

**Hitachi-GE Nuclear Energy, Ltd.
UK ABWR GENERIC DESIGN ASSESSMENT
Resolution Plan for RO-ABWR-0076
PSA ALARP Demonstration and Optioneering**

RO TITLE:	PSA ALARP Demonstration and Optioneering	
REVISION :	0	
Overall RO Closure Date (Planned):	31 May, 2017	
REFERENCE DOCUMENTATION RELATED TO REGULATORY OBSERVATION		
Regulatory Queries	RQ-ABWR-0560	
Linked ROs	-	
Other Documentation	-	

Scope of work :

Background

In September 2016, Hitachi-GE produced a preliminary Topic Report on Use of PSA in ALARP Assessment to provide evidence from the PSA that the UK ABWR design follows the principles of ALARP and to identify any areas where further risk reduction may be possible as GDA Step 4 activities are completed, or during the detailed design and plant operation which follow the completion of GDA. This assessment is the preliminary status and is under progress of GDA Step 4. Further, Hitachi-GE had developed the use of PSA process in the design through GDA.

Under this circumstance of design and assessment in GDA, it is expected that the further progress of ALARP assessment by using PSA through the use of PSA process to demonstrate UK ABWR design is ALARP.

Scope of work

The objective of this resolution plan is to introduce Hitachi-GE's plan for performing the actions requested in the RO-ABWR-0076: PSA ALARP Demonstration and Optioneering. The actions cover process of option identification, evaluation of options, identification of design changes and ALARP demonstration programme.

Description of work:

ACTION 1 – Process to identify options for ALARP Assessment

Hitachi-GE will develop and document a detailed process for using the full scope PSA and results in a systematic and thorough way to identify potential options for design improvement to reduce the risk of the UK ABWR to ALARP. Implementation of the process and the results of Action 1 will be included in a Section entitled “Insights provided from GDA PSA for ALARP” in the ALARP report.

ACTION 2 – List of the options for ALARP Assessment

ACTION 2.1 – List of options

Hitachi-GE will use the process developed to address Action 1 to systematically use the full scope PSA model and results to identify insights and potential vulnerabilities of the UK ABWR design. Hitachi-GE will then develop a list of potential options for design improvements consideration to address the insights and vulnerabilities identified. The development of the list of options will be documented in detail.

ACTION 2.2 – Involvement of Hitachi-GE engineering function for options

Hitachi-GE will prepare “use of PSA” sheets as evidences that the Hitachi-GE engineering function have been involved in the identification of options in response to action 2.1. Several examples (to be discussed and agreed with ONR) of use of PSA sheets will be submitted to ONR.

The involvement of engineering team for options may continue beyond the planned closure date of this RO in GDA design process. Outstanding issues that cannot be dealt with during GDA time frame will be captured in ‘Commitment Log’ for Horizon’s consideration and continuation post GDA.

ACTION 3 – Evaluation of risk reduction (benefit) for options

ACTION 3.1 – Evaluation of risk reduction

Hitachi-GE will use the full scope PSA model to evaluate the risk reduction (benefit) of the options identified in Action 2. The evaluation of options will be documented in detail.

ACTION 3.2 – Involvement of Hitachi-GE engineering function for evaluation

Hitachi-GE will prepare “use of PSA” sheets as evidence that the Hitachi-GE engineering function have been involved in the evaluation of the risk reduction (benefit) of the options identified in Action 2. Several examples (to be discussed and agreed with ONR) of use of PSA sheets will be submitted to ONR.

ACTION 4 – Identification of ALARP design changes

ACTION 4.1 – Decision making of ALARP design changes

Taking the risk reduction (benefit) analysis performed to address Action 3, Hitachi-GE will justify which options are reasonably practicable to be considered for inclusion into the UK ABWR Design Reference. The decision made for each option in Action 2 will be documented in detail. The results will be documented in the “use of PSA” sheets. Several examples (to be discussed and agreed with ONR) of use of PSA sheets will be submitted to ONR. This task will continue beyond the planned closure date of this RO in GDA design process.

ACTION 4.2 – Changes to the Design References

Hitachi-GE will demonstrate that changes to the design reference shall be made prior to completion of GDA, or where this is not possible, how the commitment to make the change shall be managed through the next stage of the licensing process and how closure of GDA does not preclude the options from being considered as part of future risk informed design activities. This task will continue beyond the planned closure date of this RO in GDA design process.

If all recommended options are deferred to after GDA, the decision will be documented.

ACTION 5 – PSA ALARP demonstration and optioneering programme

Hitachi-GE will review and update the PSA programme to include the development of the PSA ALARP demonstration and optioneering required to address the actions in this RO and the report on this assessment.

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> (<u>Document No.</u>)	<u>Submission Date to the Regulators</u>
ROA1, 2.1, 3.1 and 4.1	Topic Report on Use of PSA in ALARP Assessment - Current Status and Future Applications	GA91-9201-0001-00232 (AE-GD-0803)	Rev.1: 15-Feb-2017 Rev.2: 30-July-2017
ROA1, 2.1, 3.1 and 4.1	Topic Report on PSA Summary	GA91-9201-0001-00237, (AE-GD-0804) Rev.1	31-Mar-2017

Programme Milestones/ Schedule:

See attached Gantt Chart (Table 1).

Reference:

N/A

Table 1 RO-ABWR-0076 Gantt Chart

UK ABWR Probabilistic Safety Analysis (PSA) – Resolution Plan for RO-ABWR-0076 PSA ALARP Demonstration and Optioneering				December				January				February			March			April			May				June			July				August										
Level	Action Title	Start	Finish	5	12	19	26	2	9	16	23	30	6	13	20	27	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28
1	Process to identify options for ALARP Assessment	1-Dec-16	20-Jan-17	█																																						
2	List of the options for ALARP Assessment																																									
2.1	List of options	1-Dec-16	15-Feb-17	█																																						
2.2	Involvement of Hitachi-GE engineering function for options	1-Dec-16	31-Mar-17	█				█																																		
3	Evaluation of risk reduction (benefit) for options																																									
3.1	Evaluation of risk reduction	1-Dec-16	15-Feb-17	█																																						
3.2	Involvement of Hitachi-GE engineering function for evaluation	1-Dec-16	31-Mar-17	█				█																																		
4	Identification of ALARP design changes																																									
4.1	Decision making of ALARP design changes	1-Dec-16	31-Mar-17	█				█																																		
4.2	Changes to the Design References	5-Jan-17	15-Feb-17					█																																		
5	PSA ALARP demonstration and optioneering programme	1-Dec-16	15-Dec-16	█																																						
-	Review and Closure	23-Jan-17	31-May-17									█			█			█																								