

Hitachi-GE Nuclear Energy, Ltd.
UK ABWR GENERIC DESIGN ASSESSMENT
Resolution Plan for RO-ABWR-0037
Safety Case for Faults not Directly Related to the Reactor

RO TITLE:	Safety Case for Faults not Directly Related to the Reactor	
REVISION :	0	
Overall RO Closure Date (Planned):		
REFERENCE DOCUMENTATION RELATED TO REGULATORY OBSERVATION		
Regulatory Queries		
Linked ROs	RO-ABWR-0011(Safety case for spent fuel pool and fuel route)	
Other Documentation		

Scope of work :
<p>Hitachi-GE has developed a design basis safety case for the UK ABWR which demonstrates that various acceptance criteria associated with the fuel in the reactor core and the containment structure and numerical target for the effective dose are met. Hitachi-GE is also in the process of developing a PSA model which will evaluate the core damage frequencies associated with reactor accidents and the release frequencies associated with all significant sources of radioactivity.</p> <p>In the current design basis safety case, non reactor faults such as fuel handling accident, off-gas system failure and liquid radwaste tank accident are identified and analysed as design basis faults. And Hitachi-GE is developing a “full scope” PSA model including the systems that are not directly related to the reactor.</p> <p>However, Hitachi-GE will take the following actions to demonstrate the fault tolerance of the design and the robustness of safety measures which protect people from receiving a significant dose of radiation against non reactor fault.</p> <p>This Resolution Plan describes Hitachi-GE’s current plan to address the RO however as the work develops, Hitachi-GE may choose alternative means to address the RO.</p>

Description of work:
<p>RO-ABWR-0037.A1.1: Identification of all the buildings, systems, processes and activities which could result in a significant dose of radiation</p> <p>Hitachi-GE will identify buildings and systems on the generic UK ABWR site that are not directly related to the reactor and have the potential in a fault condition to result in a person receiving a significant dose of radiation, or to a significant quantity of radioactive material escaping from its designated place of residence or confinement. It is noted that initiating events in the spent fuel pool and fuel route are identified in Action 2 of the Resolution</p>

Plan for RO-ABWR-0011(Safety case for spent fuel pool and fuel route).

Identification of the buildings and systems on which initiating events could result in significant dose will be performed by the end of March 2015.

RO-ABWR-0037.A1.2: Identification of initiating events for the identified buildings, systems, processes and activities

Hitachi-GE will identify initiating events in the buildings, systems and so on identified in Action 1.1 using systematic FMEA exercise. In this study, not only single failure of a component, common cause failure such as loss of power source and controller failure, inadvertent operation and internal/external hazard, but also mis-operation in outage or maintenance activities which could result in a significant dose to workers are treated as initiating events.

Identification of initiating events will be performed by the end of March 2015. And the results of Action 1.1 and Action 1.2 will be included in the revisions of Topic Report on Fault Assessment by the end of April 2015.

RO-ABWR-0037.A2: Extension of the Deterministic Safety Case

Hitachi-GE will review the completeness of the list of initiating events for design basis analysis developed in Topic Report on Fault Assessment (UE-GD-0071 Rev.1) in comparison with initiating events identified in Action 1.2. By the result of this comparison, Hitachi-GE will modify the list of bounding faults and develop the fault schedule for additional bounding faults as needed. And then, although the provisional fault schedule for non-reactor fault has already been developed in Topic Report on Fault Assessment, it will be re-produced using modified format suitable for non-reactor fault.

In addition, Hitachi-GE will review the safety function required and safety classifications given to the safety measures for additional initiating events and perform design basis analysis (mainly Dose evaluation) for additional initiating events to demonstrate the adequacy of the safety design and the suitability and sufficiency of the safety measures.

Review of the completeness of the list of DBA fault in comparison with initiating events newly identified in Action 1.2 and development of the fault schedule for these faults of Action 2 will be performed and included in the revisions of Topic Report on Fault Assessment by the end of April 2015.

Design basis analysis for additional initiating events of Action 2 will be performed and included in the revisions of Topic Report on Design Basis Analysis by the end of June 2015.

RO-ABWR-0037.A3.1: Extension of the Probabilistic Safety Case (Providing a methodology to the risks associated with the initiating events identified in Action 1.2)

Hitachi-GE will provide a methodology to analyses the offsite risks associated with the initiating events

identified in Action 1.2, including sequence progression, calculation of frequencies and radiological consequences.

Methodology to analyse frequencies of radioactive materials associated with IEs identified in Action 1.2

Methodology to evaluate onsite risk in terms of SAP targets 5,6

Methodology to evaluate offsite risk in terms of SAP targets 7,8,9

Methodology to analyse frequencies of radioactive materials associated with IEs identified in Action 1.2 and to evaluate offsite risk in terms of SAP targets 7,8,9 will be provided by the end of May 2015.

Methodology to evaluate onsite risk in terms of SAP targets 5,6 will be provided by the end of July 2015.

RO-ABWR-0037.A3.2: Extension of the Probabilistic Safety Case (Providing analysis of the risk associated with the initiating events identified in Action 1.2)

Hitachi-GE will provide analysis of the risks associated to the initiating events identified in Action 1.2 (including sequence progression and calculation of frequencies and radiological consequences) and the overall risk associated to the buildings, systems, processes and activities identified in Action 1.1.

Action 3.2 will be performed by end of June 2016.

Summary of impact on GDA submissions:

GDA Submission Documents	Related GDA RO Action(s)	Submission Date to ONR
Topic Report on Fault Assessment	RO-ABWR-0037.A1.1 and A.1.2	31 st March 2015
Topic Report on Fault Assessment	RO-ABWR-0037.A2	30 th April 2015
Topic Report on DBA	RO-ABWR-0037.A2	30 th June 2015
Level 3 PSA methodology	RO-ABWR-0037.A3.1	31 st May 2015
Frequency analysis methodology for non-reactor faults	RO-ABWR-0037.A3.1	31 st July 2015
Onsite risk analysis methodology for non-reactor faults	RO-ABWR-0037.A3.1	31 st July 2015
Topic Report on Level 3 PSA	RO-ABWR-0037.A3.2	30 th June 2016

Programme Milestones/ Schedule:

See the Gantt Chart below (Table 1).

Reference:

