

**GENERIC DESIGN ASSESSMENT
PROGRESS REPORT
REPORTING PERIOD April - June 2014**

INTRODUCTION AND BACKGROUND

- 1 This report provides information on the work that has been undertaken so far during Step 2 of the Generic Design Assessment (GDA) of Hitachi-GE's UK Advanced Boiling Water Reactor (UK ABWR), as well as the regulators' preparation for potential other GDAs, during the period April – June 2014.
- 2 This is the second routine quarterly report that has been published since the regulators began technical assessment work on the UK ABWR, and it is presented at a time when Step 2 is nearing completion. ONR will publish its technical assessment reports and a summary report on its findings in August 2014, together with a statement on whether the UK ABWR GDA will progress to Step 3. The Environment Agency and Natural Resources Wales will also publish their initial findings report, and a summary report, in August 2014 and a statement on progress to the next assessment step.
- 3 In this period ONR have also engaged with the Japan Nuclear Regulation Authority (NRA) to share assessment information and findings relating to the UK ABWR design.
- 4 ONR inspectors also met with officials from the United States Nuclear Regulatory Commission (US NRC) to discuss the technical areas of probabilistic safety assessment (PSA) and severe accident analysis (SAA).
- 5 In June 2014 the regulators held the first 'tripartite' meeting between ONR and the Environment Agency, Hitachi-GE and Horizon Nuclear Power, to discuss issues of scope, long lead items and the transfer of information and safety case ownership between Hitachi-GE as the Requesting Party (RP) and Horizon as the prospective licensee.
- 6 We welcome comments on this report. Please send them to us at new.reactor.build@onr.gsi.gov.uk.

GDA STEP 2 - UK ABWR

Technical assessment

- 7 April to June 2014 was a period of intensive assessment of the Step 2 documentation across all of the technical areas, and the preparation of technical assessment reports for publication at the end of August.
- 8 Within this period the regulators:
 - Undertook 73 meetings across the range of topics.
 - Raised 89 regulatory queries (RQs).
 - Submitted 8 regulatory observations (ROs), which are matters that require resolution by Hitachi-GE.
- 9 Hitachi-GE have also undertaken and delivered a significant amount of work in this period across a range of technical topic areas, and have developed their knowledge of UK regulatory requirements further.
- 10 There have been no Regulatory Issues (RIs) identified so far. RIs are the highest category of regulatory concern, and indicate that the regulators consider the issue so

significant that it could result in the technology being unsuitable for licensing and or permitting in the UK.

11 The regulators have also held 'wrap-up' meetings with Hitachi-GE across the topic areas, to formally present their findings and to begin planning and preparation for Step 3 of GDA, should the UK ABWR design progress to that Step.

12 The GDA metrics (which give an overview of progress and regulatory opinion in each of the topic areas) remain in the pilot phase and will be formally launched when Step 3 begins, with the outputs being published in future quarterly reports. In addition the regulators will publish detailed technical assessment reports in each of the topic areas at the end of August. Therefore for this quarterly report the regulators will present a brief overview of each of the topic areas:

- Electrical engineering

The submissions made by Hitachi-GE are adequate to enable the Step 2 assessment report to be completed. ONR have outlined their expectations over the diversity of the electrical systems and Hitachi-GE is addressing this matter. Hitachi-GE is also showing an improved understanding of regulatory expectations in this area.

- Control and Instrumentation (C&I)

The combination of the Preliminary Safety Report (PSR) and the responses to the six RQs are sufficient to enable the C&I Step 2 assessment report to be completed. ONR held a technical workshop in the UK in June, which was supported by Hitachi-GE's technical specialists from Japan. This enabled a greater understanding of the proposed Field Programmable Gate Arrays (FPGA) Class 1 platform design to be gained by ONR, and demonstrated the RP's commitment to supporting GDA.

- Probabilistic Safety Assessment (PSA)

ONR have completed their Step 2 assessment of this topic area. ONR have concerns over the bounding core damage frequency (CDF) estimated by Hitachi-GE, and ONR have drafted a RO.

- Fault studies

ONR have completed their Step 2 assessment of this topic area. ONR have not received resolution plans for the five ROs issued, however its discussions with Hitachi-GE on the scope of work relating to the ROs have been positive.

- Severe accidents

ONR have completed their Step 2 assessment of this topic area. A technical workshop was held in May, where Hitachi-GE demonstrated good technical knowledge in this area.

- Human factors

ONR have completed their assessment of this topic area. All the RQs raised have either been addressed or deferred to the end of Step 2 / early Step 3 as agreed by ONR. Responses to RQs have generally been comprehensive and acceptable. The RO resolution plan has been issued and agreed by ONR, and Hitachi-GE is progressing this to programme.

- Fuel and core design

ONR have completed their Step 2 assessment of this topic area, and await delivery of the Step 3 submission plan from Hitachi-GE. ONR have submitted a draft RO on interim fuel storage to Hitachi-GE for discussion.

- Internal hazards

ONR have completed their Step 2 assessment of this topic area. Hitachi-GE's PSR submission on internal hazards and supporting documents do not fully meet ONR's expectations in terms of level of detail, however the submissions were sufficient for this stage of GDA to enable ONR to complete the assessment at Step 2.

A series of meetings have been put in place (and one held so far) to help improve communications between all parties and clarify Hitachi-GE's understanding of regulatory expectations.

- Civil engineering

ONR have completed their Step 2 assessment of this topic area. Hitachi-GE has made full use of technical support contractors who have contributed positively to the preparation of the documents and the progress made. ONR continue to provide further guidance to Hitachi-GE over the treatment of extreme external events.

- Mechanical engineering

ONR have completed their Step 2 assessment of this topic area. Hitachi-GE has issued a limited submission for Step 2, and this has limited the scope of assessment. ONR have drafted four ROs for discussion.

- Structural integrity

ONR have completed their Step 2 assessment of this topic area. Hitachi-GE had completed its delivery of submissions for Step 2 assessment by the end of May and has started its delivery of documents for Step 3. The documents submitted were of a good quality and were delivered in line with the agreed delivery programme

- Reactor chemistry

ONR have completed their Step 2 assessment of this topic area. Responses to all Step 2 RQs have been received on time and were generally of a good quality, and the submissions received to date are adequate for this stage of GDA. The regulators have also received the resolution plan for the RO on operational source terms, which appears credible.

- Radiological protection

ONR have completed their Step 2 assessment of this topic area. The 2 PSR reports and supporting documentation were adequate; however there are ongoing communication issues which mean that ONR does not have confidence that regulatory expectations are clearly understood.

- Radiological waste and decommissioning

ONR have completed their Step 2 assessment of this topic area. Hitachi-GE's Step 2 safety case submissions in this area were adequate, and all of the RQs raised have either been addressed explicitly in the responses, answered within the safety case submissions or deferred as agreed.

- Generic Environmental Permitting (GEP)

The approach used by Hitachi-GE to define the source term for discharges is not consistent with the UK regulatory approach. There is an RO associated with this issue, and the regulators have received the resolution plan, which appears credible.

The Environment Agency and Natural Resources Wales will publish their initial findings report and summary report from Step 2 separately from ONR, in August 2014.

- Management of Safety and Quality Assurance (MSQA)

Hitachi-GE has implemented its management arrangements for Step 2, and the MSQA procedures submitted have been satisfactory and describe appropriate processes.

- Conventional safety and fire safety

ONR have completed their Step 2 assessments of these topic areas. Hitachi-GE has demonstrated a reasonable basic understanding of their responsibilities relating to conventional health and safety. They are supported by external UK non-nuclear consultants, and their responses to regulatory engagement are sufficient at this stage. Progress has been strong in the area of fire safety.

- Security

There have been no formal submissions by Hitachi-GE in this area. Hitachi-GE has demonstrated a good understanding of the vital areas identification (VAI) process and methodology, and has responded positively to the feedback and comments provided by ONR.

Tripartite meeting

- 13 The regulators hosted a meeting of Hitachi-GE and Horizon Nuclear Power in June 2014. The aim of the meeting was to explore the interactions between GDA and the site licensing and permitting phases, with an emphasis on optimising the overall programme.
- 14 Hitachi-GE and Horizon agreed to submit an integrated schedule of the scope of work between GDA and the site licensing and permitting phases by the end of the year. This should help to ensure that as far as possible the GDA scope bounds the Wylfa site. This will help limit the amount of additional work that is required to support the site-specific submissions.
- 15 It was also agreed that the regulators would seek to schedule the assessment of matters relating to long lead items to align with Horizon's purchasing programme. This will require Hitachi-GE to provide the regulators with relevant information on the long lead items to enable these assessments in a timely way.
- 16 The regulators expect that tripartite meetings will be held throughout the GDA process.

Communications and stakeholder engagement

- 17 Within the period there were 4 comments posted on the Hitachi-GE comments website. Hitachi-GE responded to all questions within the required timeframe, and there have been no repeat questions.
- 18 The regulators also published their stakeholder engagement document on 24th June 2014. This describes their proposed approach to public and wider stakeholder engagement, and draws on the lessons learned from the earlier GDAs of the UK EPR and AP1000. Feedback on this document is welcome.

Technical Support Contracts (TSCs)

- 19 Between April and June ONR have let 4 technical support contracts:

Topic Area	Contractor Organisation	Value
Review of the applicability of US NRC's review of the US ABWR	Amec	£10,000
Review of BWR event list regarding Design Basis Events	GRS	£50,000

Development of a thermal hydraulic model for the UK ABWR	GRS	£665,500
Independent Confirmatory Analysis of the UK ABWR reactor core design	GRS	£300,000

- 20 The use of TSCs is crucial to the delivery of GDA as the TSC supply chain is able to offer world class expertise in niche complex technical areas, which the regulators may not have in their organisations. Also, as well as enhancing capability, they have capacity in areas where the regulators are short of resource. This means that the regulators can undertake broader and more detailed assessments. Throughout a typical GDA the regulators may expect to spend in the order of £10M on TSCs.

FORWARD LOOK

- 21 The next quarter will focus on completing the Step 2 assessments and publication of our findings and a statement on Hitachi-GE's readiness to progress to GDA Step 3, or otherwise, in August 2014.
- 22 The regulators will also begin preparations for Step 3 by developing assessment plans for each of the topic areas, and beginning their Step 3 work should the decision be made to progress to Step 3.
- 23 The regulators anticipate re-starting the GDA of the Westinghouse AP1000 in the next period, and have made preparations in terms of securing resource, developing a mobilisation plan and working with their legal teams on the funding model for the project.
- 24 The regulators have reviewed and restructured their joint website, which will be re-launched during the next period.

WORKING WITH OVERSEAS REGULATORS

- 25 The third Multinational Design Evaluation Programme (MDEP) conference on new reactor design activities was held on 14-16 April in Bethesda, USA. ONR attended as members of the policy group, steering committee and as a panel member on the session dedicated to post Fukushima activities. This conference was attended by almost 150 people from national regulators including 14 regulatory bodies who are members of the MDEP, international organisations and nuclear industry representatives from more than 17 countries. This conference provided an opportunity for MDEP to present the progress of the programme and for industrial stakeholders to present their on-going activities related to new reactor designs. The key themes were related to the future direction and focus of MDEP, the links to standards bodies and the interaction with commissioning activities. Arrangements are now in place for ONR to attend the next steering technical committee meeting, to chair the second ABWR working group and to attend the AP1000 working group meetings all of which are arranged for September 2014
- 26 In May 2014, ONR inspectors visited the offices of the US NRC in Washington to exchange information on the ABWR assessment in the areas of PSA and severe accident analysis. The US NRC is reviewing the GE-Hitachi ABWR, and has PSA models available for that design. During the meeting NRC provided very useful presentations containing a large amount of information relevant to ONR. ONR will continue its engagements throughout the GDA process.
- 27 In June 2014 ONR inspectors visited the offices of the Japan NRA to exchange information on regulatory regimes, new regulatory requirements in Japan post

Fukushima, re-licensing of ABWRs in Japan and ONR's initial assessment findings in topic areas of interest to the NRA.

MORE INFORMATION ON GDA

To find out more about GDA visit <http://www.onr.org.uk/new-reactors/>

To receive the latest news and information on GDA, subscribe to our e-Bulletin by visiting <http://www.onr.org.uk/new-reactors/ebulletin.htm>

SUMMARY OF REGULATOR CHARGES

Office for Nuclear Regulation:

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| ■ Charges for the quarter April – June 2014: | £1,430,340 |
| ■ Cumulative charges: | £4,207,724 |

Environment Agency:

- | | |
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| ■ Charges for the quarter April – June 2014: | £369,692 |
| ■ Cumulative charges: | £1,231,232 |