

Hitachi-GE Nuclear Energy, Ltd.
UK ABWR GENERIC DESIGN ASSESSMENT
Resolution Plan for RO-ABWR-0041
UK ABWR Probabilistic Safety Analysis Identification of Applicable External Hazards

RO TITLE:	UK ABWR Probabilistic Safety Analysis Identification of Applicable External Hazards	
REVISION :	2	
Overall RO Closure Date (Planned):	31 January, 2016	
REFERENCE DOCUMENTATION RELATED TO REGULATORY OBSERVATION		
Regulatory Queries	-	
Linked ROs	-	
Other Documentation	-	

Scope of work :
<p>Background Hitachi-GE has developed the identification of external hazards for design consistent with international good practice, e.g. IAEA/NS-G-3.1, NUREG/CR-2300, SKI Report 02:27, WENRA RHWG. ONR has identified shortfalls related to the identification of external hazards for PSA and raised RO-ABWR-0041 to state ONR's expectations and request Hitachi-GE to respond to the shortfalls.</p> <p>Scope of Work The objective of this resolution plan is to introduce Hitachi-GE's current plan for performing the actions required in the RO-ABWR-0041. The actions cover review/justification of existing analysis, additional investigation/analysis and revised/additional documentation.</p>

Description of work:

ACTION 1 – Identification process and initial list of External Hazards for the PSA

Hitachi-GE will provide an identification process and initial list of possible external hazards consistent with international good practice. This list will include credible external (and internal) event combinations.

The initial list includes the potential individual external hazards without any prioritisation. This list will be reviewed and the prioritised hazard will be summarized in Action 2.

ACTION 2 – Prioritisation of External Hazards for the PSA

Hitachi-GE will develop a prioritisation of external hazards in terms of:

- Magnitude of the hazard vs. the design basis.
- Impact on plant, systems and containment.

ACTION 3 – Combinations of Hazards

ACTION 3.1 – Prioritisation of Combination Hazards for the PSA

Hitachi-GE will develop a prioritisation of combination hazards for the PSA.

ACTION 3.2 – Technical basis and the criteria for prioritisation of combination hazards

Hitachi-GE will provide the technical basis for assessment of combination hazards and the criteria used to prioritise hazard combinations for the PSA.

ACTION 4 – Cliff Edge Effects

Hitachi-GE will compare the site effects of design basis load and beyond design basis load to determine if the risk remains low even when lower frequency (higher consequence) events are considered.

ACTION 5 – Scope of the hazards analyses

ACTION 5.1 – Other conditions

Hitachi-GE will expand the scope of the external hazards analysis to the following conditions:

- Low power conditions (start-up) with the containment deinerted.
- Refuel/outage conditions with the containment open and heavy load movements occurring with multiple equipment unavailable due to maintenance.
- Other relevant condition.

The scope will be justified.

ACTION 5.2 – Other sources

Hitachi-GE will provide an analysis of the impact of hazards on other on-site radionuclide sources (e.g., SFP) that could result in releases.

ACTION 6 – Frequency of Hazards and Magnitudes

Hitachi-GE will provide the external hazards curve expressing the frequency versus consequences for the external hazards for risk significant hazards to support the PSA and the hazards prioritisation. Action 6 will provide one of the bases for Action 2. Thus, Action 6 will proceed with Action 2 in parallel.

ACTION 7 – Hazard Impacts

Hitachi-GE will provide an auditable external hazard impact analysis with measuring the damage to systems, structures, and components (SSCs), human interface degradation and containment. Action 7 will provide one of the bases for Action 2. Thus, Action 7 will proceed with Action 2 in parallel.

ACTION 8 – Hazard PSA programme

Hitachi-GE will review and as needed revise the hazards PSA programme to include all the hazards for which a more detailed probabilistic evaluation needs to be undertaken in Step 4 in line with the results of the hazards prioritisation developed in Action 2. Hitachi-GE will also review and as needed revise the hazards PSA programme to address the hazards impact on other radioactivity sources and plant conditions.

Summary of impact on GDA submissions:

The GDA submissions that may be affected by the actions to resolve this RO are summarised below. These documents will be originated and/or revised in accordance with the corresponding actions.

<u>Related RO Actions</u>	<u>GDA Submission Document Title</u>	<u>Document ID</u> (Document No.)	<u>Submission Date to the Regulators</u>
ROA1, 2, 3, 4, 5, 6, 7	External hazard identification for PSA	-	12-Oct-2015
ROA8	PSA programme	GA91-9210-0001-00121 (AE-GD-0150)	12-Oct-2015

Programme Milestones/ Schedule:

See attached Gantt Chart (Table 1).

Reference:

N/A

Table 1 RO-ABWR-0041 Gantt Chart

Probabilistic Safety Analysis (PSA) internal initiating events at power Resolution Plan for RO-ABWR-0041				March			April			May			June			July			August			September			October			November			December			January																	
Level	Action Title	Start	Finish	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	9	16	23	30	7	14	21	28	7	14	21	28
1	Regulator's issue of RO																																																		
1.1	ONR Issue RO	1-Mar-15	16-Mar-15																																																
1.2	Hitachi-GE acknowledge RO & issue Resolution Plan	17-Mar-15	14-Apr-16																																																
1.3	Regulator's confirm credibility of Resolution Plan	15-Apr-15	30-Jun-15																																																
1.4	Regulator's publish RO and Resolution Plan	1-Jul-15	17-Jul-15																																																
2	Preparation of Submissions and Closure of RO Actions																																																		
2.1	RO Action 1: Identification process and initial list of External Hazards for the PSA	20-Apr-15	31-Jul-15																																																
2.2	RO Action 2: Prioritisation of External Hazards for the PSA	20-Apr-15	31-Jul-15																																																
2.3	RO Action 3: Combinations of Hazards	20-Apr-15	12-Oct-15																																																
2.4	RO Action 4: Cliff Edge Effects	20-Apr-15	12-Oct-15																																																
2.5	RO Action 5: Scope of the hazards analyses																																																		
2.6	RO Action 6: Frequency of Hazards and Magnitudes	20-Apr-15	12-Oct-15																																																
2.7	RO Action 7: Hazard Impacts	20-Apr-15	12-Oct-15																																																
2.7	RO Action 8: Hazard PSA programme	1-Sep-15	12-Oct-15																																																
3	Regulator's Closure of RO																																																		
3.1	Regulator's Assessment	13-Oct-15	31-Dec-15																																																
3.2	Regulator's publication of RO closure letter	1-Jan-16	31-Jan-16																																																