

Hitachi-GE Nuclear Energy, Ltd.
UK ABWR GENERIC DESIGN ASSESSMENT
Resolution Plan for RO-ABWR-0027
Hardwired Back Up System

RO TITLE:	Hardwired Back Up System	
REVISION :	<u>5</u>	
Overall RO Closure Date (Planned):	30 th September 2016	
REFERENCE DOCUMENTATION RELATED TO REGULATORY OBSERVATION		
Regulatory Queries	-	
Linked ROs	-	
Other Documentation	-	

Scope of work :
<p>Background</p> <p>Hardwired back up system (HWBS) is the new system that was provided for the UK-ABWR. So the selection of the HWBS technology is still to be confirmed. The current intention is to use analogue Trip Units and relay logic for voting. The inter connections will be hard wired. Hitachi-GE will not select a specific manufacturer or model number for HWBS equipment in this RO answer period. Instead Hitachi-GE will explain in more detail the technology used for HWBS to show the independency and diversity compared to the other control and protection systems of the UK-ABWR.</p> <p>Scope of work</p> <p>Hitachi-GE will make description that the design of the HWBS is correctly classified and that it can meet the safety function requirements identified in the UK ABWR Fault Schedule.</p> <p>Hitachi-GE will develop suitable documentation that describes the design and technology used for the HWBS and how the design protects against common cause and systematic failures.</p> <p>This Resolution Plan describes Hitachi-GE's current plan to address the RO ; however, as the work develops, it may be necessary to choose an alternative means to address the RO.</p>

Description of work:

RO-ABWR-0027 Action 1 :

The RO action states that:

Hitachi-GE are to develop a comprehensive list of safety function requirements for the hardwired backup systems which are linked to the UK ABWR Fault Schedule.

Resolution required by September 2015

Hitachi-GE will develop the comprehensive list of safety function requirements for the HWBS.

This action will be addressed as follows.

Hitachi-GE will identify and list the Category A safety functions allocated to C&I associated with the HWBS. These safety functions will be listed along with;

- The source of the requirement; i.e. Fault Schedule reference(s) and other relevant references to documents in the C&I Safety and Engineering Document Maps.
- Category.
- A high level description of the functional requirement.
- The C&I systems to implement the functionality.

RO-ABWR-0027 Action 2 :

The RO action states that:

Hitachi-GE are to develop suitable documentation that describes the design, design process and potential technology used for the hardwired backup system and how the design protects against common cause and systematic failures.

This should describe what design attributes the hardwired backup system must have to demonstrate common cause and systematic errors relating to other C&I safety systems will be avoided, including interfaces with those systems. An outline architecture drawing of the system should also be included.

Resolution required by September 2016

Hitachi-GE will develop suitable documentation that describes the design, design process and technology used for the HWBS and how the design protects against common cause and systematic failures.

The documentation will include;

- The platforms used for HWBS.
- The principal functionality allocated to HWBS, including key parameters monitored and plant controlled.
- The architecture of HWBS.
- The description and the diagram
- The location of the system and equipment of HWBS
- The C&I equipment attached to HWBS, including (but not limited to) the sensors, actuators, signal conditioning equipment, voting logic and HMIs.

- The support systems for HWBS.
- The independence, segregation and diversity claimed for HWBS.
- Design standards and methodologies

Hitachi-GE will prepare BSC on HWBS. The BSC will describe;

- A high level description of the HWBS and their architecture.
- The claims made on the HWBS and their links back to the PCSR.
- The arguments that relate the HWBS to the claims, including references to the supporting information in the TR.

Further information is developed in TR on HWBS. This information will be linked to the claims and arguments made in the BSC.

Originally Hitachi-GE intended to provide the information for action 2 in a summary document, which was intended to be “Design of the Hardwired Backup System and the selected technology”, before submitting the first revision of related BSC and TRs in order to inform the ONR as soon as possible. However, the summary document is not required because the revised BSC/TR on HWBS now provide the totality of the information required. Therefore, the update of the summary document has been superseded by the submission of the revised BSC/TR on HWBS and the update has been deleted from the section below.

The document revisions referenced in this resolution plan show which revisions information required to close the action was first included.

Summary of impact on GDA submissions:

Related RO Actions	GDA Submission Document Title	Document ID (Document No.)	Submission Date to Regulators
Submitted Document			
Action 1	Generic PCSR Chapter 14	GA91-9101-0101-14000, Rev.B (3E-GD-A0063)	October 2015
Action 1,2	Basis of Safety Cases on Hardwired Backup System	GA91-9201-0002-00029, Rev.2 (3D-GD-A0009)	<u>January 2017</u>
Action 2	Topic Report on Hardwired Backup System	GA91-9201-0001-00058, Rev.2 (3E-GD-A0105)	<u>January 2017</u>
<u>Action 2</u>	<u>Topic Report on Hardwired Backup System Platform</u>	<u>GA91-9201-0001-00153, Rev.0 (3E-GD-A0364)</u>	<u>October 2016</u>

Programme Milestones/ Schedule:

See attached Gantt Chart (Table 1).

Reference:

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