



Assessing new nuclear power station designs

Generic design assessment of Hitachi-GE's UK Advanced Boiling Water Reactor (ABWR)

Consultation summary document

12 December 2016

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

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

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

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

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

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

Natural Resources Wales is the largest Welsh Government Sponsored Body - employing 1,900 staff across Wales. We were formed in April 2013, largely taking over the functions of the Countryside Council for Wales, Forestry Commission Wales and the Environment Agency in Wales, as well as certain Welsh Government functions.

- Adviser: principal adviser to Welsh Government, and adviser to industry and the wider public and voluntary sector, and communicator about issues relating to the environment and its natural resources
- Regulator: protecting people and the environment including marine, forest and waste industries, and prosecuting those who breach the regulations that we are responsible for
- Designator: for Sites of Special Scientific Interest – areas of particular value for their wildlife or geology, Areas of Outstanding Natural Beauty (AONBs), and National Parks, as well as declaring National Nature Reserves
- Responder: to some 9,000 reported environmental incidents a year as a Category 1 emergency responder
- Statutory consultee: to some 9,000 planning applications a year
- Manager/Operator: managing seven per cent of Wales' land area including woodlands, National Nature Reserves, water and flood defences, and operating our visitor centres, recreation facilities, hatcheries and a laboratory
- Partner, Educator and Enabler: key collaborator with the public, private and voluntary sectors, providing grant aid, and helping a wide range of people use the environment as a learning resource; acting as a catalyst for others' work
- Evidence gatherer: monitoring our environment, commissioning and undertaking research, developing our knowledge, and being a public records body
- Employer: of almost 1,900 staff, as well as supporting other employment through contract work.

Published by:

Environment Agency
Horizon house, Deanery Road,
Bristol BS1 5AH
Email: enquiries@environment-agency.gov.uk
www.gov.uk/environment-agency

© Environment Agency 2016

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:
www.gov.uk/government/publications

or our National Customer Contact Centre:
T: 03708 506506

Email: enquiries@environment-agency.gov.uk.

Contents

Contents	4
Introduction	5
Your views count	5
New nuclear power stations – the government’s view	6
Regulating nuclear power stations	6
Generic design assessment	7
The UK ABWR design	8
Our views so far on the UK ABWR design	9
How to respond	11
Online.....	11
By email or letter	11
By attending an event.....	11
Next steps	11
References	12

Introduction

New nuclear power stations are an important part of the government's plans for generation of secure low carbon electricity.

Regulators are scrutinising new nuclear power station designs thoroughly, making sure people and the environment are properly protected.

The Environment Agency and Natural Resources Wales are asking for your views on their assessment of the UK Advanced Boiling Water Reactor (UK ABWR) nuclear power station design.

As regulators of the nuclear industry, the Office for Nuclear Regulation (ONR), the Environment Agency and Natural Resources Wales are working together to make sure any new nuclear power stations built in the UK meet high standards of safety, security, environmental protection and waste management.

Hitachi-GE Nuclear Energy Ltd (Hitachi-GE), a major provider of nuclear technologies, has developed the ABWR plant and used it in Japan, and has now submitted the UK ABWR design to the UK nuclear regulators for generic design assessment (GDA).

GDA is the process that allows us to begin scrutinising new nuclear power station designs well in advance of construction starting. This means that we can identify any potential design issues at an early stage and ask the reactor design company to address them, so helping to avoid potential costly and time consuming modifications during construction.

This consultation seeks your views on our preliminary conclusions following our detailed assessment of the UK ABWR new nuclear power station design, and on the environmental aspects of the design. Our consultation does not relate to a specific site, even though the UK ABWR is proposed at two sites in the UK. It is not about the need for nuclear power, the siting of nuclear power stations, or the safety and security of the design.

Your views count

We can all help to protect and improve the environment by being actively involved. We have deliberately made the GDA process open, transparent and consultative and we would like people to understand our role, what we are doing and why it's important.

This is a public consultation and we welcome everyone's views. We want to hear from the public, the energy industry, academics with an interest in nuclear power, energy or the environment, non-governmental organisations (NGOs) and any other organisation or public body.

We would like to find out your views on:

- the environmental aspects of the design
- the Environment Agency's and Natural Resources Wales's preliminary conclusions following detailed assessment of the environmental aspects of the UK ABWR nuclear power station design

The 12-week consultation begins on 12 December 2016 and will close on 3 March 2017.

You can find details of our consultation questions, detailed assessment topics and assessment findings in our full consultation document and assessment reports at:

<https://www.gov.uk/government/consultations/gda-of-hitachi-ge-nuclear-energy-ltds-uk-advanced-boiling-water-reactor>

New nuclear power stations – the government’s view

The government has outlined its commitment to new nuclear developments in the UK. It states that nuclear power, together with gas and renewable energy such as wind and solar power, will help meet the country’s energy needs in the future. It will also meet its commitment to reduce carbon emissions. As it encourages the development of new nuclear power stations, it has asked regulators to assess the safety, security and environmental impacts of new reactor designs before they are built.

Regulating nuclear power stations

The Environment Agency regulates the impacts of nuclear sites in England on the environment by issuing environmental permits to cover site preparation, construction, operation and decommissioning. Natural Resources Wales carries out the same role in Wales. We also work closely with the Office for Nuclear Regulation, which regulates the safety and security aspects of nuclear sites.

Government and industry expect power stations of almost the same design might be built on a number of sites and potentially be run by different operating companies. We've split our process for assessing and permitting the operational stage of new nuclear power stations into 2 parts.

In the first phase, GDA, we carry out assessments of designs and, at the end, provide a statement about the acceptability of each design. There may be matters which cannot be resolved at GDA and these are captured as GDA Issues and Assessment Findings, which are associated with any statement issued. For the UK ABWR, we are in this phase now.

A **GDA Issue** is an unresolved issue that is significant, but resolvable, and which requires resolution before construction of the reactor starts. The company must publish a ‘resolution plan’ setting out how it will address the issue. All GDA Issues must be resolved to the satisfaction of the regulators before GDA can be completed.

An **Assessment Finding** is an unresolved issue that is not considered critical to the decision to start construction - it will need to be addressed during the design, procurement, construction or commissioning phase of the new build project.

In the second phase, we receive applications for environmental permits for a specific site. We take into account all of the work we have done during GDA, so that our efforts are focused on site-specific matters, including how the operator is addressing Assessment Findings. We also carry out further public consultation before deciding whether or not to issue operational permits for a specific site.

The proposed sites for the UK ABWR are Wylfa Newydd on the Isle of Anglesey, and Oldbury-on-Severn in South Gloucestershire.

Generic design assessment

GDA means that we begin assessing the acceptability of the environmental aspects of a design before an application is made to build the power station. We can get involved with designers and potential operators at the earliest stage when issues can be best addressed effectively and efficiently before construction begins.

There are a number of stages:

1. **initial assessment:** we may ask the Requesting Party for further information or design changes to be made
2. **detailed assessment:** we form our preliminary views to go to consultation
3. **consultation:** we ask for views following detailed assessment – this is the stage we are at now
4. **post consultation review:** we consider all responses to the consultation
5. **decision and statement:** we decide whether to issue a statement of design acceptability (SoDA), an interim statement of design acceptability (iSoDA) if there are any outstanding issues to be addressed or no statement of acceptability

GDA is based on a generic site. When assessing applications for environmental permits we use the actual characteristics of the specific-site where it is proposed to build. The site specific characteristics may be different from those of the GDA generic site. More details of our GDA process can be found in our process and information document (P&ID) (Environment Agency, 2013).

There are 3 possible results for a GDA.

- We issue a statement of design acceptability if we are satisfied with the design (SoDA).
- If we are largely satisfied, we provide an interim statement of design acceptability (iSoDA) that identifies the issues that must be addressed before we could consider issuing a full statement of design acceptability.
- If we are not satisfied, we do not issue a statement of design acceptability or an interim statement of design acceptability.

The UK ABWR design

There are various types of nuclear reactors around the world, with over 400 in operation. One of the most common types is the boiling water reactor (BWR), of which the Advanced Boiling Water Reactor (ABWR) is the latest design in operation. Capable of producing around 1,350 megawatts of electricity, enough to power more than 2 million homes on average, the ABWR is already operational elsewhere in the world.

Figure 1. A simplified illustration of the Advanced boiling Water Reactor

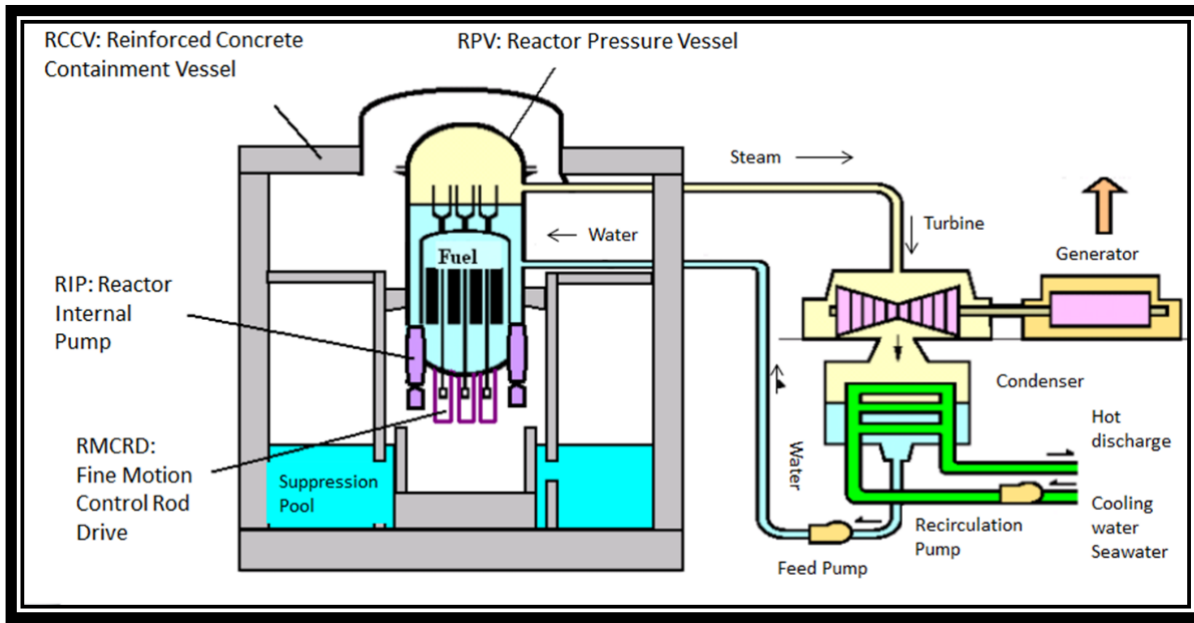


Image courtesy of Hitachi-GE

BWRs work by passing the steam that has been generated inside the reactor directly to the turbine. This makes the turbine spin and it drives a generator producing electricity.

More information on the UK ABWR is available at: <http://www.hitachi-hgne-uk-abwr.com/index.html>

Our views so far on the UK ABWR design

Hitachi-GE submitted its UK ABWR design for GDA in April 2014. We completed our initial assessment and published our report in August 2014 (Environment Agency, 2014). Since then, we have been carrying out our detailed assessment. We have based our findings so far on information submitted up to 8 July 2016 and assessed by the 5 August 2016.

We are publishing 11 assessment reports and an independent dose assessment alongside our consultation document.

Our environmental assessment reports are:

- Management systems: identifying if the designer has the necessary management systems and resources to ensure the design will achieve high standards of protection for people and the environment.
- Integrated waste strategy: assessing the waste management arrangements for a generic site
- Best available techniques: examining the evidence for claims made with respect to minimisation of waste and environmental impact.
- Gaseous waste: considering the expected quantities and limits proposed for release of radioactivity to air.
- Aqueous waste: considering the expected quantities and limits proposed for release of radioactivity to water.
- Solid waste, spent fuel and disposability: considering the expected quantities of solid waste generated and the long-term management of this waste.
- Sampling and monitoring: identifying the capability to monitor radioactive discharges to an appropriate standard for permit compliance.
- The generic site: considering the implications of the generic site selected for GDA on the applicability of an iSoDA / SoDA.
- Radiological impact on humans: assessing the impact of radioactivity on members of the public.
- Radiological impact on non-humans: assessing the impact of radioactivity on plants and animals.
- Other environmental regulations: identifying the feasibility of compliance with environmental legislation other than for regulation of radioactive substances activities, for example COMAH, combustion activities and non-radioactive surface water discharges.
- Independent dose assessment: assessing the impact of radioactivity on members of the public and comparing the methodology and outcomes with a similar study undertaken by Hitachi-GE.

Based on our findings so far, our preliminary conclusion is that we consider many of the environmental aspects of the design would be acceptable. However, at this stage of our detailed assessment there are 3 issues to be addressed before we are ready to issue a full statement of design acceptability for the UK ABWR. These are summarised below, but more detail and context is provided in our consultation documents.

Potential GDA Issues:

Potential GDA Issue 1 – Decommissioning of the UK ABWR. We require Hitachi-GE to provide sufficient evidence to demonstrate that the UK ABWR has been designed to facilitate decommissioning and hence to minimise associated waste and impacts on people and the environment from decommissioning operations.

Potential GDA Issue 2 – Source terms for the UK ABWR. We require Hitachi-GE to provide a suitable and sufficient definition and justification for the radioactive source terms in the UK ABWR during normal operations

Potential GDA Issue 3 – Consideration of 'best available techniques' (BAT) and 'as low as reasonably practicable' (ALARP) in optimisation. We require Hitachi-GE to demonstrate that appropriate consideration has been given to both environmental and safety aspects, in order to achieve an optimised design.

We have also identified 17 Assessment Findings in the consultation documents which we will expect to be addressed in the future, at the appropriate stage in the life-cycle of the plant.

We have included a draft iSoDA with the consultation documents.

We will continue with our detailed assessment, including carefully considering consultation responses, and expect that Hitachi-GE will continue to seek to resolve the above potential GDA Issues during GDA so that we can issue a full SoDA at the end of the process. We are confident that the existing issues are resolvable and can be addressed by Hitachi-GE during GDA. Only when we are satisfied that all the issues have been addressed to our satisfaction would we issue a full statement. If the issues are, for any reason, not resolved by the end of GDA then we would only be able to issue an interim statement of design acceptability.

Our preliminary conclusions and supporting reasoning are available in our full consultation document and we welcome your views.

How to respond

There are a number of ways you can let us know your views.

Online

Visit our website to view the full consultation at <https://www.gov.uk/government/consultations/gda-of-hitachi-ge-nuclear-energy-ltds-uk-advanced-boiling-water-reactor>

By email or letter

You can respond by:

Email: gda@environment-agency.gov.uk

By post to: For the attention of Declan Roscoe

Environment Agency
Ghyll Mount
Gillan Way
Penrith 40 Business Park
Penrith
Cumbria
CA11 9BP

By attending an event

We are holding some community drop-in events near Horizon Nuclear Power's proposed sites for the UK ABWR at Oldbury-on-Severn and Wylfa Newydd during the consultation period to give everyone an opportunity to have their say.

Next steps

We will carefully consider all the responses to the consultation and complete our detailed assessment. Then we will make our decision on whether or not to issue a statement, or interim statement, of design acceptability for the UK ABWR.

We will summarise the responses to our consultation, issues raised and our views on those issues.

We are targeting publishing our final conclusions in our 'decision document' in December 2017.

References

Reference	Details
Environment Agency, 2013	Process and Information Document for Generic Assessment of Candidate Nuclear Power Plant Designs, Version 2, Environment Agency, Mar 2013. http://webarchive.nationalarchives.gov.uk/20151009003754/https://www.gov.uk/government/publications/assessment-of-candidate-nuclear-power-plant-designs
Environment Agency, 2014	Report on initial assessment of Hitachi-GE Nuclear Energy, Ltd's UK Advanced Boiling Water Reactor https://www.gov.uk/government/publications/discharges-from-boiling-water-reactors-review-of-discharge-data

NRW Customer Care Centre 0300 065 3000 (Mon-Fri, 9am-5pm)

Our Customer Care Centre handles everything from straightforward general enquiries to more complex questions about registering for various permits and can provide information about the following topics:

- water and waste exemptions
- lower and Upper Tier Carrier & Broker registrations
- hazardous waste registrations
- fish net licences
- cockling licences
- water resources permit applications
- waste permit applications
- water quality permit applications
- permit applications for installations
- marine licence applications
- planning applications
- publications

Email

enquiries@naturalresourceswales.gov.uk

By post

Natural Resources Wales
c/o Customer Care Centre
Ty Cambria
29 Newport Rd
Cardiff
CF24 0TP

Incident Hotline 0800 80 70 60 (24 hour service)

You should use the Incident Hotline to report incidents such as pollution. You can see a full list of the incidents we deal with on our report it page.

Floodline 0345 988 1188 (24 hour service)

Contact Floodline for information about flooding.
Floodline Type Talk: 0345 602 6340 (for hard of hearing customers).

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

Then call us on

03708 506 506 (Monday to Friday, 8am to 6pm)

email

enquiries@environment-agency.gov.uk

or visit our website

www.gov.uk/environment-agency

incident hotline 0800 807060 (24 hours)

floodline 0345 988 1188 (24 hours)

Find out about call charges (www.gov.uk/call-charges)



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.