



Environmental Permitting (England and Wales) Regulations 2010

**Applications by NNB Generation Company Limited for
environmental permits for a proposed new nuclear
power station at Hinkley Point, Somerset**

Our decisions Summary document

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Introduction

1 In 2011, NNB Generation Company Limited (NNB GenCo) applied for three key environmental permits that it would need to operate its proposed new nuclear power station at Hinkley Point in Somerset. The proposed new power station is known as Hinkley Point C.

2 NNB GenCo applied to:

- Make radioactive waste discharges and disposals.
- Discharge non-radioactive effluent, including cooling water used in the turbine condenser.
- Operate large diesel generators.

These are all activities that require permits under the Environmental Permitting (England and Wales) Regulations 2010 (as amended) (EPR 10). NNB GenCo must have these permits in place before it can carry out these activities.

By the time the combustion activity comes into operation, the industrial emissions directive (IED) (2010/75/EU) will have come into force. This directive amends, consolidates and replaces 7 EU Directives on pollution including IPPC. The enabling legislation to bring this into force in the UK has not yet been enacted. However, the IED does not introduce any controls more stringent than those currently in force in respect of this determination.

The other permits are not affected by the IED.

3 We consulted on all three applications in 2011. After carefully considering the applications and all the comments made during the consultations, we prepared a detailed draft decision document and a draft permit for each of the applications. These documents explained how we reached our draft decisions.

4 We consulted on our draft decisions between 13 August and 9 November 2012. We held seven public surgeries and six meetings with local councillors in Somerset and South Wales. These meetings were to help the public understand both our role and how we had made our draft decisions.

5 We have now carefully considered all the comments made on our draft decisions and have made final decisions on all three applications. This document provides a brief summary of our decisions. More detailed explanations can be found in the individual decision documents that we have published.

6 Our overall conclusion is that we should issue all three permits. We consider that the limits and conditions in the permits are suitable to properly protect people and the environment.

The proposed power station and the activities we regulate

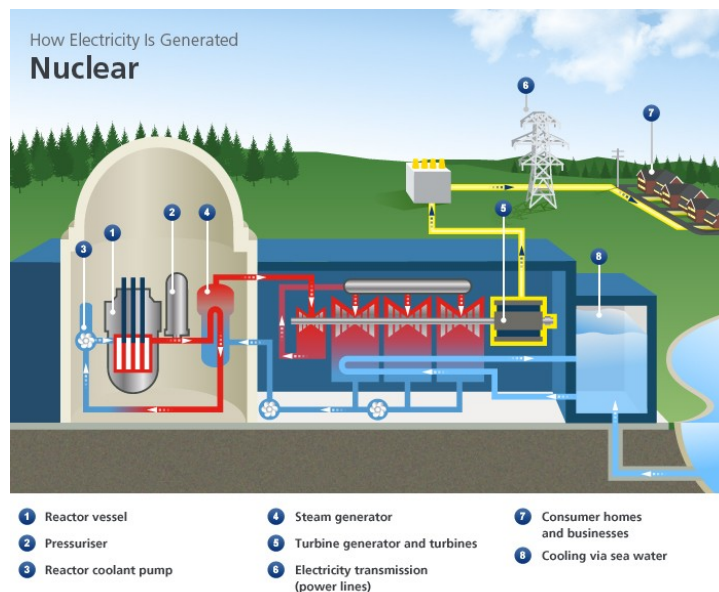
7 Hinkley Point is located on the Somerset coast approximately 12 km north-west of Bridgwater. The proposed power station would be located

immediately to the west of the two existing Hinkley Point power stations. It would have two pressurised water reactors based on EDF and AREVA's UK EPR™ type. This would produce about 9000 MW of heat and generate approximately 3260 MW of electricity. That is equal to around 6% of the UK's total electricity requirement or enough electricity to power over five million homes.

- 8 In 2007, together with the Office for Nuclear Regulation (ONR), we began our Generic Design Assessment (GDA) programme assessing the safety, security and environmental acceptability of new designs of nuclear reactors that might be built in the UK. We and ONR have assessed the UK EPR™ nuclear reactor and published our final Statement of Acceptability and Design Acceptance Confirmation for the design in December 2012.
- 9 In assessing NNB GenCo's applications and making our decisions, we took full account of the work that we did during GDA. We focused our efforts on matters to do with the operator and the site. This included any design changes that NNB GenCo proposed to make to the generic design.
- 10 We have assessed the three applications against relevant guidance and requirements, including UK and European guidance and laws that are specific to each activity. EPR 10 provides an overall framework for permitting. There are some differences in the conditions of the three permits because of the differences in requirements.

Description of the proposed facility

- 11 In the reactors, the enriched uranium oxide fuel is cooled by water in the primary pressurised circuit. This water also acts as the neutron moderator necessary for a sustained nuclear fission reaction. The primary circuit includes four steam generators where heat is transferred from the primary circuit to an isolated secondary circuit, producing steam. This steam then drives a turbine-generator to produce electricity, is condensed, and the condensed water is returned to the steam generators.



Simplified diagram of the EPR™ reactor (source AREVA)

- 12 For each reactor, the main nuclear support facilities include a spent fuel pool and water treatment systems for maintaining the chemistry of the primary and secondary water circuits. There are also some facilities shared by the two reactors, including an interim spent fuel store and an intermediate level radioactive waste store.
- 13 The operation of the power station would require a continuous supply of water for cooling. Seawater from the Bristol Channel would be used to cool the steam turbine condensers and various support systems. After it had been used within the power station, the seawater would then be discharged at a higher temperature back into the Bristol Channel.
- 14 There are 12 backup diesel generators that would provide power if there was a loss of electricity supply from the National Grid. The diesel generators are classified as safety equipment and would only be operated during testing or in the event of a power failure.

Radioactive waste discharges and disposals

- 15 Radioactive waste would be produced when the reactors are operated and maintained. In particular, operating the reactors generates radioactivity in the water of the reactor's primary circuit, some of which would subsequently become waste discharged to the environment. Radioactive waste produced when the nuclear reactors are operating includes:
- Gaseous radioactive waste, which will be discharged into the environment primarily via two main stacks, one for each reactor.
 - Liquid radioactive waste, which would be discharged with the cooling water into the Bristol Channel, approximately two kilometres offshore.
 - Solid radioactive waste, which would be produced during the treatment of gaseous and liquid waste, and during the operation and maintenance of the power station:
 - low-level solid waste, oils and solvents, which will be transferred to off-site treatment and disposal facilities
 - higher activity solid waste, which will be stored on-site until suitable disposal facilities are available.
- 16 We advertised the application and consulted on it. We received 200 responses from members of the public, public bodies and departments, and other interested groups. Many of the responses from the public used a standard template letter and raised the same concerns about the effect of discharges of radioactive waste on people's health. In total, we identified over 100 separate issues from the responses.
- 17 We carried out a further consultation on our draft decision document and draft permit. We received 44 responses from members of the public, public bodies and departments, and other interested groups. Some consultees restated concerns they had raised during the consultation on the application. We identified 36 new issues and 33 issues raised previously.
- 18 We made all of these responses available at the places listed in Annex 1. We address the issues raised in our decision document.

- 19 In our decision document for the radioactive waste disposals we have set out our conclusions on NNB GenCo's application. We have considered:
- How NNB GenCo proposes to use best available techniques to minimise:
 - the amount of radioactive waste produced
 - the discharges of radioactive waste
 - the effects on people and the environment.
 - NNB GenCo's current management arrangements and how they would develop into an operating organisation.
 - NNB GenCo's proposals for limits for discharges.
 - Our conclusions from GDA.
 - The predicted impacts on people.
 - The predicted impacts on the environment, including the nationally and internationally important designated habitats and species of the Severn Estuary.
 - The matters raised during the consultations.
- 20 Our permit is based on our standard template permit for radioactive waste discharges and disposals from a nuclear licensed site. We have included 19 requirements to provide additional information and one pre-operational measure. These will help ensure that the proposed power station will be built and operated in accordance with commitments made in the application. We have included limits on gaseous and aqueous discharges of radioactive waste.
- 21 We have assessed the impact (known as the radiation 'dose') of discharges at the permit limits for Hinkley Point C to be 8.4 microsieverts (μSv) a year to the person who would be most exposed to the discharges, including an allowance for direct radiation from the site. This person is a 'milk consumer' and the source of the radiation dose is mainly from gaseous discharges.
- 22 We have also assessed the maximum impact of Hinkley Point A, B and C power stations in total. In this case, the most exposed person is a 'crustacean consumer' who also spends time on the beach, and most of the dose is from the liquid discharges. We assessed the dose to be 43 μSv a year, including a contribution of 36 μSv a year from past discharges.
- 23 Both these doses are significantly less than the legal dose limit for the public of 1000 μSv a year and less than relevant dose constraints.
- 24 Our assessment of the impact of discharges on wildlife showed that levels were less than one thousandth of the level at which we consider there will be no harm to the integrity of a conservation site.
- 25 Our conclusion is that we should issue the permit. We consider that the limits and conditions in the permit are suitable to properly protect people and the environment.

Waste water discharges

- 26 Non-radioactive effluent would be produced during the operation of Hinkley Point C, including:
- cooling water from the turbine condenser and other cooling systems
 - process effluent from a number of plant systems
 - treated sewage effluent from staff welfare facilities
- 27 Non-radioactive effluent would be discharged into the Bristol Channel through two diffusers at the end of a single outfall tunnel, approximately two kilometres offshore. Process effluent and treated sewage effluent would be combined with the cooling water before being discharged.
- 28 Cooling water represents approximately 99.9% of the total discharge of non-radioactive effluent. The maximum daily discharge volume of cooling water would be approximately 11.6 million cubic metres. During routine operation, cooling water will be returned to the Bristol Channel at a maximum of 12.5°C above the temperature of the sea, having passed through the turbine condensers.
- 29 Process effluent would mainly be produced from plant water clean up systems that maintain the correct water purity and chemistry for the best operating conditions.
- 30 We advertised the application and consulted on it. We received 31 responses from members of the public, public bodies and departments, and other interested groups. We identified 20 issues from the responses.
- 31 We carried out a further consultation on our draft decision document and draft permit. We received six responses from members of the public, public bodies and departments, and other interested groups. We identified three new issues and one issue that had been raised previously.
- 32 We made all of these responses available at the places listed in Annex 1. We address the issues raised in our decision document.
- 33 Our assessment has considered the discharge of non-radioactive effluent both during commissioning and the subsequent operational phase of Hinkley Point C. The operational phase includes maintenance and refuelling periods as well as routine day-to-day operations.
- 34 In our decision document for water discharges we have set out our conclusions on NNB GenCo's application. We have considered:
- Emissions to surface water and their potential impact on water quality.
 - Emissions to surface water and their potential impact on the nationally and internationally important designated habitats and species of the Severn Estuary.
 - Our GDA conclusions, to make sure that NNB GenCo has dealt with any matters that were not covered by GDA.

- The control of biological fouling of the cooling systems, and whether the proposed strategy and the resultant discharge of total residual oxidant (TRO) are acceptable.
- The matters raised during the consultations.

35 As well as assessing the emissions above, we have also considered the impact of abstracting cooling water on marine life.

36 Our permit is based on our standard templates for water discharges. We have included 16 pre-operational measures and three requirements for further information in the permit. These will help ensure that the proposed power station will be built and be capable of being operated in accordance with commitments made in the application.

37 We have assessed the impact of discharges from the proposed Hinkley Point C. Apart from temperature and TRO, the levels of all other permitted substances do not exceed the relevant Environmental Quality Standard or target before being discharged into the Bristol Channel. The permit requires NNB GenCo to operate in a way that makes sure that the maximum loading of substances in the discharge does not exceed those levels stated in its application. We have included limits for temperature and TRO in the permit that would make sure that the environment is protected.

38 Our conclusion is that we should issue the permit. We consider that the limits and conditions in the permit are suitable to properly protect people and the environment.

Operation of backup diesel generators

39 Hinkley Point C would have 12 backup diesel generators for providing electrical power in the event of loss of its supply from the National Grid. The backup diesel generators will have a total heat input of 176 MW from the diesel burnt in the engines. The permit covers the diesel generators together with associated fuel storage tanks and the interconnecting pipework.

40 The generators would be housed in four purpose-built concrete buildings, each containing three generators. Each of the buildings has two essential diesel generators (EDG), each with a heat input of 18.5 MW and producing 7.9 MW of electricity, and a station blackout (SBO) diesel generator with a heat input of 7 MW and producing 2.9 MW of electricity.

41 The diesel generators are classified as safety equipment and will only be operated during testing or in the event of loss of off-site electricity supplies.

42 The main emissions are to air via exhaust stacks around 30 metres high. The emissions consist of combustion gases containing particulates as well as oxides of sulphur, nitrogen and carbon.

43 We advertised the application and consulted on it. We received 24 responses from members of the public, public bodies and departments, and other interested groups. We identified 17 issues from the responses.

44 We carried out a further consultation on our draft decision document and draft permit. We received seven responses from members of the public, public

bodies and departments, and other interested groups. We identified 11 issues from the responses.

- 45 We made all of these responses available at the places listed in Annex 1. We addressed the issues raised in our decision document.
- 46 Our assessment of the environmental impact of these emissions covers three operational scenarios: commissioning, routine testing and loss of off-site power.
- 47 We have assessed long-term and short-term impacts for all three operational scenarios. The key issues we found during these assessments were air quality and the dispersion of emissions to air, and the impact of these emissions on the local environment.
- 48 From our assessment of the air dispersion modelling, we have concluded that during normal operations relevant air quality objectives and environmental assessment levels are not likely to be exceeded at the limits (emission limit values) we have set within the permit.
- 49 Our conclusion is that we should issue the permit. We consider that the limits and conditions in the permit are suitable to properly protect people and the environment.

Our decisions

- 50 In reaching our decisions, we have considered the relevant legislation, Government policy and guidance, our own guidance and the responses to our consultations on both the applications and our draft decisions. We have carried out an Appropriate Assessment under The Conservation of Natural Habitats and Species Regulations 2010.
- 51 We consider that NNB GenCo will use the best available techniques to minimise discharges and impacts on the environment. We assessed NNB GenCo's management arrangements and concluded that these were suitable and that NNB GenCo is a suitable operator.
- 52 We have carefully considered all of the consultation responses and used them to help inform our decisions on whether to issue each permit and what conditions they should include.
- 53 Our overall conclusion is that we should issue the permits.
- 54 We consider the limits and conditions in the three permits are suitable to properly protect people and the environment.

Background to nuclear power developments in the UK and at Hinkley Point

Government's role on energy and nuclear policy and other related matters

- 55 Energy policy is decided by the UK Government. UK policy is set out in the [white paper on nuclear power](#)¹ and its Energy [National Policy Statements](#)². The Nuclear National Policy Statement was designated on 19 July 2011 and lists eight sites, including Hinkley Point, as potentially suitable for the deployment of new nuclear power stations by 2025.
- 56 [Regulatory Justification](#)³ is a process required by European law to establish whether the benefits of a practice causing exposure to radiation outweigh the risks to health. The Secretary of State for Energy and Climate Change published his justification decisions on 18 October 2010, stating that the AP1000® and EPR™ reactor designs are justified and that their benefits outweigh any health risks they may cause.
- 57 [Waste and decommissioning financing arrangements](#)⁴ ensures operators of new nuclear power stations put aside sufficient funds to pay for the future decommissioning of nuclear power stations and the disposal of any waste they produce. A new operator must submit its decommissioning and waste management plan for its proposed power station for approval by the Secretary of State.
- 58 The indicative timeline for [nuclear new build](#)⁵, available on the [Department of Energy and Climate Change](#)⁶ (DECC) website, shows how the various activities within the new nuclear programme and other related activity fit together.
- 59 Some elements of the timetable are generic to all new nuclear power stations, whereas other elements are specific to certain projects. The timing of project-specific activity, in particular, is subject to change and dependent on when prospective operators bring their plans forward and if the site-specific proposals are acceptable. This activity will need to be repeated separately, at different points in time, for each new nuclear power station.

Other permissions required before Hinkley Point C can be built

- 60 NNB GenCo must obtain planning permission in the form of a development consent order (DCO) before it can build a new nuclear power station at Hinkley Point C. It applied for this to the Infrastructure Planning Commission (IPC), which has now been incorporated into the National Infrastructure Directorate of the Planning Inspectorate. The Planning Inspectorate's role is

¹ http://webarchive.nationalarchives.gov.uk/20100512172052/http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/nuclear/white_paper_08/white_paper_08.aspx

² http://www.decc.gov.uk/en/content/cms/meeting_energy/nuclear/new/siting/siting.aspx

³ http://www.decc.gov.uk/en/content/cms/meeting_energy/nuclear/new/reg_just/reg_just.aspx

⁴ http://www.decc.gov.uk/en/content/cms/meeting_energy/nuclear/new/waste_costs/waste_costs.aspx

⁵ www.decc.gov.uk/assets/decc/What%20we%20do/UK%20energy%20supply/Energy%20mix/Nuclear/new_nuclear/1_20091111105719_e_@@_newnuclearimeline.pdf

⁶ www.decc.gov.uk

to make recommendations to the Secretary of State for Energy and Climate Change who, in turn, will decide whether developments should proceed.

61 NNB GenCo obtained a nuclear site licence under the Nuclear Installations Act 1965 to build and operate its proposed new nuclear power station. The Office for Nuclear Regulation granted the licence for Hinkley Point C in December 2012. The Office for Nuclear Regulation (ONR) regulates the nuclear safety and security of nuclear licensed sites and the transport of nuclear materials.

62 ONR intends to specify, in accordance with a condition in the nuclear site licence for Hinkley Point C, that NNB GenCo needs ONR's consent to begin construction, defined as 'the first pour of nuclear safety related concrete'.

Keeping you informed in the future

63 This is the final stage of our determination of environmental permit applications for operation of the proposed Hinkley Point C nuclear power station.

64 If the Secretary of State grants NNB GenCo a DCO, the company will need to apply for certain further *construction* related environmental permits. We would consult on the applications for these construction phase permits if we receive them.

65 There will continue to be opportunities to get involved with us, for example we attend EDF Energy's Hinkley Community Forum and Main Site Neighbourhood Forum and the Somerset Nuclear Energy Group.

66 You can find up to date information on our work on our [Hinkley web pages](#)⁷.

67 Wherever possible and practicable, we will respond positively to requests to update local communities and other interested people.

68 We will put the reports that are required by the permits on the public register. These reports will include those required by information requirements, pre-operational measures and, in due course, discharge and environmental monitoring reports.

⁷ <http://www.environment-agency.gov.uk/hinkleypoint>

Annex 1 – Places where the documents can be viewed

Environment Agency*
Rivers House
East Quay
Bridgwater
Somerset
TA6 4YS

Environment Agency *
Rivers House
St. Mellons Business Park
Fortran Road
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Cardiff
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West Somerset Council
West Somerset House
Killick Way
Williton
Somerset
TA4 4QA

West Somerset Council*
Minehead Customer Centre
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Minehead
TA24 5BP

Sedgemoor District Council*
Bridgwater House
King Square
Bridgwater
TA6 3AR

Burnham-on-Sea Library
Princess Street
Burnham-on-Sea
Somerset
TA8 1EH

Somerset County Council
Major Energy Projects
Environment Directorate
Somerset County Council
County Hall
Taunton
TA1 4DY

North Somerset Council
Corporate Services Unit
Somerset House
Oxford Street
Weston-super-Mare
BS23 1TG

Vale of Glamorgan Council*
Pollution Control Team
Civic Offices
Holton Road
Barry
CF63 4RU

Highbridge Public Library
Alpha House
Market Street
Highbridge
Somerset
TA9 3BP

* location of public registers

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