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| ONR Project assessment report  Generic Design Assessment of the GE-Hitachi BWRX-300 – Step 1 Summary Report |



ONR Project assessment report

**Project name**: Generic Design Assessment of the GE-Hitachi BWRX-300

**Report title**: Step 1 Summary Report

**Requesting Party:** GE-Hitachi Nuclear Energy International LLC(UK Branch)

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# Executive summary

In January 2024, the Office for Nuclear Regulation (ONR), together with the Environment Agency and Natural Resources Wales, began Step 1 of the Generic Design Assessment (GDA) of the BWRX-300 design on behalf of the United Kingdom (UK) branch of GE-Hitachi Nuclear Energy International LLC (UK Branch), the Requesting Party (RP). During the last 11 months, we have undertaken activities to initiate and establish the project and to prepare for technical assessment in Step 2. These activities are defined within our GDA guidance document, Guidance to Requesting Parties.

This report has been produced:

* To document the completion of and outcomes from Step 1;
* To summarise the activities undertaken by both the RP and ONR during Step 1;
* To provide a summary of ONR’s judgements, specifically focusing on whether the Step 1 objectives have been met; and
* To document the basis for the decision on whether to proceed to Step 2, or not.

The BWRX-300 is a single unit, direct-cycle, natural circulation, boiling water reactor with a power of ~870 MW (thermal) and a generating capacity of ~ 300 MW (electrical), and is designed to have an operational life of 60 years. The RP claims the design is at an advanced concept stage of development and is being further developed during the GDA in parallel with the RP’s safety, security, safeguards and environmental cases (SSSE).

We have undertaken activities which have allowed us to fulfil the objectives for Step 1. These are for ONR and the RP to agree:

* The GDA scope;
* The documentary basis for the generic safety and security cases that will be submitted for assessment throughout GDA;
* The gaps that have been identified by the RP in meeting regulatory expectations and the resolution plans for how these may be resolved;
* The RP’s arrangements necessary to undertake the GDA; and
* The schedule and associated programme for subsequent steps.

During Step 1 we have undertaken engagements with the RP at a project and individual technical topic level. This included a four day design familiarisation training session provided by the RP to improve our understanding of the design, two topic-specific engagements per topic area, and monthly project and programme management meetings. We have assessed more than 56 submissions.

We have been able to conclude that the information submitted within Step 1 met all the requirements from our guidance and demonstrated a good understanding of UK practice and regulatory expectations. We take confidence from these submissions that the RP has a clear view of what is needed to progress through the GDA and how it will justify its design.

The RP has confirmed during Step 1 engagements that it will complete GDA up to the end of Step 2, in line with its original application to the Department for Energy Security and Net Zero.

The overall duration for GDA is expected to be 23 months, completing in December 2025.

We have agreed a defined GDA scope with the RP. Where aspects are declared as being out of scope, we are content that these are justified and appropriate. Overall, we are satisfied that the agreed GDA scope will allow for a meaningful assessment of the generic design.

The SSSE to be submitted during GDA will comprise a Preliminary Safety Report (which encompasses Safeguards), a Generic Security Report, and a Preliminary Environment Report. The scope of these submissions includes all expected technical topics. We are satisfied that the proposed SSSE approach is logical and suitably structured.

We have assessed the arrangements that the RP has developed to undertake the GDA, including specific interventions by our Management of Safety and Quality Assurance specialists. We are content that the RP has appropriate arrangements in place to enable it to undertake the GDA process.

GE-Hitachi Nuclear Energy Americas LLC (a sister company of the RP) is currently engaging with regulators internationally, including the Nuclear Regulatory Commission in the US (US NRC) and the Canadian Nuclear Safety Commission in Canada (CNSC). It is proposing a standard BWRX-300 design for global deployment with minimal design variations from country to country. To this end, the RP is aiming to demonstrate in this GDA the suitability of the standard plant design for deployment at a nuclear site in Great Britain.

We have agreed a submission schedule with the RP which aligns with our assessment plans, the agreed GDA scope and the RP’s declared schedule for GDA. The RP has stated it has sufficient resource to deliver the submissions identified for Step 2 to the agreed schedule.

We have used the knowledge gained during Step 1 to inform our detailed planning within the 19 assessment plans we have developed for Step 2.

In line with our guidance, the RP undertook a self-assessment and review of its own readiness to proceed to Step 2. We judge that the process undertaken by the RP was reasonable, proportionate and sufficiently robust for this step of GDA. The conclusion of the RP’s readiness review is that it considers itself ready to begin Step 2.

We undertook a review of our own readiness to proceed to Step 2. We conclude that, based on the agreed GDA scope and submission schedule, the assessment will remain meaningful during Step 2 and warrants the continued deployment of regulatory resource. Our readiness review demonstrated that we are ready to proceed to Step 2 of GDA for the BWRX-300.

In summary:

* The RP has completed all the requirements for Step 1 from our guidance;
* Interactions with the RP throughout Step 1 have been professional and constructive, and we have confidence that this will continue;
* The RP has made good progress in developing its organisation and arrangements to support GDA;
* The agreements necessary to undertake the GDA are in place, or have developed sufficiently for this point in the project with clear plans for further development;
* The RP has demonstrated a good understanding of our regulatory expectations and has confidence that these can be met by its design and safety, security and safeguards case;
* We have improved our understanding of the generic BWRX-300 design and safety, security and safeguards case, and have used this to inform our planning for further assessment activities; and
* We, and the RP, are ready to proceed to Step 2 of the GDA.

Based on our work during Step 1, we recommend that ONR should proceed to Step 2 of the GDA for the generic BWRX-300 design.

Table 2: List of abbreviations

|  |
| --- |
| **Term/Acronym Description** |

|  |  |  |
| --- | --- | --- |
| ALARP |  | As Low as Reasonably Practicable |
| ABWR |  | Advanced Boiling Water Reactor |
| BTC |  | Basic Technical Characteristics |
| BWR |  | Boiling Water Reactor |
| CAE |  | Claim, Argument and Evidence |
| CNSC |  | Canadian Nuclear Safety Commission |
| DAC |  | Design Acceptance Confirmation |
| DEC |  | Design Extension Conditions |
| DESNZ |  | Department of Energy Security and Net Zero |
| DR |  | Design Reference |
| DRP |  | Design Reference Point |
| DRR |  | Design Reference Report |
| ESBWR |  | Economic Simplified Boiling Water Reactor |
| FAP |  | Forward Action Plan |
| FNEF |  | Future Nuclear Enabling Fund |
| GB |  | Great Britain |
| GDA |  | Generic Design Assessment |
| GEH-A |  | GE-Hitachi Nuclear Energy Americas LLC |
| GSE |  | Generic Site Envelope |
| GSR |  | Generic Security Report |
| IAEA |  | International Atomic Energy Agency |
| ICSO |  | Isolation Condenser System |
| LOCA |  | Loss of Coolant Accident |
| LTR |  | Licensing Topical Report |
| MDSL |  | Master Document Submission List |
| MSQA |  | Management of Safety and Quality Assurance |
| NISR 2003 | | Nuclear Industries Security Regulations 2003 |
| NPP |  | Nuclear Power Plant |
| NRC |  | Nuclear Regulatory Commission |
| NRW |  | Natural Resources Wales |
| ONR |  | Office for Nuclear Regulation |
| OPEX |  | Operational Experience |
| OPG |  | Ontario Power Generation |
| PCSR |  | Pre-construction safety report |
| PIP |  | Project Implementation Plan |
| PSA |  | Probabilistic Safety Analysis |
| PSAR |  | Preliminary Safety Analysis Report |
| PSR |  | Preliminary Safety Report |
| PSyR |  | Preliminary Security Report |
| RGP |  | Relevant Good Practice |
| RI |  | Regulatory Issue |
| RO |  | Regulatory Observation |
| RP |  | Requesting Party |
| RPV |  | Reactor Pressure Vessel |
| RQ |  | Regulatory Query |
| SBWR |  | Simplified Boiling Water Reactor |
| SGI |  | Safeguards Information |
| SSSE |  | Safety, Security, Safeguards and Environmental Cases |
| SMR |  | Small Modular Reactor |
| SNI |  | Sensitive Nuclear Information |
| SSCs |  | Structures, Systems and Components |
| TAG |  | Technical Assessment Guide (ONR) |
| TVA |  | Tennessee Valley Authority |
| UK |  | United Kingdom |
| US |  | United States of America |

Contents

[Executive summary 4](#_Toc185276350)

[1. Purpose 10](#_Toc185276351)

[2. Background 11](#_Toc185276352)

[2.1. Generic Design Assessment 11](#_Toc185276353)

[2.2. Objectives for Step 1 13](#_Toc185276354)

[2.3. Requesting Party 14](#_Toc185276355)

[2.4. BWRX-300 design 14](#_Toc185276356)

[2.5. Safety, security and safeguards cases 17](#_Toc185276357)

[3. Work carried out by ONR in consideration of this request 19](#_Toc185276358)

[3.1. Assessment of submissions 19](#_Toc185276359)

[3.2. Interactions with the requesting party 19](#_Toc185276360)

[3.3. Step 2 assessment plans and submissions schedule 21](#_Toc185276361)

[3.4. Assessments performed by other regulators 22](#_Toc185276362)

[3.5. Readiness reviews 23](#_Toc185276363)

[3.6. Joint working with the Environment Agency and NRW 23](#_Toc185276364)

[4. Matters arising from ONR’s work 24](#_Toc185276365)

[4.1. RP’s arrangements for undertaking GDA 24](#_Toc185276366)

[4.2. Agreement of the GDA scope 30](#_Toc185276367)

[4.3. Status of the design and safety, security and safeguards cases 32](#_Toc185276368)

[4.4. Information submitted during Step 1 35](#_Toc185276369)

[4.5. ONR’s Step 2 assessment plans 42](#_Toc185276370)

[4.6. Readiness reviews 42](#_Toc185276371)

[5. Conclusions 45](#_Toc185276372)

[6. Recommendations 46](#_Toc185276373)

[7. References 47](#_Toc185276374)

[8. Tables 52](#_Toc185276375)

[9. Figures 57](#_Toc185276376)

# Purpose

1. A request was received from the Department of Energy Security and Net Zero (DESNZ), in June 2023 (ref. [1]) for the Office for Nuclear Regulation (ONR), the Environment Agency and Natural Resources Wales (NRW) to undertake Steps 1 and 2 of a Generic Design Assessment (GDA) for GE-Hitachi’s BWRX-300 design. The request was contingent on the outcome of GE-Hitachi’s application to the DESNZ Future Nuclear Enabling Fund (FNEF) for matched funding to cover the costs of the GDA. ONR, the Environment Agency and NRW entered Step 1 of GDA with GE-Hitachi Nuclear Energy International LLC (UK Branch), the Requesting Party (RP), in January 2024 once a positive outcome had been achieved with FNEF.
2. During the last 11 months we have undertaken those activities identified for Step 1 within our GDA guidance document, Guidance to Requesting Parties (ref. [2]). These are mainly associated with initiation of the project and preparation for technical assessment in later steps.
3. This report has been produced:

* To document the completion of and outcomes from Step 1;
* To summarise the activities undertaken by both the RP and ONR during the step;
* To provide a summary of ONR’s judgements, specifically focusing on whether the Step 1 objectives have been met; and
* To document the basis for the decision on whether or not to proceed to Step 2.

# Background

## Generic Design Assessment

1. ONR is the UK’s independent nuclear regulator, with the legal authority to regulate nuclear safety, civil nuclear security and safeguards, and nuclear site health and safety at the 36 licensed nuclear sites in Great Britain (GB). We also regulate the transport of civil nuclear and radioactive materials by road, rail and inland waterways. ONR’s mission is to protect society by securing safe nuclear operations.
2. The GDA process was developed in response to the Government's 2006 Energy Review; in particular lessons learnt from experience with new nuclear power plants (NPPs) indicated that the use of a standardised design, where the design and safety case are well developed much earlier in the project, would facilitate a reduction in the time for regulatory assessment. It would also minimise any potential regulatory uncertainty for a future site licensee wishing to build such a design. Although GDA is not a mandatory process, because of its inherent benefits it is expected that it will usually be requested for new NPPs intended for construction in GB.
3. The objective for GDA is to provide confidence that the proposed design is capable of being constructed, operated and decommissioned in accordance with the standards of safety, security, safeguards and environmental protection required in GB. For the RP, the organisation(s) who requested the GDA, this offers a reduction in uncertainty and project risk regarding the design and safety, security, safeguards and environmental cases so as to be an enabler to future licensing, permitting, construction and regulatory activities.
4. To fulfil this objective, GDA progresses in steps, with the regulatory assessments becoming increasingly detailed. The assessment considers the majority of ONR’s purposes, using inspectors from the full range of technical topics as defined in our Guidance to Requesting Parties (ref. [2]).
5. The GDA process has three steps, noting that earlier GDAs had four steps. This was a change resulting from lessons learnt and efficiency improvements implemented in 2019. The overall intent is that:

* Step 1 is the initiation step where matters such as the GDA scope and timescales are agreed, and ONR’s knowledge of the design and the RP’s safety, security and safeguards cases increases. Further details on Step 1 are provided in Section 2.2;
* Step 2 is the fundamental assessment of the generic design and safety, security and safeguards cases, to identify any potential issues that may preclude deployment of the design; and
* Step 3 is the detailed assessment of the generic safety, security and safeguards cases on a sampling basis.

1. The 2019 revision of the GDA process also provided the flexibility to stop at the end of Step 2 with just a fundamental assessment completed. In this case, the RP has taken up the option to undertake a two-step GDA, ending with the provision of a Step 2 GDA Statement. A Design Acceptance Confirmation (DAC) will not be awarded as the necessary detailed assessment to support this outcome will not have been undertaken. Instead, ONR’s GDA Statement will detail the outcome of our fundamental assessment of the generic design and safety, security and safeguards cases.
2. The BWRX-300 design is the ninth design to begin a GDA. The first round of GDA started in 2007 when ONR and the Environment Agency began assessment of four designs, although two of these first-round designs were withdrawn by the RP part-way through the assessment process. The remaining two designs, the EDF and AREVA UK EPR™ and the Westinghouse AP1000® designs, subsequently completed GDA in 2012 and 2017 respectively (noting the latter included a pause of several years). In 2013, the Hitachi-GE Nuclear Energy, Ltd. (Hitachi-GE) UK ABWR entered the GDA process, and this was completed in 2017. Also in 2017, the CGN/EDF/GNI UK HPR1000 started a GDA which was completed in 2022. Full details of completed GDA projects are available on the joint regulators’ website (ref. [3]). At the time of writing, two other GDAs are currently underway; the Rolls-Royce SMR which started in 2022 and Holtec International’s SMR-300 which started in 2023.
3. This GDA of the BWRX-300 is the second GDA started with the intention of only completing activities to the end of Step 2.
4. The environmental protection aspects of the generic design are assessed and reported separately (ref. [4]) by the environment agencies (the Environment Agency and NRW) with whom we work closely during GDA. The Environment Agency has also published separate guidance on the process it follows (ref. [5]).

## Objectives for Step 1

1. Step 1 is the project initiation part of the design assessment process. This involves the RP establishing its project management and technical teams, its arrangements for undertaking a GDA and preparing and submitting documentation during Step 1 and for the commencement of Step 2. It also involves discussions with the RP to ensure a full understanding of the requirements and processes that will be applied.
2. The objectives for Step 1 are for ONR and the RP to agree:

* The GDA scope;
* The documentary basis for the generic safety, security and safeguards cases that will be submitted for assessment throughout GDA;
* The gaps that have been identified by the RP in meeting regulatory expectations and the resolution plans for how these may be resolved;
* The RP’s arrangements necessary to undertake the GDA; and
* The schedule and associated programme for subsequent steps.

1. Appendix 2 of Guidance to Requesting Parties (ref. [2]) provides further details of what the RP is required to do and what ONR will do during Step 1. Where we have made a judgement against a requirement placed on the RP from this appendix, these are specifically cited in this report.
2. A number of the requirements on the RP are to submit information to ONR. These cover matters which are necessary for undertaking GDA (such as project management controls, cost recovery arrangements and demonstration of adequate resources) along with matters of a more technical or regulatory nature. They are targeted at ensuring that both the RP and ONR are prepared for the more detailed assessments to be undertaken in later steps.
3. During Step 1 our assessment of the RP’s technical submissions that support the BWRX-300 design has been limited. The purpose of our assessment was to form a judgement on whether the requirements in Appendix 2 of Guidance to Requesting Parties (ref. [2]) have been met and to provide us with confidence going forwards with the GDA. We provided feedback to the RP on submissions received and highlighted any obvious omissions or gaps in meeting regulatory expectations. Assessment of the adequacy of the technical submissions is a Step 2 activity.

## Requesting Party

1. For the purposes of the GDA, GE-Hitachi Nuclear Energy International LLC (UK Branch) is the RP. GE-Hitachi Nuclear Energy Americas LLC (GEH-A) is a provider of advanced reactors and nuclear services, and is the designer of the BWRX-300. It is headquartered in Wilmington, North Carolina, United States of America (US).
2. As of 2024, the ultimate parent company of both the RP and GEH-A is GE Vernova Inc.
3. In the UK, the RP is supported by its supply chain partner Amentum who is assisting the RP in the development of the UK-specific chapters of the Safety, Security, Safeguards and Environment cases (SSSE), and other technical documents for the GDA.
4. Further details of the RP’s capacity, capability and organisation to support GDA are given in Section 4.1.2.

## BWRX-300 design

### Design status

1. The BWRX-300 is the tenth generation of the boiling water reactor (BWR) designed by GEH-A and its predecessor organisations. The BWRX-300 design builds upon technology and methodologies used in its earlier designs, including the Advanced Boiling Water Reactor (ABWR), Simplified Boiling Water Reactor (SBWR) and the Economic Simplified Boiling Water Reactor (ESBWR).  The ABWR has been licensed, constructed and is currently in operation in Japan, and a UK version of the design was assessed in a previous GDA with a view to potential deployment at the Wylfa Newydd site. Neither the SBWR and ESBWR have been built or operated.
2. GEH-A is currently engaging with regulators internationally, including the United States Nuclear Regulatory Commission (US NRC) and the Canadian Nuclear Safety Commission (CNSC) in support of proposed BWRX-300 projects at Clinch River and Darlington sites in Tennessee and Ontario respectively. GEH-A also has advanced plans for BWRX-300 deployment in Poland; one potential customer, Orlen Synthos Green Energy, is making a financial contribution to the RP’s GDA activities in the UK and is observing many of the engagements.
3. GEH-A intends to develop a standard design to be deployed globally, with minimal country-specific variations.  Some country, site and customer variations will, however, be inevitable. Notably a 60Hz power grid exists in North America and a 50 Hz power grid in Europe, which will require variations to the design between deployments.  In this GDA, the RP is aiming to demonstrate the suitability of the standard plant design for deployment at a generic nuclear site in GB, identifying but not providing design detail for any country or site-specific safety and security related changes that may need to be implemented in the future.
4. The RP has provided a design description document to regulators (ref. [6]) and also maintain a version on GE Vernova Inc’s public website (ref. [7]).

### Design overview

1. The BWRX-300 design is a single unit, direct-cycle BWR with a power of ~870 MW (thermal) and a generating capacity of ~ 300 MW (electrical).  The BWRX-300 reactor core houses 240 fuel assemblies and 57 control rods inside a reactor pressure vessel (RPV).  It uses fuel assemblies (GNF2) that are already currently widely used globally (ref. [6]).
2. The RP states that GEH-A has designed the BWRX-300 to optimise the costs of construction, operation, maintenance, staffing, and decommissioning, whilst maintaining safety provision in line International Atomic Energy Agency (IAEA) expectations for five levels of defence in depth (ref. [8]).
3. Of particular note is its use of natural circulation and passive cooling. Steam condensation and gravity allow the BWRX-300 to passively cool itself for seven days without alternating current power or operator action during abnormal events, including station blackouts.
4. The RP also identifies innovation in the design to mitigate loss of coolant accidents (LOCAs). The BWRX-300 has a relatively large RPV volume, which along with a tall chimney region (necessary to support natural circulation in normal operation) provides a substantial reservoir of water above the core. This ensures the reactor water level is maintained above the fuel, such that the fuel cladding is within the normal operating temperature range following transients involving feedwater flow interruptions or LOCAs.
5. The BWRX-300 design incorporates two isolation valves in series which attach directly to the RPV. These valves are designed to close as part of the response to a LOCA. The RP claims the double RPV isolation valve configuration provides redundancy as each is capable of independently isolating a coolant pipe break.
6. Key to the claims on passive cooling is the isolation condenser system (ICS). The BWRX-300 is equipped with three isolation condensers designed to remove decay heat and reject it to the environment following a scram and isolation of a previously operating reactor. It also minimises increases in steam pressure and maintains the RPV pressure at an acceptable level through decay heat removal.
7. As a result of these innovations, the BWRX-300 design has eliminated safety relief valves and many of the active safety systems commonly installed on earlier generations of BWRs.
8. In another change from previous BWRs, the BWRX-300 has a dry containment. It continues to be the ultimate means of confining radioactive material following a fault and is inerted with nitrogen in most operating modes. However, the RP states that the way in which LOCAs are managed on the BWRX-300 allows (wet) suppression pools to be removed from this design.
9. The containment structure is a vertical cylinder 17.5 metres diameter and 38 metres high constructed with steel-plate composites. As a result of the integration of the dryer and steam separators into the RPV, all BWRs need tall RPVs and containment structures. This height challenge is even greater on the BWRX-300 because of the chimney included in the design to facilitate natural circulation. The approach taken by the BWRX-300 designers is to deeply embed the RPV and containment structure within in a cylindrical and largely below grade reactor building. This is claimed by the RP to have advantages for mitigating the effects of aircraft impact, adverse weather, flooding, fires, and earthquakes, whilst also allowing fuel handing activities to be undertaken much closer to ground level than would otherwise be the case.
10. The major systems of the BWRX-300 design can be seen in Figure 1.
11. The reactor building and containment design are illustrated in Figure 2
12. The reactor building and the turbine building, along with the majority of the significant structures, systems and components (SSCs) are housed with the ‘power block’. The power block also includes the radwaste building, the control building and a plant services building. The site layout, including where the power block sits within the wider site, can be seen in Figure 3.

### ONR’s familiarity with the technology used in the BWRX-300

1. Whilst there is no operating BWR plant in the UK, ONR has previously performed a four-step GDA on the Hitachi-GE UK ABWR (ref. [9]). ONR intends to take learning from this previous activity, targeting the assessment on those aspects of the BWRX-300 which are novel or specific to this design and will not look to reassess inherent aspects of BWR technology which were considered in significant detail for the UK ABWR and judged to be acceptable. We will continue to target areas where the nuclear safety, security and safeguards implications are highest.

## Safety, security and safeguards cases

1. The RP has submitted information on its strategy and intentions regarding the development of the SSSE (refs. [10], [11], [12], [13]). This was submitted to ONR during Step 1; our views on this are detailed further in Section 4.3, but some of the key points are summarised below.
2. At the time of writing, the BWRX-300 design has not yet been constructed, and no formal international regulatory evaluations have been published. Therefore, there is no reference design, as seen in historic GDAs. However, GEH-A has set out to develop the BWRX-300 standard plant design so that it can be licensed in the US, Canada and Europe. To that end, it has chosen to develop the design and demonstrate its safety by closely aligning its approach with IAEA safety standards. With this approach, GEH-A supported Ontario Power Generation (OPG) in the production of a Preliminary Safety Analysis Report (PSAR) consistent with the IAEA’s safety guide for the format and content of NPP safety analysis report (ref. [14]) to support the deployment of BWRX-300s at the Darlington site in Canada. OPG submitted this PSAR to CNSC as part of an application for a licence to construct in October 2022. We understand an outcome from this application is due in 2025.
3. GEH-A has also been supporting the Tennessee Valley Authority (TVA) with the production of a PSAR to support an application to US NRC for a licence to construct at the Clinch River site. This PSAR is similarly based on IAEA standards but with some modifications to reflect US regulatory requirements. This PSAR has been drafted to support the same standard design as included in the OPG PSAR but revised to reflect the level of design maturity the BWRX-300 had reached in March 2024, with accompanying analysis updated (relative to the Darlington PSAR) for that design reference. At the time of writing, the Clinch River PSAR has not been submitted to the US NRC.
4. GEH-A has submitted directly to the US NRC a number of Licensing Topical Reports (LTRs) on specific topics with a view to derisking future regulatory evaluations of BWRX-300 licence applications. These have generally been in areas where there is perceived to be novelty or higher regulatory risks when compared to previous NRC-approved BWR designs, including the ESBWR.
5. For Step 2 of the GDA, the RP intends to submit a SSSE for the BWRX-300 that demonstrates that the standard BWRX-300 can be constructed, operated, and decommissioned on a generic site in GB such that a future licensee will be able to fulfil its legal duties for activities to be safe, secure and will protect people and the environment. The SSSE will comprise a Preliminary Safety Report (PSR) which also includes information on its approach to safeguards, a Generic Security Report (GSR), a Preliminary Environment Report (PER), and their supporting documents.
6. The format and structure of the PSR is expected to be consistent with Darlington and Clinch River PSARs (and therefore in line with IAEA standards) but supplemented with UK-specific aspects as necessary. The RP has stated that the design and analysis referenced in the PSR will be consistent with the March 2024 PSAR planned for submission to the US NRC. The GSR and PER will be for the same March 2024 design but will have more limited links to any US or Canadian submissions.
7. The first version (Revision 0) of the SSSE is expected to be received by regulators at the start of Step 2. An updated SSSE (Revision 1) is expected later in Step 2. Revision 1 of the SSSE will take into account regulatory feedback on Revision 0, along with any additional work or analysis conducted by the RP within Step 2.
8. All of ONR’s technical topics, as defined in Guidance to Requesting Parties (ref. [2]), are within the scope of the SSSE.
9. Should BWRX-300 projects be taken forward in GB beyond GDA Step 2, the RP and GEH-A intend to support their customers in developing the SSSE further, for example implementing the safety case strategies set out in the PSR to develop a site-specific pre-construction safety report (PCSR).

# Work carried out by ONR in consideration of this request

1. Guidance to Requesting Parties [2] details the activities that both ONR and the RP are expected to undertake in a GDA. This provided the framework for our work during Step 1.
2. To ensure that our activities were coordinated and delivered, we produced a delivery strategy [15] which outlines roles and responsibilities, key activities and assurance arrangements for the project. It also served as the project assessment plan for Step 1. It is intended that this strategy will provide the overarching framework for our regulatory assessments during this GDA, including how we will coordinate assessments across each of our technical topics. It will be kept as a live document and updated as the GDA progresses.

## Assessment of submissions

1. Appendix 2 of Guidance to Requesting Parties (ref. [2]) sets requirements on the RP for information to be submitted during Step 1. The requirements are summarised in Table 3 of this report along with reference to where they are documented, as appropriate.
2. To meet those requirements the RP submitted multiple documents to us covering all of the major topics expected in Step 1.
3. As described in Section 2.2, we assessed the RP’s submissions to form a judgement on whether the requirements had been met during Step 1. Details of our assessment of these submissions are in section 4.

## Interactions with the requesting party

1. During Step 1 we held more than 100 meetings with the RP at project and individual technical topic level. This included a four-day design familiarisation training session provided by the RP to improve our understanding of the design, approximately two topic-specific engagements in each of the 20 ONR topic areas, and monthly project and programme management meetings. We also started the assessment for the Management of Safety and Quality Assurance (MSQA) topic area, which included a specific targeted intervention to look at the RP’s arrangements and capability to support the GDA, and sought confirmation that the RP had adequate arrangements in place to meet the requirements of the Nuclear Industries Security Regulations 2003 (NISR) (ref. [16]).
2. Overall, the purpose of these engagements was:

* To seek assurance on the adequacy of the RP’s arrangements to undertake the GDA;
* To develop our understanding of the BWRX-300 design;
* To understand the structure and strategy for developing the SSSE ;
* To discuss submissions made during Step 1;
* To agree the GDA scope;
* To plan our assessments in each technical topic area for Step 2, including development of a schedule of any additional submissions required from the RP, in support of the PSR;
* To understand any commonalities in methodology and/or design between the historic ABWR design, which has already progressed through GDA in the UK, and the BWRX-300; and
* To understand any areas for collaboration between UK regulators and other international regulators.

1. During Step 1, we sought confidence that the RP had adequate arrangements in place to facilitate meetings between ONR and relevant RP’s personnel to share information and discuss technical matters.
2. These meetings have followed the intent of the interface arrangements [17], and have all been organised by the RP. Whilst further work is required by the RP in Step 2 to improve its planning and timeliness of meetings with the regulators, we are satisfied that the RP has adequate arrangements in place. This meets our expectations against requirement [1.26] in Guidance to Requesting Parties (ref. [2]).
3. We found the RP to be professional, responsive and open throughout our interactions. We have confidence that this constructive working relationship will continue throughout the GDA.

## Step 2 assessment plans and submissions schedule

1. The main deliverable produced from each of ONR’s technical topics is the assessment plan for Step 2. These outline the areas we intend to focus on to make a judgement on the fundamental adequacy of the design and SSSE, and the suitability of the methodologies, approaches, codes, standards and philosophies which form the building blocks for these areas. As part of this we have explicitly considered how our risk-informed and targeted assessment activities (ref. [18]) support the delivery strategy (ref. [15]) and the objectives for Step 2, such that we will produce a holistic, joined-up assessment of the overall design and SSSE.
2. To inform these plans, we have agreed with the RP a submission schedule for the documents to be provided to the regulators in Step 2 (ref. [19]). This schedule identifies when in Step 2 the submissions will be received by regulators. This is supported by the Master Document Submission List (MDSL) (ref. [20]) which defines all of the documents we expect to receive throughout Step 2, and identifies whether these documents have been submitted to regulators, withdrawn, or superseded; this meets requirement [1.19] from Guidance to Requesting Parties (ref. [2]). The MDSL will be maintained as live by the RP throughout GDA. At the end of Step 2, we expect the MDSL will have evolved to represent the final versions of all submissions made to the regulators, against which our Step 2 judgements will be based.
3. The RP has committed to providing one SSSE submission at the start of Step 2 which will form the bulk of the security, safety and environment considered for assessment (and some safeguards information). This will be based on the March 2024 standard design reference. The submission schedule identifies only a limited number of additional documents that will subsequently be provided for assessment over the course of Step 2, notably reports to support the safeguards, severe accidents analysis and electrical engineering topic areas.
4. The RP intends to provide a consolidated SSSE in July 2025 to incorporate any additions and clarifications to safety and security claims that stem from Step 2 regulatory engagements. It is anticipated that this updated SSSE will continue to be against the same March 2024 design reference; any design or analysis changes, whether they are due to GDA-specific engagements or routine development work overseas will not be included in the Step 2 submissions and instead will be identified for inclusion in future versions of SSSEs that support BWRX-300 projects in GB.

## Assessments performed by other regulators

1. ONR’s Guidance to Requesting Parties (ref. [2]) requirement [1.9] expects the RP to submit to ONR information on assessments performed by other regulators on the proposed design, including the current status of any reviews, any findings and any changes made or proposed as a result, including a judgement on their significance.
2. The RP submitted a report summarising the submissions it has made to US NRC and CNSC, as well as details on the BWRX-300 construction licence applications planned or made by TVA and OPG with the support of GEH-A (ref. [21]). This summary report has been reviewed by ONR specialist inspectors to inform our assessment planning, and we are content that it demonstrates the RP has undertaken a comprehensive review of assessments undertaken by other regulators and has robustly documented them all in a valuable submission.
3. The RP has also made available to us a copy of the Darlington PSAR submitted by OPG to CNSC in 2022. This has not been provided as a formal submission; we have been provided access to view it using GEH-A’s online document viewing platform – the “reading room”. We have no intention of assessing this extensive document written to support a construction licence elsewhere, however we have used it in Step 1 to gain regulatory confidence in the breadth and depth of the analysis we expect to receive in Step 2, and to inform areas of regulatory collaboration within our assessment plans.
4. In March 2024, ONR signed a tripartite Memorandum of Cooperation (MoC) with US NRC and CNSC on advanced reactor and small modular reactor technologies (ref. [22]). This has allowed ONR to join ongoing dialogues with US NRC and CNSC on the BWRX-300 (and other reactor technologies), and broader discussions involving TVA and OPG.
5. US NRC publishes on its website public versions of its completed evaluations of GEH-A topical reports (ref. [23] ) and joint reports produced with CNSC (ref. [24]), and therefore these are freely available to ONR to support its assessment of the BWRX-300. Through the MoC, we are able to talk in more detail about these evaluations and joint reports, and also gain access to non-public information. Of note, during Step 1 we have obtained details of US NRC’s independent modelling of the performance of the BWRX-300’s dry containment and CNSC’s ongoing assessment of GEH-A’s and OPG’s claims on the adequacy of the BWRX-300’s alternative shutdown systems. We have also observed US NRC and CNSC engagements on the BWRX-300’s defence in depth approach and probabilistic safety analysis.
6. The submission provided by the RP (ref. [21]) adequately addresses requirement [1.9] and has helped us to engage with US NRC and CNSC in an informed and targeted manner (to the benefit and efficiency of all three regulators). We have used the information it contains together with our conversations with US NRC and CNSC to develop an international engagement strategy (ref. [25]) which identifies where and how we would intend to leverage assessment work already completed by the other regulators and collaborate in ongoing or new areas.
7. This collaboration should have benefits for the efficiency and value of our Step 2 assessment, avoid the need for the RP to provide new or additional submissions in some areas, increases the likelihood of a standard BWRX-300 design that is acceptable in multiple regulatory regimes, and hopefully (through our contributions) help to improve the safety and security of the BWRX-300 (in the design and accompanying documentation) in other countries.

## Readiness reviews

1. As required by Guidance to Requesting Parties (ref. [2]) we undertook a readiness review to determine if the RP should proceed to Step 2. This included a review of our own readiness, but also considered the evidence provided by the RP of its readiness to proceed. The details of these reviews and their outcomes are provided in section 4.6.

## Joint working with the Environment Agency and NRW

1. As a joint project, we have worked collaboratively with both the Environment Agency and NRW during Step 1, as appropriate. This included joint meetings on matters of regulatory interest to each regulator, particularly for project and programme management, MSQA, aspects of radioactive waste management and chemistry. We expect this joint working to continue for the remainder of the GDA.
2. The environmental regulators’ assessment of the environmental aspects of the BWRX-300 design are reported separately (ref. [4]).

# Matters arising from ONR’s work

1. The matters arising from the work carried out by ONR are summarised as follows:

## RP’s arrangements for undertaking GDA

1. The RP has stated that it intends to complete a two-step GDA. The current schedule is for a 12-month Step 2; this corresponds to a total duration of GDA of 23 months from January 2024 to December 2025. We have agreed this overall GDA schedule which therefore fulfils requirement [1.3] of the Guidance to Requesting Parties (ref. [2]).
2. GDA represents a significant undertaking for both the RP and the regulators. One of ONR’s priorities during Step 1 is to determine that the working arrangements needed to facilitate the GDA are developed, agreed and embedded. These aspects are specified in Appendix 2 of Guidance to Requesting Parties (ref. [2]), as they are important enabling activities for conducting the technical assessments in Step 2.
3. The RP is supported by Amentum as its primary technical support contractor to adapt and supplement the available standard plant information to reflect the agreed scope of this GDA. Amentum staff are identified as technical leads and subject matter experts in many topic areas, supporting the RP’s licensing leads. Amentum also support the RP’s Regulatory Interface Office and Project Management Office functions under the instruction of the RP. Amentum has provided significant support in some topics, specifically where there is a difference in approaches or regulatory expectations in the UK compared to other countries.
4. However, we expect the RP to retain overall responsibility for, and control and oversight of, any work undertaken for the GDA process, including work carried out on its behalf by Amentum.

### Management system

1. To assess the adequacy and deployment of the RP’s Management System (MS), and to provide confidence that the RP has the controls and arrangements in place to deliver the GDA, we undertook an assessment in the MSQA topic area. This involved a targeted intervention combined with assessment of a sample of key documents from the RP. The following summary is consistent with ONR’s MSQA assessment (ref. [26]).
2. All of ONR’s MSQA interactions with the RP have been performed in conjunction with assessors from the Environment Agency.
3. Within GDA Step 1 and 2 the RP plans to use existing GEH-A project management and quality arrangements, supplemented by the RP’s Project Implementation Plan (PIP) (ref. [27]) to conduct its GDA activities in accordance with the procedures defined within the GE-Hitachi Nuclear Energy Quality Assurance Program Description (ref. [28]).
4. From our assessment, we are confident the PIP (ref. [27]) contains the necessary signposting to existing and supplementary GDA project management and quality arrangements (such as management arrangements for capturing assumptions, constraints, dependencies, requirements, risks and commitments in the generic SSSE) for Step 2.
5. We have assessed the RP’s procedures for controlling documented information, and have seen evidence of the GEH-A documentation which supports the project level documentation.
6. We have confidence that these arrangements, if adequately implemented, are capable of supporting delivery of documentation to suitable quality within Step 2 of GDA.
7. We consider, therefore, that the RP has made adequate progress towards establishing and deploying adequate management system arrangements to support its SSSE development activities. These are sufficient to satisfy requirement [1.27] in Guidance to Requesting Parties (ref. [2]).

### RP’s capability and capacity

1. At the start of Step 1, the RP in the UK was a very small organisation (in comparison with its much larger and more established US-based sister company, GEH-A). As a result, it initially faced difficulties deploying a UK-based team, and meeting timescales for regulatory deliverables. Gaining confidence in its ability to meet the growing requirements placed upon the RP as the GDA progressed was a priority activity for us in Step 1.
2. We therefore assessed the RP’s capability and capacity to undertake this GDA as part of our MSQA assessment (ref. [26]), and raised a Regulatory Query (RQ) to gain additional clarity. Regulatory queries are discussed further in Section 4.1.5 of this report.
3. In the response to the RQ (ref. [29]), the RP has provided evidence of GEH-A’s corporate arrangements (refs. [30]; [31]) which has provided regulatory confidence that the RP has adequate arrangements in place for:

* Resource allocation, and assignment of resources;
* Reviewing organisational capability and capacity;
* Defining, achieving and periodically evaluating the qualifications and experience of its employees; and
* Facilitating technical training and proficiency.

1. Based on this supplementary evidence and the growth in capacity and capability we have observed over the course of Step 1, we are content that the RP meets requirement [1.25] of Guidance to Requesting Parties (ref. [2]).

### Interface arrangements and information access

1. Interface arrangements (ref. [17]) have been agreed with the RP during Step 1 which detail the working level interfaces between the RP and regulators. These include the agreed system for transmission and tracking of submissions, correspondence, meetings, and regulatory questions. These arrangements have been successfully implemented during Step 1, considered as part of the readiness review for entry to Step 2, and are judged to be adequate. Any amendments to these will be part of normal business for the remainder of the GDA.
2. As part of implementing the interface arrangements, the RP has put arrangements in place that allows the regulators access to commercially confidential and proprietary information. These arrangements have been tested during Step 1, and we are content that they are adequate.
3. With regard to export control, the RP has informed us that it expects it will be necessary over the course of this GDA to transfer controlled nuclear information between the UK and a number of different organisations and corporate entities in the US, Canada and Poland. The RP has confirmed that GEH-A, GE-Hitachi Nuclear Energy International LLC and Global Nuclear Fuel-Americas LLC have the ability to transfer controlled nuclear information from the US to the UK under 10 CFR Part 810 General Authorisation and that the RP holds export licences for the transfer of controlled nuclear information from the UK to the GE-Hitachi US entities.
4. To support technical engagement activities, ONR has obtained export licences to allow for transfer of controlled information from ONR to the RP and GEH-A in the US and Canada.
5. We have applied for export control licences to enable transfer of export-controlled information to Poland and to Global Nuclear Fuel-Americas (a GE Vernova Inc.-led joint venture with Hitachi Ltd that is the proposed fuel vendor) to enable discussions with all potential members of the project. At the time of writing, these licences are not yet in place. However, we are content that absence of these export licences will not affect any meaningful engagements with the RP in Step 2 as we hold licences which allow us to transfer export-controlled information to the majority of the stakeholders.
6. We judge that the arrangements currently in place are sufficient to meet requirements [1.1], [1.4], [1.7] and [1.26] from Guidance to Requesting Parties (ref. [2]).

### Master document submission list

1. During the GDA the RP will make multiple submissions to ONR. The RP needs to have arrangements to keep track of the documents submitted, any subsequent changes to these documents, and any documents withdrawn. This also includes responses to regulatory questions and their incorporation within the SSSE documents.
2. Key to these arrangements is the MDSL, which is the live document that allows ONR to understand and reference the latest versions of the GDA submissions. The MDSL will be a key reference from the GDA statement. During Step 1 we worked with the RP to establish its arrangements to control and manage the MDSL.
3. The MDSL (ref. [20]) is a version-controlled document. GE-Hitachi have submitted 9 versions of the MDSL to ONR during Step 1, with routine updates planned to be supplied during Step 2 on a monthly basis. The arrangements for the development and maintenance of the MDSL are described in the PIP (ref. [32]). The scope and contents of the MDSL are consistent with ONR’s expectations. Maintenance of the MDSL will be an important activity for the remainder of the GDA.

### Regulatory questions

1. Guidance to Requesting Parties (ref. [2]) defines a hierarchy for regulatory questions that may be asked of the RP during GDA, which includes Regulatory Queries (RQ), Regulatory Observations (RO) and Regulatory Issues (RI). During Step 1 we sought confidence that the RP has arrangements in place to receive, process, respond and control these questions.
2. The RP has documented arrangements for managing RQs, ROs and RIs within the PIP (ref. [32]) which are consistent with the agreed interface arrangements [17]. These include the responsibilities for checking and approving the responses. During Step 2, when an increase in both the number and significance of regulatory questions is expected, we will monitor the ongoing implementation of these arrangements.
3. During Step 1, ONR raised nine RQs. Responses received to date have been in accordance with the interface arrangements (ref. [17]) and the RP’s procedures (ref. [32]), demonstrating the overall adequacy of these arrangements.

### Design reference

1. In accordance with Guidance to Requesting Parties (ref. [2]) the RP needs to have suitable arrangements to document and control the design ONR is assessing; in simple terms the generic safety, security and safeguards cases must align with the generic design. The RP is therefore required to submit a Design Reference (DR) which lists all the documents that define the design of the NPP. The RP is also expected to freeze the design at a specific date known as the Design Reference Point (DRP).
2. The RP describes the arrangements for the BWRX-300 design evolution and design reference in the Design Reference Report (DRR) (ref. [33]), including identification of the GDA reference design documents.
3. The RP has confirmed its intention to set the DRP at the start of Step 2 of the GDA and has scheduled submission of a final revision of the DRR accordingly. The RP has stated that the DRP for the GDA will align with a design freeze of the standard plant at March 2024, and that it does not intend to introduce any design changes throughout the course of the GDA. Therefore, the DR agreed at the start of Step 2 will be equivalent to the DRP for this GDA. There will be no further DRPs during the course of this GDA.
4. We are content that the scope and contents of the design reference have been agreed with ONR via the DRR (ref. [33]), and that there will be no routine updates to the DR. We are content that the RP has clearly stated its intent for the DRP. We judge that this meets requirement [1.22] of Guidance to Requesting Parties (ref. [2]).

### Change control

1. ONR’s Guidance to Requesting Parties (ref. [2]) sets an expectation that the RP puts in place arrangements to control changes to the generic design and SSSE. From a GDA perspective the regulators’ expectations are to ensure we have clarity over what is assessed and what any regulatory judgements and GDA outputs are made against.
2. As stated in section 4.1.6, the intent for the RP during GDA is not to implement any changes to the design beyond the initial DRP. The RP’s Forward Action Plan (FAP) (ref. [34]) presents a process for documenting prospective design changes that may occur as a result of this GDA project, but it does not intend to implement these until there is a GB project to deploy its reactor technology.
3. Therefore, during this GDA, the regulators do not need to consider the RP’s process for change control of the design reference. Our assessment will be against the design declared in the DRP at the start of Step 2.
4. During the MSQA engagement, we reviewed the FAP document (ref. [34]) and its associated procedures, and we are content that the RP and GEH-A have adequate arrangements in place for recording these prospective design changes.
5. Overall, we are satisfied that the RP and GEH-A arrangements for managing prospective design changes meet our expectations for a two-step GDA, satisfying requirement [1.27] of Guidance to Requesting Parties (ref. [2]).

### Capturing requirements, assumptions and commitments

1. As part of both this GDA and its ongoing BWRX-300 activities outside of the GDA and the UK, the RP needs to identify requirements, assumptions and commitments to be acted upon in any future NPP project. These could come via development of the design or SSSE. The organisation responsible for discharging these commitments could be the RP, or a future licensee. It is important that the RP has arrangements in place to record and control these, such that they can be fulfilled. In Step 1 we sought to understand how these important topics will be addressed.
2. The RP identified the FAP (ref. [34]) as its prime vehicle for detailing the arrangements for forward management of commitments, assumptions and requirements.
3. Whilst the FAP provided comprehensive evidence for the process for capturing commitments, assumptions and requirements arising from the development of the SSSE, it was not clear from the FAP how commitments identified for resolution after the GDA process were being identified and managed. We therefore raised an RQ to get further clarity on this issue (ref. [35]). The RP’s response (ref. [36]) stated that it anticipated that it would continue to identify further commitments, assumptions and requirements during the production of the SSSE, and throughout Step 2 engagements. These, and any commitments for resolution after GDA will be recorded in a forward action plan tracker, submitted to regulators in Step 2.
4. Whilst the arrangements for the management of commitments, assumptions and requirements were found to be adequate for this stage of the GDA, it is recognised that further work will be required by the RP in this area in Step 2.

### Summary

1. During Step 1 the RP has demonstrated an understanding of the arrangements needed to undertake the GDA. It has developed adequate processes and guidance documents, under an overarching Project Implementation Plan (ref. [32]) to undertake the two-Step GDA it has requested. We consider it a positive that the RP is building upon its existing arrangements, and introducing GDA specific arrangements where necessary.
2. Overall, we are content that sufficient progress has been made during Step 1, and plans for further development and implementation during Step 2 are acceptable.
3. We judge that this information, in combination with other information described in Section 4 of this report, is sufficient to meet requirements [1.1], [1.21], [1.22], [1.23], [1.24] and [1.27] from Guidance to Requesting Parties (ref. [2]).

## Agreement of the GDA scope

1. A fundamental objective of Step 1 is to agree the GDA scope between the RP and the regulators (ref. [2]). The GDA scope defines the boundaries of the GDA, and therefore influences both the submissions produced by the RP and the assessment undertaken by ONR. Throughout Step 1 we have engaged with the RP to discuss and agree the GDA scope and the associated schedules.
2. Based upon these engagements, the RP has documented the agreed GDA scope in an overall Scope of Generic Design Assessment report (ref. [37]). This is further supported by its Design Reference Report (ref. [33]) and the MDSL (ref. [20]). The GDA scope report documents the submissions which will be provided in each topic area during Step 2 and provides a brief overview of the physical and functional scope of the NPP that is proposed for consideration in the GDA. The DRR provides a list of the SSCs which are included in the scope of the GDA, and their relevant GDA reference design documents. When taken in totality, we are content that these documents provide sufficient information for us to understand the scope of GDA being proposed by the RP.
3. Through these three references (refs. [33], [20] and [37]), the RP has defined the following aspects as being within the scope of this two-Step GDA:

* A single unit site located within a generic GB coastal site, with a site environment bound by the defined Generic Site Envelope (GSE) (ref. [38]). The GSE is discussed further in Section 4.4.6;
* All SSCs on a generic site important for safety, security, safeguards and environmental protection throughout the lifecycle of the BWRX-300, although the design and SSSE is more developed for SSCs in the ‘power block’ than it is for the balance of plant;
* The following modes of operation:
  + At Power (full and low power)
  + Startup
  + All Shutdown modes
  + Refuelling
* All lifecycle stages but with the most focus on the operational stage of a BWRX-300’s lifecycle. Consideration of decommissioning will be limited to design provisions to support it and an estimate of decommissioning waste volumes. There will be some consideration of the construction stage, with regards the control of conventional safety risks on the construction site and the responsibilities of GEH-A under the Construction Design and Management Regulations 2015. The construction inspection for the deeply embedded reactor building and other structures will be addressed where these have the potential to affect the lifetime claims placed on these structures. No specific details of commissioning activities will be provided, however sufficient information will be provided of the generic principles and strategy for commissioning, the generic framework/plan for commissioning and a description how hazards and risk will be controlled during commissioning; and.
* The approach to developing operating limits and conditions.

1. As would be expected for a two-step GDA on a still evolving design, the RP has identified exclusions and limitations to the scope. The GDA scope document has been reviewed by all topic areas, and we are generally content that the exclusions are appropriate.
2. The identified three references do not explicitly detail what plant states will be considered in this GDA. However we are confident from our discussions with the RP and notably the BWRX-300 safety strategy (ref. [10]) that the SSSE will cover all plant states from normal operation through design extension conditions (DECs) in line with ONR and IAEA expectations.
3. Although this commitment to consider design extension conditions is noted, discussions and the review of submissions over the course of Step 1 established that the design of SSCs for DECs (and the accompanying severe accident analysis to demonstrate their effectiveness) was less mature than other parts of the design in March 2024. This resulted in the severe accident analysis section of the RP’s initial scope document defining a scope that was inadequate for a meaningful GDA. However, the RP has recognised this, and in Revision 2 of the scope document (ref. [37]) it has stated the scope in this area will be defined separately through ongoing regulatory discussions.
4. In the FAP (ref. [34]), the RP has committed to providing severe accident analyses with a supporting methodology report during Step 2 to supplement the contents provided in the initial submission of the PSR. This has also been captured on the submission list (ref. [19]). On this basis, the limitations in the GDA scope document are acceptable.
5. As a result, we are satisfied that the agreed GDA scope defined in ref. [37], in conjunction with the design reference report (ref. [33]) and MDSL (ref. [20]) is sufficient to undertake a meaningful fundamental assessment of the proposed BWRX-300 design. Further refinements or changes to the agreed GDA scope can be agreed as normal business for the remainder of the GDA.
6. We judge that this information is sufficient to meet requirement [1.2] from Guidance to Requesting Parties (ref. [2]).

## Status of the design and safety, security and safeguards cases

### Design maturity

1. The RP has proposed a single unit of its standard BWRX-300 design for GDA, based on the same March 2024 design freeze considered in the TVA PSAR. It characterises the design submitted for GDA as equivalent to a ‘conceptual full plant design’ as outlined in Guidance to Requesting Parties [2].
2. Despite this general characterisation, the RP states in references (ref. [37]) and (ref. [33]) that different parts of the NPP have reached different levels of maturity. The GDA Scope Report (ref. [37]) describes the RP’s design process that extends from baseline (BL) 0 (where functional requirements are defined) up to BL 3 (where the design is ready for construction). In the March 2024 design reference, SSCs in the power block are stated to be at BL1. BL1 is defined as:

* System interfaces established;
* (included) in an integrated 3D model;
* Instrumentation and control aspects have been modelled;
* Deterministic and probabilistic analysis has been undertaken; and
* System descriptions developed for the primary systems.

1. The balance of plant remains at BL0 for which only plant requirements have been established and SSC design remains at a high concept level.
2. As the design has continued to develop since March 2024, the RP has stated that many power block SSCs will reach BL2 whilst the GDA is underway. BL2 is characterised as the standard design being complete ready for construction planning and to support equipment procurement and fabrication. However, this design development is going on outside of GDA and the RP is not planning to introduce submissions reflecting this next level of design maturity during Step 2. However, we have undertaken an initial review of GEH-A’s corporate arrangements for managing design changes (ref. [26]) and are content that they are sufficient for us to enter Step 2, noting the RP’s position of not changing the design during GDA.
3. During Step 2, we will look again at the adequacy of the RP’s project arrangements, and wider GEH-A corporate arrangements to ensure we have confidence in how the design will have been controlled and managed between March 2024 and the commencement of any UK BWRX-300 project post-GDA.

### Safety, security and safeguards case

1. The RP intends to submit the SSSE at the start of Step 2 in four volumes that integrate environmental protection, safety, security, and safeguards. This will be accompanied by a head document, which will present the integrated GDA environmental, safety, security, and safeguards case.
2. For the safety case, the PSR will be submitted at the start of Step 2, which is aligned with the DRP. For the security topic, a GSR will be submitted during Step 2, and supported by a chapter in the PSR. The safeguards information will be presented as a chapter in the PSR and will be supported by a basic technical characteristics (BTC) submission in Step 2.
3. All four volumes will subsequently be consolidated to incorporate any commitments and clarifications identified in regulatory engagements, regulatory queries and regulatory observations, and will be resubmitted in July 2025. This consolidated revision will be the basis of the regulatory judgements reached in Step 2 and reflected in the GDA statement.

#### Safety Case

1. The BWRX-300 UK GDA Safety Case Development Strategy (ref. [13]) was submitted during Step 1, which describes the structure and chapter descriptions of the PSR. It also describes how the PSR will interact with the other three volumes of the SSSE.
2. The RP intends to follow a claim, arguments, evidence (CAE) approach. It is understood that the availability of the evidence will be limited in a two-step GDA, however, it is expected that evidence will be provided on request as part of a sampling approach to gain an appreciation of how the RP has set out to substantiate the claims and arguments it is making.
3. The PSR structure follows the IAEA guidance on the format and content of a safety analysis report (ref. [14]), with some additional chapters that are within the agreed scope of GDA but not specified in the international guidance (notably chemistry, conventional safety and life fire safety). The PSR also documents the approach to meeting the UK-specific safety case objective to demonstrate that risks have been reduced as low as reasonably practicable (ALARP).
4. We are satisfied that the RP has taken cognisance of relevant good practice, and that the format and proposed content of the PSR will be suitable to enable us to undertake a meaningful assessment.

#### Security Case

1. The RP submitted its security design assessment strategy (ref. [12]) which outlines its approach to its security case. The RP initially proposed to submit a preliminary security report (PSyR) in Step 1, and a GSR by the end of the Step 2. However, due to constraints on the ability to transfer US safeguards information (SGI) between the UK and US, the RP now intend to submit the GSR and a security chapter within the PSR at the beginning of Step 2, and a consolidated security submission towards the end of Step 2 to incorporate the findings from the ONR assessments and any commitments made in response to regulatory queries.
2. Although we have been unable to review the PSyR, an overview of the security case was presented to regulators (ref. [39]) in Step 1. The RP has provided a comprehensive plan of submissions for Step 2, along with a high-level preview of the format the submissions will take. The RP has provided assurances that it will be able to overcome the SGI challenges and submit an adequate security case to enable a meaningful assessment in Step 2.
3. We are therefore content that the RP will be able to provide a proportionate demonstration of the security methodologies during Step 2. We are satisfied that this meets requirements [1.18] and [1.19] of Guidance to Requesting Parties (ref. [2]).

#### Safeguards Case

1. The RP has elected to produce a safeguards specific chapter within the PSR in Step 2, and provide a BTC towards the end of Step 2 to provide further details of its nuclear material accountancy and control case.
2. The regulatory requirements in the Nuclear Safeguards (EU Exit) Regulations 2019 (NSR19) (ref. [40]) are for the operator/licensee of the reactor, with information only required to be provided when the decision to construct or authorise construction is made. The RP has committed to providing a generic BTC during GDA for the generic design. Although this isn’t a requirement of GDA, it provides confidence that the RP understands the UK safeguards requirements prior to the first formal legislative requirements. The RP have committed to voluntarily providing this information to ONR before completion of Step 2.
3. We have undertaken a number of engagements to confirm that the RP has a satisfactory understanding of safeguards requirements at the generic (international/national) level, and how they will be accommodated in the generic design (ref. [41]).
4. From our engagements, we are content that the RP has demonstrated an adequate understanding of these requirements, and we consider it positive that the RP has committed to providing additional documentation in Step 2 to provide further information on its nuclear material accountancy and control case and BTC.
5. Whilst it is recognised that there is more work to do in Step 2, there are no fundamental concerns with the RP’s approach at this stage.
6. In summary, we judge that this information is sufficient to meet requirements [1.12], [1.18] and [1.19] from Guidance to Requesting Parties (ref. [2]).

## Information submitted during Step 1

1. Guidance to Requesting Parties (ref. [2]) contains several requirements for the RP to submit information to ONR during Step 1. This information is essential to enable us to gain familiarity with the RP’s design and safety, security and safeguards cases and approach, and for the RP to demonstrate an understanding of the regulatory expectations for GDA.
2. section summarises the information that has been submitted during Step 1 against each of those specific requirements. Note that the intention for such submissions was primarily to inform subsequent assessments in Step 2 and to build confidence in the RP’s ability to meet regulatory expectations. The technical content of these submissions has been reviewed to gain a view on maturity, relevance and consistency with our expectations. Where necessary we have raised RQs to clarify our understanding of the RP’s submissions against Guidance to Requesting Parties (ref. [2]), or to request further details. We have also provided feedback on submissions during our routine Level 3 and 4 engagements. In a number of cases the documents were revised and resubmitted to reflect the responses to our feedback.

### Design familiarisation

1. During Step 1 ONR has undertaken several design familiarisation activities to prepare for and aid the planning of the technical assessments in Step 2.
2. To facilitate this, the RP submitted a BWRX-300 general description document (ref. [6]) and held a four-day design familiarisation training session to brief the regulators on the generic design. These were supplemented by topic-specific meetings where the regulators took the opportunity to develop their understanding of the design in more depth.
3. Collectively these have increased ONR’s understanding of the design and provided useful information regarding the design, functions, justifications, and approaches likely to be adopted in future SSSE submissions. They formed the basis of the initial technical discussions between ONR and the RP during Step 1, and helped ensure agreement of the GDA scope and production of ONR’s assessment plans for Step 2.
4. We judge that this information is sufficient to meet requirement [1.8] from Guidance to Requesting Parties (ref. [2]).

### Fundamental design philosophy and engineering design principles

1. To allow ONR to understand the BWRX-300 design philosophy, the main design features, main safety and security claims including identification of hazards, control measures and protection systems, the RP submitted a suite of documents across the entirety of Step 1.
2. This included the BWRX-300 UK GDA Safety & Design Principles (Safety, Security, Environmental, Safeguards) in UK Context report [42] and the BWRX-300 Safety Strategy document (ref. [10]).
3. The BWRX-300 design evolution document (ref. [43]) also provided evidence of how the RP’s design philosophy had evolved, and the BWRX-300 UK Generic Design Assessment (GDA) Safety Case Development Strategy (ref. [13]) details the main safety claims. The Security Design Assessment Strategy (ref. [12]) identifies what the high-level format of submissions will be and the content that will be included to meet security expectations in a two-step GDA.
4. The BWRX-300 UK GDA Safety & Design Principles (Safety, Security, Environmental, Safeguards) in UK Context report (ref. [42]) provided evidence that there was alignment between the RP’s Safety and Design Principles and UK relevant good practice, as outlined in ONR’s SAPs (ref. [44]), SyAPs (ref. [45]), and safety, security and safeguards assessment guidance.
5. We consider that the submissions provided by the RP were sufficient to develop ONR’s understanding of the RP’s fundamental design philosophy during Step 1.
6. Specifically, we judge that this information is sufficient to meet requirements [1.10] and [1.15] from the Guidance to Requesting Parties (ref. [2]).

### Demonstration of ALARP

1. Guidance to Requesting Parties (ref. [2]) requirement [1.11] expects a description of the process being adopted by the RP to demonstrate compliance with the legal duty to ensure that the risks to human health arising from the operation of a NPP based on the proposed design are reduced to ALARP. The RP state that it is the intention of the PSR to demonstrate that the design decisions made in the development of the BWRX-300 meet the principles of ALARP.
2. The RP has submitted a number of documents which demonstrate that it has an understanding of the ALARP principle, such as the BWRX-300 UK Generic Design Assessment (GDA) Safety & Design Principles (Safety, Security, Environmental, Safeguards) in UK Context report (ref. [42]) and the Safety Case Strategy document (ref. [13]). The RP’s demonstration of its understanding of ALARP has been further reinforced through discussions we have had with the RP in our technical engagements.
3. The BWRX-300 has principally been developed in North America without explicit consideration of the ALARP principle. However, the design evolution document (ref. [43]) sets out how the BWRX-300 has been developed from previous BWR designs, taking into account relevant good practice and OPEX, as well as considering (and incorporating) reasonably practicable options to reduce safety risks. These aspects would all be relevant factors to include if an explicit ALARP process had been followed.
4. Within the RP’s readiness review, a high-level description of its ALARP process was provided (ref. [46]). The RP has committed to producing a formal document early in Step 2 which documents the process being adopted. This commitment is captured in the FAP (ref. [34]) as a formal action, and the MDSL submission (ref. [20]).
5. We are therefore satisfied that the submissions provided to date, and our engagements with the RP are adequate to meet our expectations against requirement [1.11] from Guidance to Requesting Parties (ref. [2]).
6. The most significant vehicle for the RP to explain how a future licensee could demonstrate that the design of the BWRX-300 has reduced risks ALARP will be the PSR section of the SSSE due at the start of Step 2. The assessment of the PSR, which will include the ALARP approach will be central to ONR’s assessment activities in Step 2.

### Compliance with NISR 2003

1. NISR 2003 places requirements on dutyholders regarding physical security measures for facilities, cyber security, nuclear material and the security of Sensitive Nuclear Information (SNI). During a two-step GDA, the expectation is for the RP to demonstrate that its generic design is likely to be able to meet such requirements. This is addressed within the Project Security Plan (ref. [47]) and Security Design Assessment Strategy (ref. [12]), and it is the RP’s stated intention to address relevant matters during this GDA.
2. The Project Security Plan (ref. [47]) has been reviewed by specialist inspectors. We judge that the document contains sufficient detail to have confidence that requirement [1.12] can be met in that there will be continued compliance with NISR 2003.
3. We consider that the information provided by the RP is sufficient to meet requirement [1.12] from Guidance to Requesting Parties (ref. [2]).
4. NISR 2003 also places requirements on dutyholders for handling and protecting security marked documentation, including identifying any SNI. The Project Security Plan (ref. [47]) contains arrangements for handling and protecting security marked documentation, and our security inspectors have confirmed that Amentum, as the RP’s main contractor, have appropriate vetting processes to support the project and obtain the relevant security clearances for staff supporting this GDA (ref. [48])
5. We are therefore content that the RP meets the requirements of NISR 2003 in this regard and the expectations of requirements [1.5] and [1.6] of Guidance to Requesting Parties (ref. [2]).

### Regulatory framework and principles

1. All RPs are expected to demonstrate understanding of the UK regulatory framework and principles, including how these will be considered within the design and safety, security, and safeguards cases. The RP has submitted its BWRX-300 UK GDA Safety & Design Principles (Safety, Security, Environmental, Safeguards) in UK Context report (ref. [42]) to demonstrate its understanding of the UK regulatory framework.
2. We have reviewed this report, and we are content that it adequately demonstrates that the RP understands the nuclear regulatory framework and regulatory principles in GB, and how these have been (or will be) considered as part of the design and generic safety and security cases for the proposed design.
3. The RP has submitted a suite of additional documentation to demonstrate its understanding of defence in depth and its approach to categorisation and classification against UK regulatory requirements (refs. [10], [13], [49] and [50]). Its approach aligns with IAEA SSR 2/1 – Safety of Nuclear Power Plants: Design (ref. [8]) and SSG 30 - Safety Classification of Structures, Systems and Components in Nuclear Power Plants (ref. [51]). We are content with this approach.
4. The BWRX-300 UK GDA Safety & Design Principles (Safety, Security, Environmental, Safeguards) in UK Context report acknowledges that the classification and categorisation report (ref. [42]) does not address security categorisation and classification or environmental protection functions, and the RP has committed to resolve this during Step 2. We raised a RQ (ref. [35]) to address this gap, and to better understand the extent that categorisation and classification will be applied to BL0 SSCs​.
5. However, we are content that the RP has demonstrated sufficient understanding of UK requirements and is adopting an internationally recognised approach to both defence in depth and classification and categorisation.
6. We consider it positive that the RP has undertaken a comprehensive gap analysis, and has committed to resolving the gaps identified. This will remain an area of focus for ONR within Step 2.
7. We are content that these reports meet the expectations of requirement [1.13]. of Guidance to Requesting Parties (ref. [2]).

### Site characteristics

1. The RP submitted its GSE report (ref. [38]) which bounds the site characteristics of a potential GB site. This submission was reviewed by our specialist inspectors, and we are content that the scope and coverage of the GSE is reasonable, that it is suitably representative of a generic GB site and is consistent with previous GDAs. The GSE is intended to bound the declared candidate sites for deployment of the BWRX-300 within the extant national policy statement (ref. [52] [52]). During Step 2 we will assess the adequacy of the values proposed by the RP.
2. We judge that this information is sufficient to meet requirement [1.16] from Guidance to Requesting Parties (ref. [2]).

### Codes and standards

1. During Step 1, the RP has submitted multiple documents to support requirement [1.17] of Guidance to Requesting Parties (ref. [2]). This includes an Applicable Codes, Standards, and Regulations List (ref. [53]), which provided a list of regulations, codes, and standards that make up the generic design basis list.
2. The RP have also submitted a codes and standards report (ref. [54]), which presents its methodology and assessment of the BWRX-300 codes and standards listed in the Applicable Codes, Standards, and Regulations List (ref. [53]) with respect to those codes and standards that are considered relevant good practice within the UK.
3. The documents were reviewed by all specialist topic inspectors, and subsequently discussed in topic specific meetings. From our review of the documents, we are content that the RP has identified the principal codes and standards applied to the SSCs important to safety within the power block, and where any gaps are identified, has established a forward action plan to address these gaps.
4. We are therefore satisfied that requirement [1.17] from Guidance to Requesting Parties (ref. [2]) has been fulfilled.
5. The codes and standards applied to the BWRX-300 design will continue to be of regulatory interest and will form an important part of ONR’s Step 2 assessment.

### Gap analysis

1. Guidance to Requesting Parties (ref. [2]) requires the RP to undertake a gap analysis of the submissions planned to support Step 2 against regulatory expectations and to propose how any identified gaps will be resolved.
2. It was necessary to raise several regulatory queries (ref. [35]) to understand exactly which of the RP’s activities in Step 1 addressed the requirements to undertake a gap analysis and how the outputs were captured and controlled.
3. Through our Step 1 engagement, we were able to establish that the RP has undertaken appropriate reviews with the assistance of its UK-based supply chain partner Amentum. Aspects of these reviews were captured in the Safety & Design Principles in UK Context document (ref. [42]) and it was also an integral input to the chapter specifications used by the RP and Amentum to adapt and supplement overseas PSARs for SSSE GDA submissions.
4. In a number of areas, the RP has self-identified gaps that will not be addressed in the start of Step 2 SSSE submissions. It initially stated that these would be identified in its FAP document. However, examination of Revision 0 of this document which was submitted in Step 1 (ref. [34]) identified just 12 forward actions, all of which were scheduled to be completed over the course of the GDA. It was unclear if all of these actions would be completed in time for assessment during Step 2, and it provided no details on any actions against its own delivery phase categories of ‘during PCSR development’ and ‘before site licence application’.
5. The RP has subsequently clarified which of the 12 forward actions will result in submissions for assessment and consideration in GDA and which will not. It has also stated that SSSE chapters will include additional commitments to be addressed post-Step 2 in the different delivery phases, and there will be an accompanying revision of the FAP document.
6. Ultimately, we are content that the RP and its supply chain partner have undertaken a systematic review to identify gaps against UK regulatory expectations that is sufficient to give us confidence that the SSSE will be adequate for a meaningful GDA, and we will have visibility early in Step 2 of all self-identified actions to be addressed post-Step 2. The established process should also be adequate to capture new gaps identified through interactions with ONR during Step 2.

### Public comments process

1. Requirement [1.28] of Guidance to Requesting Parties (ref. [2]) requires the RP to put arrangements in place to facilitate a public comment process which should run for the duration of GDA from the start of Step 2. The RP provided us with a copy of its work instruction for managing public enquiries for information. The RP also provided regulators with access to its draft website which enabled us to view the content of the webpages. We have reviewed this and provided feedback, which the RP has actioned. We are satisfied therefore that requirement [1.28] has been fulfilled.
2. The RP is expected to launch its website with a public comment process and public versions of its SSSE at the start of Step 2.

## ONR’s Step 2 assessment plans

1. ONR has produced a total of 19 assessment plans for Step 2. These cover each of the technical topics that will assess the RP’s submissions (although for this specific GDA, we have chosen to integrate the assessment of severe accident analysis into the deterministic fault studies assessment). All the plans are consistent with our delivery strategy (ref. [15]).
2. Our assessment plans have been informed by:

* The agreed GDA scope (ref. [37]);
* Our understanding of the generic design and SSSE;
* Discussions with the RP to understand the scope and maturity of submissions planned for Step 2;
* The submissions received from the RP during Step 1;
* Available information from US NRC’s and CNSC’s evaluations of the standard BWRX-300 design to date, and discussions with the two regulators enabled by the MoC; and
* Consideration of ONR’s GDA of the UK ABWR design.

1. The SSSE submissions we need to assess during Step 2 have formed the basis of the RP’s submission schedule (ref. [19]). The provision of this schedule satisfies requirement [1.19] of Guidance to Requesting Parties (ref. [2]).

## Readiness reviews

### RP readiness review

1. In accordance with requirement [1.30] of Guidance to Requesting Parties (ref. [2]), the RP undertook a self-assessment and review of its readiness to proceed to Step 2 of the GDA. The evidence presented to ONR to support the outcomes of this review is captured in the BWRX-300 UK Generic Design Assessment (GDA) Step 2 Readiness Review report (ref. [46]).
2. The report states the purpose of the report is to:

* Document the process followed for the RP’s GDA Step 2 Readiness Review;
* Summarise the evidence against which readiness is judged through self-reflection;
* Detail the outcome (recommendations and graded forward actions) of the independent panel review of readiness;
* Provide the decision of the project board.

1. The evidence needed to assess the readiness of the RP to proceed to Step 2 was gathered by the RP and Amentum. This evidence was then reviewed by an independent panel of GEH-A employees, and the ultimate decision for readiness was made by a GDA Project board.
2. The judgement of readiness and evidence gathering was made against the requirements in Guidance to Requesting Parties (ref. [2]). The RP split the requirements into a project evidence summary section, and an organisational readiness summary section.
3. The outcome of the readiness review is described in the report (ref. [46]). This includes a statement of readiness against each requirement in Guidance to Requesting Parties (ref. [2]), and reference to the evidence to support that status.
4. The RP also undertook a review of its capacity and capability to undertake the GDA and concluded that it had sufficient resources in place. This satisfies requirement [1.25] of Guidance to Requesting Parties (ref. [2]).
5. The RP concluded that it was ready to enter Step 2, and the report (ref. [46]) highlighted four recommendations related to scheduling, project escalation and oversight, and resources. The RP did not consider that these recommendations prevented it from entering Step 2.
6. We are content that the readiness review accurately reflects the position of the RP at the end of Step 1. The report was well balanced, and accurately reflected the challenges the RP has faced, especially around deploying a UK team, and proposed proportionate solutions. The independent review was robust. We are content that that gaps identified will not prevent the RP from entering Step 2. However, we intend to seek assurances during Step 2 that the areas for improvement are being resolved.
7. For requirement [1.29] of Guidance to Requesting Parties (ref. [2]), an appropriate charging agreement needs to be in place between ONR and the RP to cover the costs of the remainder of the GDA. The charging agreement signed between ONR and RP in January 2024 (Ref. [55]) explicitly covers the entirety of a two-step GDA culminating in the issue of a GDA Statement. It does not include any provision for moving into Step 3. It includes a fixed cap on ONR’s costs that requires agreement to be increased. We have reviewed the assumptions that were made to calculate the original price cap against current schedule and scope proposed for the remainder of the GDA, and we are satisfied the current charging agreement remains adequate to deliver Step 2.
8. On this basis, we are satisfied the RP is ready to start Step 2.

### ONR readiness review

1. In line with the requirements of Guidance to Requesting Parties (ref. [2]), we undertook a review of our own readiness to progress to Step 2 (ref. [56] [57]). In addition to considering the outcomes from the RP’s readiness review, we also confirmed that we:

* Agree that the RP has met requirements [1.1] to [1.30] of Guidance to Requesting Parties (ref. [2]), see Table 3, as described in this report;
* Have completed all of the requirements against us as defined in Appendix 2 of Guidance to Requesting Parties (ref. [2]), namely [1.31] to [1.40];
* Have implemented suitable project management and arrangements to undertake the GDA;
* Have secured sufficient internal resources to undertake the activities identified in our assessment plans for Step 2
* Have taken account of the outcome of the Environment Agency’s own readiness review and NRW’s position; and
* Consider that, based on the agreed GDA scope (ref. [37]) and submission schedule (ref. [19]), the assessment will remain meaningful during Step 2, and warrants the continued deployment of regulatory resource.

1. The outcome from our readiness review is that we consider we are ready to proceed to Step 2 of GDA for the BWRX-300.

# Conclusions

1. This report summarises our assessment of the BWRX-300 at the end of Step 1 of the GDA. In this step we have initiated the project and developed our understanding of the design, the SSSE, and the RP’s capacity and capability. We have agreed the GDA scope and schedule and a submission schedule for Step 2. This has allowed us to plan for our fundamental assessment to begin in Step 2 and to develop detailed assessment plans for each of our technical topics. As the RP does not intend to make any design changes during the course of the GDA, our judgements will be against the DRP declared at the start of Step 2.
2. Based on the work carried out by ONR, we are satisfied that:

* The RP has completed all the requirements for Step 1 from our guidance;
* Interactions with the RP throughout Step 1 have been professional and constructive, and we have confidence that this will continue;
* The RP has made good progress in developing its organisation and arrangements to support GDA;
* The agreements necessary to undertake the GDA are in place, or have developed sufficiently for this point in the project with clear plans for further development;
* The RP has demonstrated a good understanding of our regulatory expectations and has confidence that these can be met by its design and safety, security and safeguards case;
* We have improved our understanding of the BWRX-300 design and SSSE, and have used this to inform our planning for further assessment activities; and
* We, and the RP, are ready to proceed to Step 2 of the GDA.

1. We will continue to rigorously assess the RP’s submissions in line with our assessment plans and will address any potential matters of concern should they arise. We will continue to assess the effectiveness of the RP’s arrangements to deliver an adequate, holistic SSSE for its generic design. We have planned our assessments across the 20 technical topics we will assess to ensure we deliver a holistic fundamental assessment of the generic BWRX-300 design during Step 2, taking cognisance of work undertaken during the historic assessment of the ABWR, and by overseas regulators.

# Recommendations

1. Based upon the work described in this report, we recommend that ONR should proceed to Step 2 of the GDA for the BWRX-300 design.

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# Tables

Table 3 - Step 1 requirements from Guidance to Requesting Parties (ref. [2])

|  | Requirement on the RP during Step 1 | Section |
| --- | --- | --- |

|  |  |  |
| --- | --- | --- |
| [1.1] | Agree with ONR interface arrangements to be applied throughout GDA | 4.1.3 |
| [1.2] | **Agree with ONR** the GDA scope, to ensure that the assessment is meaningful | 4.2 |
| [1.3] | **Agree with ONR** the overall GDA timescales and associated schedule, including subsequent steps | 3.3  4.1 |
| [1.4] | **Put arrangements in place** to ensure that ONR will have full access to any commercially confidential information necessary for it to complete its assessments at each step; this must also include relevant commercial information which is the property of third parties. ONR expects this information to be made available in ONR’s offices | 4.1.3 |
| [1.5] | **Put arrangements in place** for handling and protecting security marked documentation, including identifying any SNI. ONR expects the RP’s document classification scheme to be compatible with the Government Security Classifications | 4.4.4 |
| [1.6] | **Obtain** all necessary personnel security clearances for all staff who will be supporting GDA | 4.4.4 |
| [1.7] | **Obtain** all necessary export licenses to ensure that information can be transferred to and from the UK, and other relevant countries where information transfer is necessary as part of GDA | 4.1.3 |
| [1.8] | **Submit to ONR** design familiarisation information. This should include sufficient information to provide ONR with an overall understanding of the safety and security of the proposed design, in line with the agreed scope for GDA. This should also include information on the current status of the design and the identification of any aspects where development is still required, alongside an indication of what this may entail and likely timescales. The RP should identify any distinguishing features of the design | 4.4.1 |
| [1.9] | **Submit to ONR** information on assessments performed by other regulators on the proposed design, including the current status of any reviews, any findings and any changes made or proposed as a result, including a judgement on their significance | 3.4 |
| [1.10] | **Submit to ONR** a description of the fundamental design philosophy and identification of the main safety and security claims including identification of hazards, control measures and protection systems | 4.4.2 |
| [1.11] | **Submit to ONR** a description of the process being adopted by the RP to demonstrate compliance with the legal duty to ensure that the risks to human health arising from the operation of a power station based on the proposed design are reduced to ALARP | 4.4.3 |
| [1.12] | **Submit to ONR** a description of the process being adopted by the RP to demonstrate compliance with the requirements of the Nuclear Industries Security Regulations (NISR) | 4.4.4 |
| [1.13] | **Submit to ONR** evidence of the RP’s understanding of the nuclear regulatory framework and regulatory principles and how these have been (or will be) considered as part of the design and generic safety and security cases for the proposed design. This should include matters such as:   1. the approach to categorisation of safety functions and classification of structures, systems and components 2. the development of a schedule of faults (including internal events and internal and external hazards), including protection and mitigation measures and the links this has to the associated engineering 3. an understanding of the approach adopted to defence in depth and the hierarchy of controls, including consideration of matters such as common cause failure, segregation, redundancy and diversity | 4.4.5 |
| [1.14] | **Submit to ONR** information about the reference design (or designs) on which the generic safety and security cases are based, if appropriate | 2.5 |
| [1.15] | **Submit to ONR** the RP’s own design, security and safety principles adopted in the proposed design | 4.4.2 |
| [1.16] | **Submit to ONR** a definition of the site characteristics to be used as the basis for the safety analysis (the 'generic site envelope') | 4.4.6 |
| [1.17] | **Submit to ONR** a description of the codes and standards which have been used as part of the proposed design, including the identification of any non-conformances | 4.4.7 |
| [1.18] | **Put arrangements in place** for development of the safety and security cases. **Agree with ONR** the approach for structuring the generic safety and security cases and their format, including the intentions for using existing information throughout GDA. This should include details of existing safety and security case information and its availability. Where existing information is to be used the scope, background and regulatory basis of this information should be specified | 4.3 |
| [1.19] | **Agree with ONR** a schedule of generic safety and security case information which will be submitted to ONR ahead of, and during Step 2. **Submit to ONR** any information agreed for submission during Step 1 | 3.3  4.3 |
| [1.20] | **Undertake** a gap analysis of the submissions identified to support Step 2 against regulatory expectations. Where gaps are identified the RP should **agree with ONR** a resolution plan which identifies what those gaps are, how they may be resolved and the timescales for doing so. | 4.4.8 |
| [1.21] | **Agree with ONR** the scope and contents (template) of the Master Document Submission List (MDSL) and any required arrangements for handling it, including provision of routine updates. **Submit to ONR** the MDSL in accordance with the RP’s arrangements and any updates necessary throughout the step | 4.1.4 |
| [1.22] | **Agree with ONR** the scope and contents of the Design Reference (DR) and any required arrangements for handling it, including routine updates, and the intent for the Design Reference Point (DRP) | 4.1.6  4.1.7 |
| [1.23] | **Put arrangements in place** for capturing commitments, assumptions and requirements identified in the generic safety and security cases | 4.1.8 |
| [1.24] | **Submit to ONR** responses to any questions raised by ONR during its assessment (RQs, ROs and RIs) | 4.1.5 |
| [1.25] | **Obtain** sufficient resources to support completion of GDA. This should include technical, regulatory, front office, interface and management resources, as necessary, and may include third-party support. The RP should **submit to ONR** information regarding its intentions for evolution of its GDA resources and a demonstration of the on-going sufficiency of resources to be applied through the step | 4.1.2 |
| [1.26] | **Put arrangements in place** to facilitate meetings between ONR and relevant RP’s personnel to share information and discuss technical matters | 4.1.3 |
| [1.27] | **Submit to ONR** a demonstration of the adequacy of the RP’s arrangements, including:   1. project management arrangements and quality management system 2. the DR change control process to be applied during GDA, including the RP’s decision making arrangements for safety and security related matters 3. arrangements and timescales for responding to ONR assessment 4. arrangements for ensuring that the designers, and generic safety and security case authors and approvers are suitably qualified and experienced persons 5. the generic safety and security case developer's quality control, including peer review arrangements | 4.1 |
| [1.28] | **Put arrangements in place** to facilitate a public comment process which should run for the duration of GDA. This should include:   1. Host a public website containing information on the proposed design and generic safety and security cases, and including the means to submit comments 2. **Agree with ONR** what information will be published on the RP’s website (following removal of commercial and security related information) to allow comments to be made by the public during GDA, including updates when a significant change is made to the information submitted to ONR 3. **Agree with ONR** the process and timescales to be adopted for responding to public comments | 4.4.9 |
| [1.29] | **Agree with ONR** any extended or revised cost recovery agreements. This should cover the remainder of all subsequent steps | 4.6.1 |
| [1.30] | **Undertake** a review of its readiness to begin Step 2 and **submit to ONR** evidence to support the outcomes | 4.6.1 |

# Figures

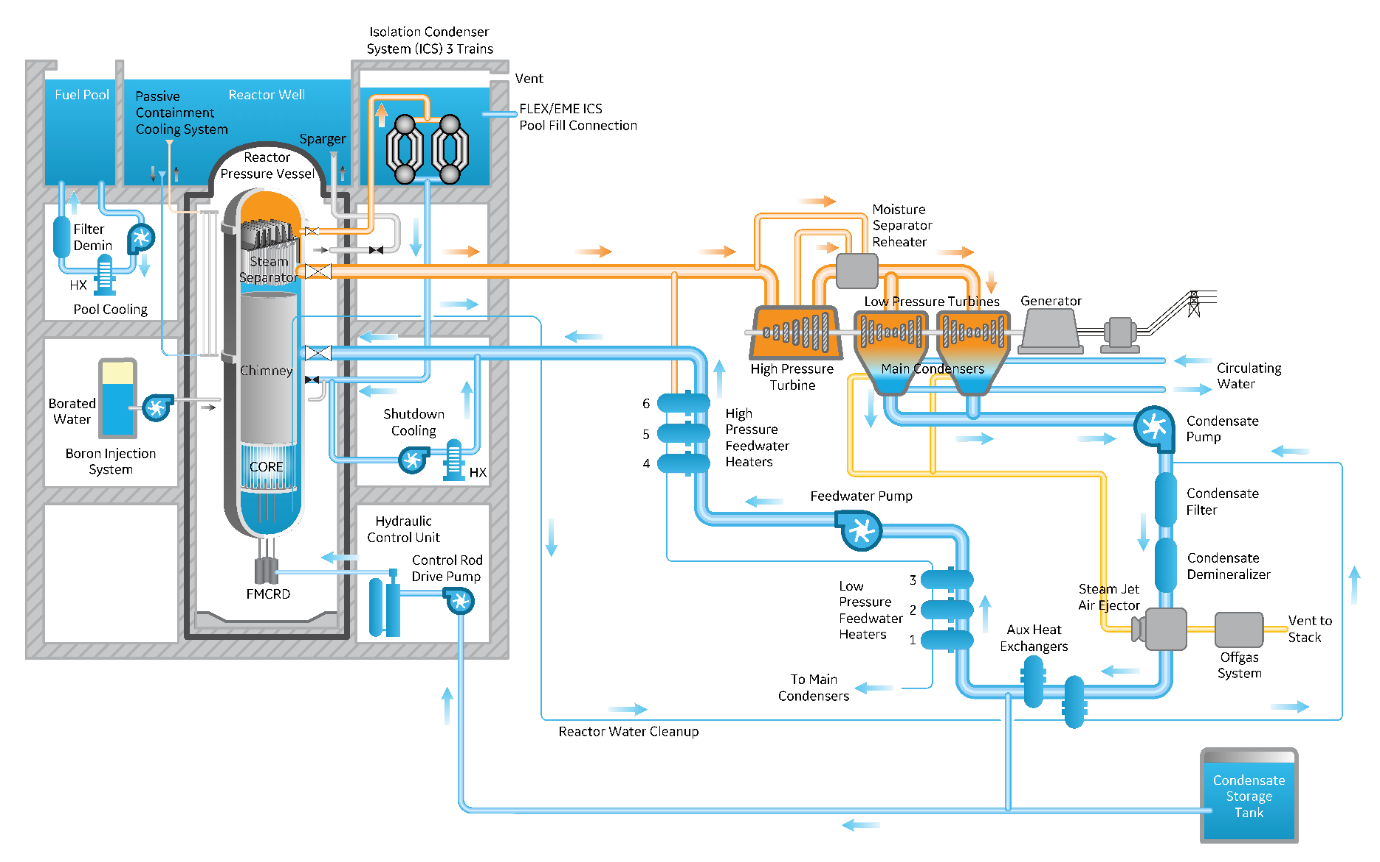


Figure 1 - BWRX-300 Major systems

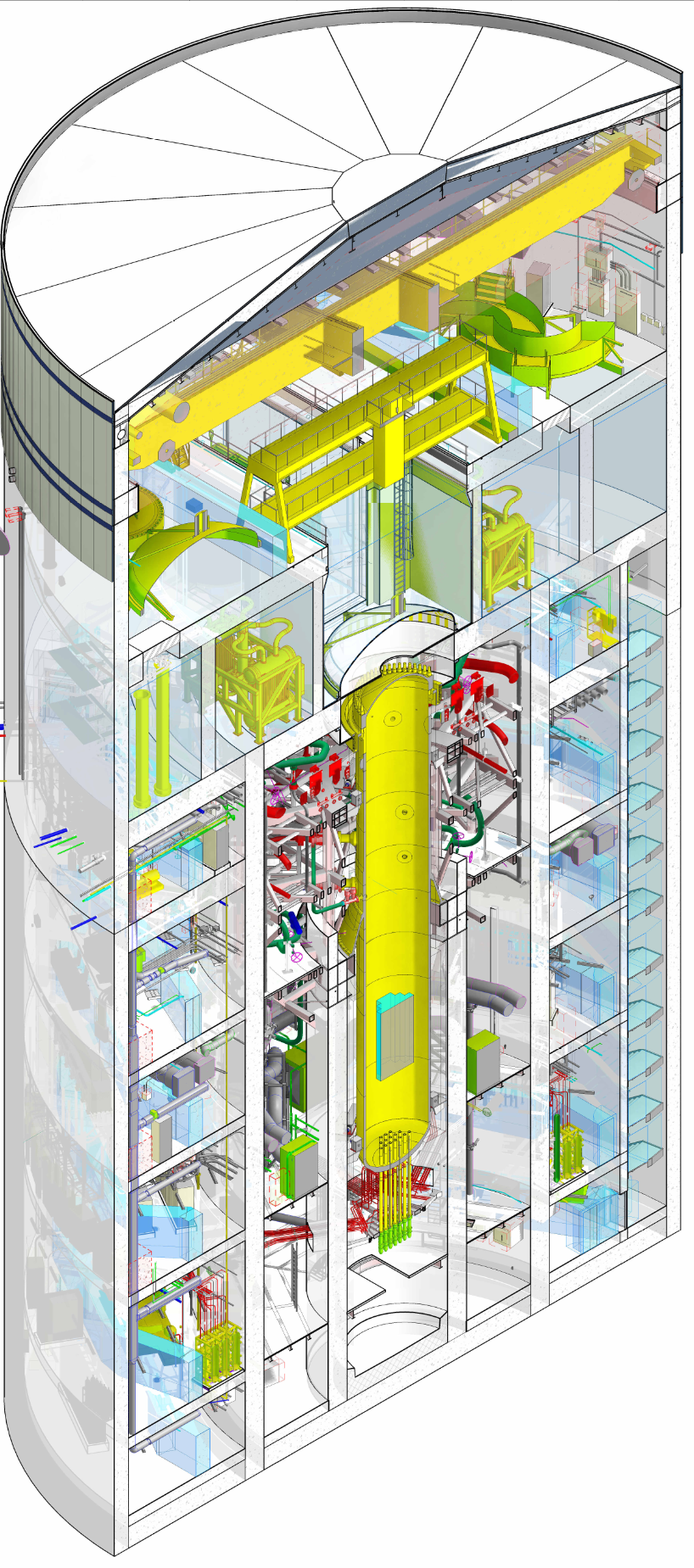


Figure 2 - BWRX-300 containment structure

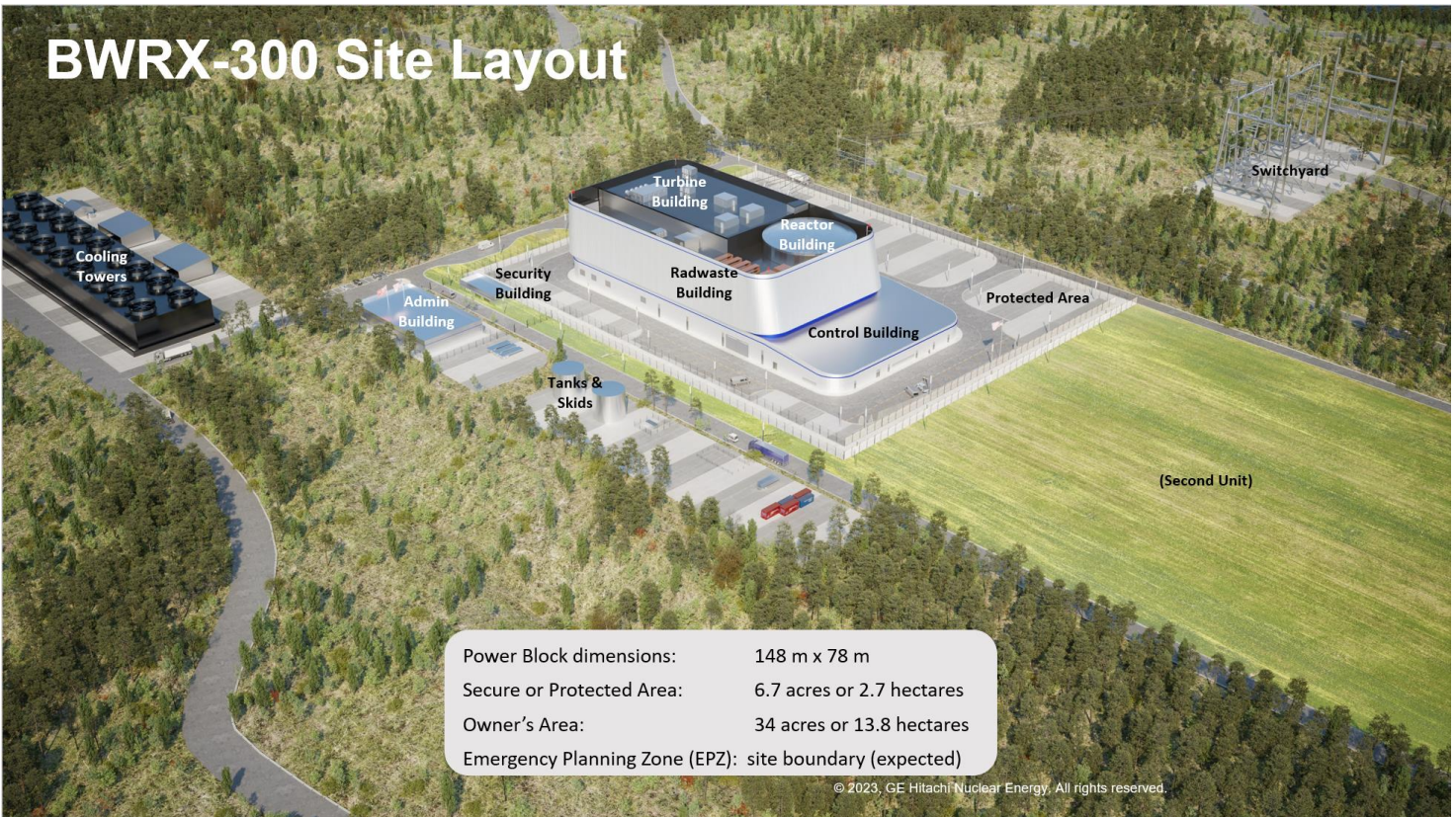


Figure 3 - BWRX-300 reactor power block and generic site layout