

Hitachi-GE Nuclear Energy, Ltd.

UK ABWR GENERIC DESIGN ASSESSMENT

Resolution Plan for RO-ABWR-0075

(Robust demonstration that the design of the UK ABWR HVAC system has been adequately conceived and reduces risks SFAIRP)

RO TITLE:	Robust demonstration that the design of the UK ABWR HVAC system has been adequately conceived and reduces risks SFAIRP	
REVISION :	0	
Overall RO Closure Date (Planned):	30 June 2017	
REFERENCE DOCUMENTATION RELATED TO REGULATORY OBSERVATION		
Regulatory Queries	RQ-ABWR-1048	
Linked ROs	RO-ABWR-0015 RO-ABWR-0016 RO-ABWR-0017 RO-ABWR-0018 RO-ABWR-0051 RO-ABWR-0052 RO-ABWR-0064 RO-ABWR-0065	
Other Documentation	See Related Deliverables in Description of Work and References	

Scope of work:
<p>Background RO-ABWR-0075 has been raised by the ONR with regard to clarifying the safety justification for the HVAC system provided on the UK ABWR plant. The key areas identified by the ONR are:</p> <ul style="list-style-type: none"> • Clear derivation of system normal operational requirements. • Clear derivation of Safety Functional Claims (SFCs). • Clear application of SFCs and Safety Property Claims (SPCs) to the HVAC system. • Clear integration of the Internal Hazards Safety Case. • A clear justification that the HVAC system design can reduce the associated risks ALARP. <p>Scope of work This Resolution Plan summarises the ONR’s Regulatory Expectations and Actions raised via RO-ABWR-0075, and sets out Hitachi-GE’s proposed programme and milestones to meet those expectations and address the actions.</p>

Description of work:

Task Breakdown

A description of the tasks which Hitachi-GE will carry out to address this RO is provided below:

Task 1 – Revise Basis of Safety Case on HVAC to Revision 3

Hitachi-GE shall revise the Basis of Safety Case (BSC) on HVAC systems [Ref-1] (From Rev 2 to Rev 3) to address the ONR's concerns raised within RO-ABWR-0075. The works shall also bring the BSC in line with Revision 2 of the Safety Case Development Manual [Ref-2]. The following is a more detailed summary of the works.

The BSC [Ref-1] shall be updated to clearly state:

- The normal operational requirements for the HVAC system (RO-ABWR-0075.A3, RO-ABWR-0075.A5) and the HVAC systems Category and Classification (RO-ABWR-0075.A1).

Hitachi-GE shall update the BSC to clearly state the operational requirements of the system (based on KK7 heat loading data and appropriate UK environmental data), and to state the category and classifications of the HVAC systems based upon their Nuclear Safety Significance. In order to do this, Hitachi-GE will review the SSCs located in each HVAC service area and clarify the requirement to provide HVAC in order to maintain the Fundamental Safety Functions (FSFs). This information is readily available and will be presented clearly in the revised BSC

- The design of the system in support of the Internal Hazards safety case, including the propagation of hazards via the HVAC system (RO-ABWR-0075.A6)

Hitachi-GE are developing a separate internal hazards safety case. Hitachi-GE will clearly incorporate the requirements of the internal hazards safety case into the HVAC BSC.

- The compliance of the system with the SPCs (RO-ABWR-0075.A3), (RO-ABWR-0075.A4), (RO-ABWR-0075.A7), (RO-ABWR-0075.A10).

As part of the revision of the BSC, Hitachi-GE will review in detail the provided information for the SPCs and will update this element of the BSC to present this information clearly. It is envisaged that the SPCs can be discussed for class 1, class 2, and class 3 systems as different groups.

- The tolerance of the system to cliff edge effects (RO-ABWR-0075.A2)

Hitachi-GE will identify system parameters which may affect delivery of the safety functions. An assessment of the cliff edge effects, commensurate with the level of detail required within GDA, shall be developed and reported within the BSC.

- The approach to be taken to meet HVAC requirements for Decommissioning (RO-ABWR-0075.A9).

As the lifetime of an HVAC system (approximately 25 years) is significantly less than the lifetime of the plant (60 or 100 years), Hitachi-GE will update the BSC to illustrate that detailed design for decommissioning is appropriate at this time, using OPEX from decommissioning of existing plants, and that a gap analysis of the

HVAC system against the decommissioning plan and risks will be undertaken prior to the commencement of decommissioning.

- Interactions of the HVAC system with other ventilation systems (RO-ABWR-0075.A13)

In updating the BSC, under SPC 3, Hitachi-GE will clarify in the BSC the function of lower class equipment, and how it is not possible for those items of lower class equipment to inhibit the safety function of the higher class equipment.

- A justification that the system design is such that the risks can be reduced ALARP in the detailed design phase (RO-ABWR-0075.A4) (RO-ABWR-0075.A6) (RO-ABWR-0075.A11), (RO-ABWR-0075.A12)

Hitachi-GE will review the ALARP assessments required for the HVAC system. The findings of this review will be incorporated into an update to the HVAC Topic Report on ALARP Assessment for R/A, T/B, Rw/B and S/B HVAC systems (HPE-GD-H050).

- Where applicable, reference shall be made to supporting calculations (RO-ABWR-0075.A2) (RO-ABWR-0075.A3) (RO-ABWR-0075.A5) (RO-ABWR-0075.A8) in order to demonstrate the system can meet the demands placed upon the system.

Hitachi-GE will review the available evidence and update the information included as part of the submission. This will be done cognisant of the appropriate level of detail required to complete GDA.

Task 2 – Draft RO75 Response Document

In order to clearly demonstrate the actions placed upon Hitachi-GE by the ONR in RO-ABWR-0075 have been addressed, a supporting document [Ref-3] shall be issued with the BSC Rev 3 [Ref-1]. This draft document will be reviewed by the ONR in order to gain their comments on the response to RO-ABWR-0075, and to inform further changes to the BSC in order to clarify the Safety Case position at the end of GDA.

Task 3 – Revise Basis of Safety Case on HVAC to Revision 4

In accordance with the outcome of the review of the Draft RO75 Response Document, the BSC [Ref-1] will be updated in order to reflect the Safety Case position at the end of GDA, and to ensure the outcome of RO75 is appropriately reflected within the BSC.

Task 4 – Issue RO75 Response Document

The formal issue of the RO75 Response Document [Ref-3] shall include resolution of all ONR comments and reflect how Hitachi-GE resolved the actions raised within RO-ABWR-0075.

Summary of impact on GDA submissions:

<u>GDA Submission Document</u>	<u>Submission Data to ONR</u>
Basis of Safety Cases on Heating, Ventilating and Air Conditioning system, Revision 3 [Ref-1]	12 th of April 2017
Summary Report of RO Actions regarding RO-ABWR-0075, Draft [Ref-3]	21 th of April 2017
Basis of Safety Cases on Heating, Ventilating and Air Conditioning system, Revision 4 [Ref-1]	30 th of June 2017
Summary Report of RO Actions regarding RO-ABWR-0075, Revision 0 [Ref-3]	30 th of June 2017

Programme Milestones / Schedule:

Revision 3 of [Ref-1] shall be issued on the 12 th of April 2017.
Revision 4 of [Ref-1] shall be issued on the 30 th of June 2017.
Revision 0 of [Ref-3] shall be issued on the 30 th of June 2017.

References:

<u>Ref.</u>	<u>Document Title</u>	<u>Document ID</u>	<u>Rev.</u>
[Ref-1]	Basis of Safety Cases on Heating, Ventilating and Air Conditioning system	GA91-9201-0002-00041 (HPE-GD-H006)	2
[Ref-2]	Safety Case Development Manual	GA10-0511-0006-00001 (XD-GD-0036)	2
[Ref-3]	Summary Report of RO Actions regarding RO-ABWR-0075	GA91-9201-0003-02105 (HPE-GD-H070)	-

