

**Hitachi-GE Nuclear Energy, Ltd.**  
**UK ABWR GENERIC DESIGN ASSESSMENT**  
**Resolution Plan for RO-ABWR-0033**  
**Hitachi-GE Nuclear Energy Ltd. Baseline HF Assessment**

<b>RO TITLE:</b>	Hitachi-GE Nuclear Energy Ltd. Baseline HF Assessment	
<b>REVISION :</b>	2	
<b>Overall RO Closure Date (Planned):</b>	30 Nov. 2015	
<b>REFERENCE DOCUMENTATION RELATED TO REGULATORY OBSERVATION</b>		
<b>Regulatory Queries</b>	RQ-ABWR-0168, 0171	
<b>Linked ROs</b>	-	
<b>Other Documentation</b>	-	

<b>Scope of work :</b>
<p><b>Background</b>  ONR's Step 2 review of the RP's baseline HF assessment and its subsequent detailed assessment concluded as follows:</p> <ul style="list-style-type: none"> <li>• The baseline HF assessment reflects arguments for the existence HF adequacy, rather than a specific evidence base.</li> <li>• The baseline HF assessment makes many claims relating to the efficacy of the HFI processes applied to the ABWR which have some face validity. However, it is rare to find the claims supported by cogent arguments and underpinned by substantive evidence.</li> <li>• It seems that many aspects of the plant lifecycle (e. decommissioning, consideration of mis-diagnosis, spent fuel pond, radioactive waste management, and severe accident response) were not included in the J-ABWR design and safety case.</li> </ul> <p>During Step 2 two regulatory queries (RQ-ABWR-0168 and 0171) were raised. Hitachi-GE stated in its responses that it does not intend the conclusions of the baseline HF assessment to be human-based safety claims and the baseline HF assessment itself will not form part of their safety case moving forward.</p> <p>However, ONR regards that the baseline HF assessment and its conclusions form an explicit part of the PCSR. And the baseline HF assessment and its referenced documents provide the main source of evidence for the Level 1 Human-Based Safety Claim: "The ABWR plant has a long operating history which includes widespread consideration of HF and human error in the genesis from BWR to ABWR, and regular design improvement through a well-managed programme of making use of operational experience and risk-based design philosophy to identify and reduce opportunity for human error". As such Hitachi-GE needs to assemble and compile its baseline HF evidence and submit it as part of the PCSR.</p> <p><b>Scope of Work</b>  This RO is related to the baseline HF assessment and the Level 1 HBSC in the PCSR. Hitachi-GE proposes its Resolution Plan to address ONR's observations. This plan describes Hitachi-GE's current plan to address the RO. As the work develops, we may choose alternative means to address this RO.</p>

## Description of work:

**Action # 1** :Following on from RQ-ABWR-0171, Hitachi-GE is required to submit to ONR the report(s) of its HF review of the respective documents, records, reports, specifications, test and assessment results as claimed within the baseline HF assessment to provide "abundant fully-integrated consideration of HF within the H-GE processes and J-ABWR design". Hitachi-GE is required to provide a comprehensive reference list for these claimed information sources.

Hitachi-GE will update the baseline HF assessment to include as an appendix, a package of evidence, as appropriate and able to be shared, that contains

- Summaries of evidence documents' contents / sections.
- Sanitised examples of process applications / results with data record, figures, etc.

Resolution Date:

ROA 1: 31 August 2015

**Action # 2** :Hitachi-GE is required to submit to ONR its rigorous programme of QA and V & V as applied to the J-ABWR designs, and in particular for safety important Human System Interfaces (HSI), or provide representative samples and evidence that such a process had been followed.

Hitachi-GE will update the baseline HF assessment to include a package of evidence in the same way as the ROA 1.

Resolution Date:

ROA 2: 31 August 2015

**Action # 3** :Following on from RQ-ABWR-0161, Hitachi-GE is required to provide a report that demonstrates with logical arguments and evidence, how the design evolution / improvements have reduced the overall dependency on human action to maintain safety.

Hitachi-GE will update the baseline HF assessment to include justification with available sanitised evidence or examples in the same way as the ROA 1.

Resolution Date:

ROA 3: 31 August 2015

**Action # 4** :Hitachi-GE is required to provide a report or alternative evidence that demonstrates how consideration of HF extends to all stages of the ABWR plant lifecycle.

Hitachi-GE will update the baseline HF assessment to make clearer its descriptions about application of HF to consideration of plant life cycle and add more details as appropriate in the same way as the ROA 1.

Resolution Date:

ROA 4: 31 August 2015

**Action # 5** :Hitachi-GE is required to provide a report of a convincing representational selection of evidence (i.e. sufficient, relevant and accurate) of human performance enhancing design features that have come about through operational experience feedback. This OEF review should be of significant depth and consist of sufficient representative examples and supporting evidence that highlights and reports on:

*Examples of key incidents, events and learning that have occurred over the past 10 - 15 years that are relevant to pre and post-fault scenarios referenced in the safety case; identifying information about error-prone activities / human error mechanisms, performance shaping factors (PSF) and any design weaknesses, with explanations of how known problem areas have been (will be) addressed by the UK ABWR design, how any error-prone activities have been designed out, or the design / operational processes changed to improve human reliability.*

Hitachi-GE will update the baseline HF assessment to provide a summary of the study related to HF perspective, linking to HF risk reduction.

Resolution Date:

ROA 5: 31 August 2015

**Action # 6 :** *Hitachi-GE is requested to provide a document route 'route-map' that logically shows how the ABWR baseline HF evidence links to and substantiates the Level 1 human-based safety claims made in the PCSR regarding the widespread integrated consideration of HF during the original design and its evolution, and throughout the plant life-cycle.*

The statement in the PCSR was supposed to say “Level 1 claim on existing plant”; the baseline HF assessment only acts as evidence to the single high-level claim on previous ABWR general level of HFI. Hitachi-GE will correct and clarify in the next revision of PCSR.

Resolution Date:

ROA 6: 31 August 2015

**Summary of impact on GDA submissions:**

<u>GDA Submission Document</u>		<u>Submission Date to ONR</u>
Baseline Human Factors Assessment Report	GA91-9201-0001-00032	Rev. B, 31 August 2015, Action #1 to #6
PCSR chapter 27 (Human Factor)	GA91-9201-0101-27000	Rev. B, 23 August 2015

**Programme Milestones/ Schedule:**

See attached Gantt Chart (Table 1).

**Reference:**

N/A

Table 1 RO-ABWR-0033 Gantt Chart

Hitachi-GE Nuclear Energy Ltd. Baseline HF Assessment Resolution Plan for RO-ABWR-0033				2014												2015																																				
				December				January				February				March				April				May				June				July				August				September				October				November				
				1	8	15	22	29	5	12	19	26	2	9	16	23	2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	31	7	14	21	28	5	12	19	26	2
Level	Action Title	Start	Finish																																																	
1	Regulator's issue of RO																																																			
1.1	ONR Issue RO	5-Dec-14	5-Dec-14																																																	
1.2	Hitachi-GE acknowledge RO & Issue Resolution Plan	8-Dec-14	31-Jan-15																																																	
1.3	Regulator's confirm credibility of Resolution Plan	2-Feb-15	27-Feb-15																																																	
1.4	Regulator's publish RO and Resolution Plan	27-Feb-15	27-Feb-15																																																	
2	Preparation of Submissions and Closure of RO Actions																																																			
2.1	ROA 1	1-Jun-15	31-Aug-15																																																	
2.2	ROA 2	2-Mar-15	29-May-15																																																	
2.3	ROA 3	2-Mar-15	29-May-15																																																	
2.4	ROA 4	2-Mar-15	29-May-15																																																	
2.5	ROA 5	2-Feb-15	29-May-15																																																	
2.6	ROA 6	2-Feb-15	31-Mar-15																																																	
3	Regulator's Closure of RO																																																			
3.1	Regulator's Assessment	1-Sep-15	13-Nov-15																																																	
3.2	Regulator's publication of RO closure letter	2-Nov-15	30-Nov-15																																																	