantially revised it is in a blue font.

- 12 We expect the design to use the best available techniques (BAT) to measure and assess discharges of radioactive waste to the environment. This will enable any operational UK EPR to:
- a) confirm that discharges are as predicted by the designer;
  - b) assess compliance with limits;
  - c) provide good quality data for dose assessments.
- 13 We set out in our P&ID the requirements for a requesting party to provide information. Section 2.6 of the P&ID requires 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 included 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 (EC, 2004) and showing that they represent the best practicable means for such analyses.
- 14 In this report we assess the techniques EDF and AREVA use in the UK EPR to monitor radioactive disposals. EDF and AREVA submitted their UK EPR design for generic design assessment (GDA) in August 2007.
- 15 We found that the submission did not contain the level of information we needed to carry out a detailed assessment but EDF and AREVA committed to providing further information. In 2008, EDF and AREVA provided this additional information, a pre-construction environmental report (PCER) with supporting documents.
- 16 Although the information provided was generally much improved it was still not complete in regard to the monitoring of radioactive discharges and disposals and hence technical queries (TQ-EPR-223 (gaseous) and TQ-EPR-224 (liquid)) were issued. [A final revision of the PCER was received in March 2011](#) which is published along with other documents on their website (<http://www.epr-reactor.co.uk>).
- 17 The initial submission lacked detail and it became apparent through the responses to technical queries (TQs) that in relation to gaseous discharges, the detailed design of the main stack and the associated monitoring arrangements for the reference EPR are not yet finalised. Also that the height of the stack will be site-specific. In relation to aqueous discharges the monitoring arrangements (equipment and procedures) for the UK EPR will not be specified until later stages during site licensing. Detailed information was not provided on monitoring of solid waste.
- 18 [Our assessment of the information contained in the revised submission on monitoring of radioactive disposals is documented within this assessment report. This is essentially the same as that provided in the first issue of this assessment report but updated, where appropriate, to reflect our consideration of any consultation responses relevant to this topic.](#)
- 19 Our findings on the wider environmental impacts and waste management arrangements for the UK EPR reactor may be found in our Decision Document (Environment Agency, 2011).
- 20 [We have published the consultation responses submitted in regard to our preliminary conclusions for the UK EPR design on our website \(see: <https://consult.environment-agency.gov.uk/portal/ho/nuclear/gda>\).](#)

### 3 Assessment

#### 3.1 Assessment methodology

21 The basis of our assessment was to:

- a) review appropriate sections of the PCER and its supporting documents;
- b) hold technical meetings with EDF and AREVA to clarify our understanding of the information presented and explain any concerns we had with that information;
- c) raise Regulatory Observations (ROs) and Technical Queries (TQs) where we believed information provided by EDF and AREVA was insufficient;
- d) assess the techniques proposed by EDF and AREVA for the monitoring of radioactive discharges and disposals;
- e) [consider any consultation responses relevant to this topic](#);
- f) decide on any GDA Issues or assessment findings to carry forward from GDA.

#### 3.2 Assessment objectives

22 The assessment considered:

- a) The sampling arrangements, techniques and systems proposed for measurement and assessment of the discharges and disposals of radioactive waste.
- b) The specific nuclides to be monitored and whether systems are adequate to meet the levels of detection specified in EU Commission recommendation 2004/2/Euratom (EC, 2004).
- c) Whether the arrangements represented Best Available Techniques (BAT).
- d) How monitoring proposals compared to our Technical Guidance Notes (TGNs) M1, M11 and M12, and whether any commitment to our MCERTS (Monitoring Certification Scheme<sup>1</sup>) was given (Environment Agency, 2010a, 1999a, 1999b and, 2008, respectively).

#### 3.3 EDF and AREVA documentation

23 The pre-construction environmental report is divided into chapters and sub-chapters (provided as separate documents) and has supporting documents. We referred to the following documents to produce this report:

Document reference	Title	Version number
UKEPR-0003-070	PCER – Chapter 7 – Measures for monitoring discharges	01
UKEPR-0003-080	PCER – Chapter 8 – Best Available Techniques	02
UKEPR-0007-001	Monitoring of liquid and gaseous discharges: Prospective arrangements for the UK EPR	02

<sup>1</sup> MCERTS is the Environment Agency's Monitoring Certification Scheme. It provides the framework for businesses to meet our quality requirements. If Operators comply with MCERTS we can have confidence in the monitoring of emissions to the environment. You can read about how MCERTS is used to approve instruments, people and laboratories by visiting [www.mcerts.net](http://www.mcerts.net).

24 We use short references in this report, for example:

a) PCER sub-chapter 6.2 section 1.2.1 = PCERsc6.2s1.2.1;

### 3.4 Monitoring of gaseous disposals

25 Measures for monitoring discharges are described in chapter 7 of the PCER and in  
document UKEPR-0007-001 '*Monitoring of liquid and gaseous discharges:  
Prospective arrangements for the UK EPR*'. BAT is described in chapter 8 of the  
PCER.

26 Activity concentrations will be determined for tritium, noble gases, iodine and other  
activation or fission products and carbon-14. Emission rates will be determined  
using an average flow rate via the stack for the discharge period. EDF and AREVA  
state that the measuring techniques correspond to BAT with some justification  
given in PCERsc8.4. Sampling procedures appear to be reasonable, but the  
submission is lacking information on sampling locations. EDF and AREVA  
understand the need for isokinetic sampling and stated arrangements will be  
implemented to meet ISO2889:1975. However, we will expect arrangements to  
meet the more recent standard ISO2889:2010 and EN15259:2007. They are  
committed to determining detection limits, decision thresholds and expression of  
results in compliance with EU Commission Recommendation 2004/2/Euratom,  
however the proposed krypton-85 and carbon-14 limits of detection would not meet  
required levels (PCERsc8.4 Table 1). The future operator will need to demonstrate  
that they meet these requirements.

27 The UK EPR gaseous effluent treatment system presents some major differences  
to that currently in place in existing stations. As such it is expected that some of the  
monitoring activities may be different in the UK EPR (s2.2 of [UKEPR-0007-001](#)).

28 A technical query was issued to confirm the location and facilities for the  
monitoring, sampling and flow measurement of gaseous effluent discharges from  
the UK EPR. Also, at this early design stage, to confirm that the design includes  
provision for adequate facilities to allow independent monitoring to our required  
standards. Further, we intend to extend the application of our MCERTS Monitoring  
Certification Scheme to radioactive discharges in the future. Therefore we expect  
that the UK EPR design will be able to comply with these future requirements.

29 The response to the technical query indicated the detailed design of the main stack  
and the associated monitoring arrangements for the reference EPR are not yet  
finalised. Additionally EDF and AREVA state that the height of the stack will be  
site-specific. Further site-specific verification will be needed on the sample probe  
locations and compliance of the purchase specifications for devices to meet  
guidance and MCERTS requirements. (PCERsc7.3s1.1.2).

30 EDF and AREVA claim that: (PCERsc7.3s1.1.2)

- a) there is redundancy built into the systems which would allow for continuity of  
monitoring and provision of independent samples;
- b) installation of sampling and monitoring equipment would take account of  
engineering rules, regarding space for monitoring operations and maintenance.

#### 3.4.1 Other matters for monitoring of gaseous disposals

31 Information is still required on exact locations of the sampling points within the  
stack. However, from the preliminary information it would appear that, due to probe  
positioning and location of the monitoring rooms next to the plenum, the sample  
lines are going to be long as they descend the stack. Although EDF and AREVA  
state that actual lengths of sampling lines will be determined during implementation



- studies taking into account ISO2889 recommendations. This information will be required and assessed by us at the detailed design stage.
- 32 No information has been provided on upstream and downstream disturbances or location of filtration relative to the sampling points. This information will be required and assessed by us at the detailed design stage.
- 33 EDF and AREVA state calculations show particulate air flow would be already homogenous at 15 m of height, but no evidence was provided. This information will be required and assessed by us at the detailed design stage.
- 34 Little evidence was provided to demonstrate locations will ensure representative sampling (some reference was made to calculations) and little reference made to M1 (Environment Agency, 2010a). This information will be required and assessed by us at the detailed design stage.
- 35 Precision and bias of continuous stack monitoring devices is not known – EDF and AREVA indicated it would be up to the supplier to identify appropriate monitoring equipment. This information will be required and assessed by us before the procurement phase.
- 36 Reporting is stated by EDF and AREVA to be a matter for the operator.
- 37 The design of the nuclear auxiliary building ventilation system (DWN), in particular flow measurement equipment, is still to be defined and timescales are not indicated. This information will be required and assessed by us before the procurement phase.

### 3.5 Monitoring of aqueous disposals

- 38 Measures for monitoring discharges are described in chapter 7 of the PCER and in document UKEPR-0007-001 '*Monitoring of liquid and gaseous discharges: Prospective arrangements for the UK EPR*'. BAT is described in chapter 8 of the PCER.
- 39 Pre-discharge screens are carried out on a sample from each tank for tritium, to check the absence of gross alpha activity, gross beta and gross gamma. Further checks are then carried out on a sample after discharge either taken from the tank before discharge or an aliquot sample representative of all the discharges from the tanks over one period. Activity concentrations will be determined for tritium, iodine radionuclides and other activation or fission products and carbon-14 and activity discharged by multiplying by volume discharged. EDF and AREVA state that their measuring techniques correspond to BAT with some justification given in PCERsc8.4. No details have been provided on how the discharge volume is measured and samples taken, but EDF and AREVA demonstrate that they understand the need for homogenous representative samples. They are committed to determining detection limits, decision thresholds and expression of results in compliance with EU Commission Recommendation 2004/2/Euratom, however the proposed tritium limit of detection (LoD) would not meet the required level (PCERsc8.4 Table 2).
- 40 EDF and AREVA are proposing not to monitor for strontium-90 and they are also not proposing to seek authorisation for alpha emitters (plutonium-239, plutonium-240 and americium-241). However, gross alpha activity will be monitored.

- 41 [Ingleby Barwick Town Council \(GDA38<sup>2</sup>\)](#) provided the following response to our consultation: *'I am surprised at your monitoring of Strontium 90 and Plutonium 239 and 240, especially in the early life of the reactor.'* We are not expecting routine monitoring of strontium-90, plutonium-239 and plutonium-240 but this may be a requirement for a periodic measurement.
- 42 Originally EDF and AREVA were proposing pre-discharge analysis for accounting purposes to take place on samples taken from the storage tank mixing line after homogenisation. EDF and AREVA also propose online monitoring of ongoing discharge which is for check purposes not for accountancy, stating this was in line with French practices. It was unclear whether there would be any sampling during discharge using flow proportional samplers. We regard sampling during discharge using proportional samplers as BAT, and following discussions EDF and AREVA have now stated that flow proportional sampling during discharges will be used for retrospective assessment and statutory reporting.
- 43 EDF and AREVA originally stated that independent sampling arrangements were a site-specific matter, but that the Regulator would be able to take samples on the mixing tank line after homogenisation. Following discussions EDF and AREVA stated in the PCER update sc7.3s2.1.3 that separate flow proportional sampling will be arranged as required by the Regulator to enable independent samples to be collected.
- 44 A technical query was issued to confirm the location and facilities for the monitoring, sampling and flow measurement of aqueous effluent discharges from the UK EPR.
- 45 Our Nuclear Sector Plan (Environment Agency, 2009) has the intention to extend the application of the MCERTS monitoring scheme to radioactive discharges in the future and the response to the technical query acknowledges EDF and AREVA will take into account MCERTS, but they have not given any information as to how and if they have considered whether appropriate instrumentation (for example flow meters) are available (PCERsc7.3s2.1.4.1).
- 46 We expect, as BAT, that sampling and monitoring equipment to be protected from the weather and interference by unauthorised personnel and for analysis to achieve ISO17025 (BSi, 2005) and MCERTS accreditation. EDF and AREVA's response stated that sampling is to be carried out in the pumping station, which is in a controlled area, and recognised the need for the laboratory to be accredited so that sampling should meet MCERTS requirements, but EDF and AREVA stated that these would be operator responsibilities (PCERsc7.3s2.2.3).

### 3.5.1 Other matters for monitoring of aqueous disposals

- 47 Little information was provided on the monitoring equipment and analysis in terms of the minimum specification for detection limit, precision, bias and availability / reliability. EDF and AREVA state they will follow MCERTS requirements. This information will be required and assessed by us before the procurement phase.
- 48 Reporting is stated by EDF and AREVA to be a matter for the operator.

### 3.6 Monitoring of solid waste disposals

- 49 EDF and AREVA have provided limited information on monitoring of solid waste.

---

<sup>2</sup> We list the names of all the organisations that responded to the consultation in Annex 7 of the Decision Document (Environment Agency, 2011a). We have not given names of individuals or members of the public. The list gives a GDA number to each response (for example, GDA76 is for the Health & Safety Executive (now the Office for Nuclear Regulation)), so that the documents can be searched to allow all respondents to see where their responses have been considered. Where we quote consultation responses in this document, we have not corrected spelling or grammar.

### 3.7 Monitoring of radioactive disposals – review of consultation responses

50 An individual respondent (GDA25) provided the following response to our consultation: *'I believe that a thorough and open system of monitoring and reporting the disposal of radioactive waste is very desirable to instil confidence in residents around the site and over a wider area'*. Maldon Town Council (GDA51) said: *'We note that no assessment has been carried out to date. UK EPR not provided any detailed information on solid waste.'* West Somerset Council and Sedgemoor District Council (GDA154) said: *'We are concerned that an effective monitoring, management and intervention programme is established to consider the potential cumulative effects on the surrounding receptors and ensure that findings are clearly and concisely communicated to the local communities surrounding reactor sites.'* The Institution of Mechanical Engineers (GDA145) said that monitoring equipment is vital to reassure the public and gain acceptance of future stations. Stop Hinkley (GDA157) are concerned that insufficient information has been supplied by EDF and AREVA on sampling lines and achieving representative samples.

51 Ingleby Barwick Town Council (GDA38) provided the following response to our consultation: *'Sampling must be conducted on a regular time basis and procedures adopted to see that any problems are tackled on a planned basis.'* We agree with this comment and we will assess this at the commissioning phase.

52 NNB Genco (GDA106) provided the following response: *'We support the Environment Agency's conclusion that monitoring of radioactive disposals is an essential element in demonstrating good environmental performance and effective application of BAT to the design, construction, commissioning and operation of UK EPR facilities. We recognise the obligation on prospective operators, including NNB GenCo, to ensure that BAT is being applied. We also recognise that radiation metrology is a constantly advancing field. The methods used must clearly represent BAT, which for example will require proportional sampling. But given the timescale on which UK EPRs will actually be commissioned and radioactive disposals will therefore begin, it is important to ensure that decisions on equipment and techniques are not made prematurely. This would foreclose the benefits from future developments. Thus it is important that prospective operators remain able to make the right decisions on appropriate monitoring techniques at the right time. These could also then comply with, and reflect developments in, the latest guidance and standards (such as the Environment Agency's Monitoring Certification Scheme MCERTS and its planned extension).'*

53 Additionally, Horizon Nuclear Power (GDA127) provided the following response: *'We note the EA's conclusion and recognise that the monitoring of radioactive disposals will be addressed in more detail during site specific permitting. We would, however, also note that information on monitoring techniques provided during site specific permitting will need to be appropriate to the development of the design at the time of the application. It is Horizon's view that initial information will relate more to principles and strategy. As the programme develops, and we get closer to construction of the relevant parts of the plant, further details on specific techniques and equipment will become available.'*

54 We require information at an early stage to ensure BAT has been considered so that the UK EPR early design does not rule out the most suitable options for monitoring. For example, from current guidance on sampling lines, there are requirements that need to be met (which will not be subject to technological change) and these need to be appropriate from the outset (for example; short sampling lines, isokinetic flow, access to sampling ports). We agree that individual instrumentation is advancing and would not expect this to be specified at this early stage.

55 Sellafield Ltd (GDA126) provided the following response: *'The EA could not conclude that the proposal utilises BAT. We would not see this as a major difficulty given that the technological needs for sampling and for sample analysis are so well understood.'*

56 Sampling is important at the design stage as a plant needs to be constructed in such a way as not to foreclose on appropriate techniques. The fact that the needs are universally understood does not mean they will be incorporated.

57 Several respondents, including; an individual respondent (GDA84), the Nuclear Technology Subject Group of the Institution of Chemical Engineers (GDA67), Springfields Site Stakeholder Group (GDA96), Committee on Medical Aspects of Radiation (GDA129), Stop Hinkley (GDA157), and the Institution of Mechanical Engineers (GDA145) agreed with our conclusions on monitoring of radioactive disposals and recognised our requirement for more information.

### 3.8 Compliance with our REPs

58 Our radioactive substances regulation environmental principles (REPs) (Environment Agency, 2010b) were considered in our assessment of EDF and AREVA's monitoring of radioactive disposals (see above). The table below summarises the position in regards to those REPs from EDF and AREVA's submission:

REP number	REP title	Information in submission
RSMDP13	Monitoring and assessment	EDF and AREVA state measuring techniques correspond to BAT with some justification given. Detail on gaseous sampling locations lacking and how aqueous discharge volume is measured and samples taken. Showed understanding of processes.
ENDP10	Quantification of discharges	See RSMDP13. Recognised that the laboratory will have to have suitable accreditations, but given as an operator responsibility.

## 4 Public comments

59 The public involvement process remained open during our detailed assessment stage (see <http://www.hse.gov.uk/newreactors/publicinvolvement.htm>). We did not receive any public comments on monitoring of radioactive disposals by this route.

60 Responses made to our public consultation for the UK EPR design in regard to our preliminary conclusions on monitoring of radioactive disposals are considered within this document and in our decision document, where relevant.

## 5 Conclusion

61 Section 2.6 of the P&ID requested 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.

62 The information provided by EDF and AREVA on the UK EPR design for the  
determination of both gaseous and aqueous discharges have been assessed  
against the requirements of our Technical Guidance Notes M1, M11 and M12  
(Environment Agency, 2010a, 1999a, and 1999b, respectively) and other best  
practice for monitoring (for example, Environment Agency 2008).

63 The process for nuclear new build can be divided into; early design, detailed  
design, procurement, construction or commissioning phases and it has become  
apparent from the information provided that many of the details requested will only  
be available at a later stage.

64 The conclusions from this report therefore focus on those matters that need to be  
incorporated in the early design stage to avoid potentially costly retrospective  
correction.

65 As the process moves into the detailed design and construction more information  
will be required on the general monitoring facilities, the samplers / instruments used  
and measures taken to obtain a representative sample. Then, moving into  
commissioning and operations, information will be required on analysis,  
maintenance, management arrangements and quality assurance.

66 **We have concluded that for the monitoring of gaseous disposals:**

- a) **BAT has not been comprehensively demonstrated for the monitoring on the UK EPR gaseous effluent systems.**
- b) **We could not make an assessment on the suitability of the sampling lines, EDF and AREVA say that arrangements may be site-specific. We require sample lines to be as short and direct as possible.**
- c) **Evidence has not been provided to back up the statements about how representative samples would be achieved, therefore, we could not assess whether monitoring locations being planned are appropriate.**

67 **We have concluded that for the monitoring of aqueous disposals:**

- a) **we were unable to assess whether monitoring locations being planned are appropriate as there was insufficient information in the submission.**

68 EDF and AREVA have not provided any detailed information on monitoring of solid  
waste. This matter needs to be closed-out by submission of appropriate evidence  
at the detailed design stage.

69 Overall, our conclusions are unchanged since our consultation, however, we have  
reworded our assessment finding.

70 **We are unable to conclude that the UK EPR utilises the best available  
techniques to measure and assess radioactive disposals.**

71 As part of our assessment, we identified the following assessment finding:

- a) Future operators shall provide:
  - i) During the detailed design phase, the location and arrangement of sampling and monitoring facilities for solid, gaseous and aqueous wastes supported by an assessment that these represent BAT and will provide representative sampling and monitoring;
  - ii) during the detailed design phase and before final equipment selection, the details of equipment and techniques to be used for analysis of gaseous,

aqueous and solid wastes supported by an assessment that these represent BAT for monitoring. (UK EPR-AF18)

## References

- (BSi, 2005) General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)
- (BSi, 2010) ISO2889:2010: Sampling airborne radioactive materials from the stacks and ducts of nuclear facilities
- (EC, 2004) Commission Recommendation of 18 December 2003 on standardised information on radioactive airborne and liquid discharges into the environment from nuclear power reactors and reprocessing plants in normal operation (*notified under document number C(2003) 4832*)  
[http://ec.europa.eu/energy/nuclear/radioprotection/doc/legislation/2004\\_2\\_en.pdf](http://ec.europa.eu/energy/nuclear/radioprotection/doc/legislation/2004_2_en.pdf)
- (Environment Agency, 1999a) Technical Guidance Note M11: Monitoring of Radioactive Releases to Atmosphere from Nuclear Facilities, 1999.
- (Environment Agency, 1999b) Technical Guidance Note M12: Monitoring of Radioactive Releases to Water from Nuclear Facilities, 1999.
- (Environment Agency, 2007) Process and Information Document for Generic Assessment of Candidate Nuclear Power Plant Designs, Environment Agency, Jan 2007.  
<http://publications.environment-agency.gov.uk/pdf/GEHO0107BLTN-e-e.pdf>
- (Environment Agency, 2008) Minimum Requirements for the Self-monitoring of Effluent Flow Environment Agency, Version 3.2, February 2008.  
<http://publications.environment-agency.gov.uk/pdf/GEHO0108BNQA-E-E.pdf>
- (Environment Agency, 2009) Environmental sector plan for the nuclear industry, v2, Environment Agency, July 2009  
<http://publications.environment-agency.gov.uk/pdf/GEHO0709BQGI-e-e.pdf>
- (Environment Agency, 2010a) Technical Guidance Note M1: Sampling Requirements for Monitoring Stack Emissions to Air from Industrial Installations, v6, Environment Agency, January 2010.  
<http://publications.environment-agency.gov.uk/pdf/GEHO0110BRRO-E-E.pdf>
- (Environment Agency, 2010b) Regulatory Guidance Series, No RSR 1: Radioactive Substances Regulation - Environmental Principles (REPs), 2010.  
<http://publications.environment-agency.gov.uk/pdf/GEHO0709BQSB-e-e.pdf>
- (Environment Agency, 2011). Generic design assessment. UK EPR nuclear power plant design by AREVA NP SAS and Electricité de France SA. Decision Document.  
<http://publications.environment-agency.gov.uk/pdf/GEHO1211BTNO-e-e.pdf>

While every effort has been made to ensure the accuracy of the references listed in this report, their future availability cannot be guaranteed.

## Abbreviations

BAT	Best available techniques
DWN	Nuclear auxiliary building ventilation system
GDA	Generic design assessment
MCERTS	Monitoring Certification Scheme
P&ID	Process and information document
PCER	Pre-construction environmental report
PCERsc3.3s4.1	PCER sub-chapter 3.3 section 4.1 (example reference)
REPs	Radioactive substances regulation environmental principles
RO	Regulatory observation
TQ	Technical query





**Would you like to find out more about us,  
or about your environment?**

**Then call us on**

**03708 506 506** (Mon-Fri 8-6)

Calls to 03 numbers cost the same as calls to standard geographic numbers  
(i.e. numbers beginning with 01 or 02).

**email**

**[enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)**

**or visit our website**

**[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)**

**incident hotline 0800 80 70 60** (24hrs)

**floodline 0845 988 1188**



**Environment first:** Are you viewing this on screen? Please consider the environment and only print if absolutely necessary. If you are reading a paper copy, please don't forget to reuse and recycle if possible.