Hitachi-GE Nuclear Energy, Ltd.
UK ABWR GENERIC DESIGN ASSESSMENT
Resolution Plan for RO-ABWR-0028
Safety System Logic & Control (SSLC) Class 1 HMI

RO TITLE:	Safety System Logic & Control (SSLC) Class 1 HMI	
REVISION :	0	
Overall RO Closure Date (Planned):		30th September 2015
REFERENCE DOCUMENTATION RELATED TO REGULATORY OBSERVATION		
Regulatory Queries	- RQ-ABWR-0156	
Linked ROs	- This Regulatory Observation is linked to the ROs on Embedded and Smart Devices RO-ABWR-0030 and Production Excellence RO-ABWR-0029.	
Other Documentation	-	

Scope of work :

Background

The ONR have raised RO-ABWR-0028 in respect of the HMI to be provided for the Class 1 SSLC. ONR has stated the purpose of the RO

The purpose of this regulatory observation is to provide guidance on the regulatory expectations of the HMI for the Class 1 SSLC.

Hitachi-GE's understanding of the RO is that it is seeking more information on the SSLC HMI than has been provided in the Step 2 Preliminary Safety Report (PSR) and Chapter 14 and 21 of the Pre-Construction Safety Report (PCSR) and also that was provided in response to Regulatory Query (RQ) (RQ-ABWR-0156). Hitachi-GE has indicated that touch screens are associated with the operation of J-ABWR and ONR has expressed the opinion that justification the technology to meet the safety standards specified for Safety Class 1 will be onerous. Hitachi-GE has stated its intention is to make the local the operator interface such that its connection to the Class 1 SSLC is commensurate with the overall classification of the system and has heeded ONR advice, consequently an alternate technology will be used for the UK-ABWR.

Scope of work

Hitachi-GE's Human factors and C&I engineers will jointly undertake the analysis and develop the documentation that describes the required functionality of the SSLC HMI. This will be undertaken using task analysis that will include consideration of the modes of operation in which the HMI is used e.g. for routine (maintenance and test) and emergency operations; this will be by joint work with the HFE Group taking the lead.

Hitachi-GE C&I engineers will develop suitable documentation that describes the design of the SSLC HMI, justifies the selected technology for the SSLC HMI as being Class 1.

This resolution Plan describes Hitachi-GE's current intention to address the RO. However, as the work develops, it may be necessary to choose alternative means to address the RO.

Description of work:

Hitachi-GE will provide the following submissions for this RO

RO-ABWR-0028.Action 1

The RO action states that

Hitachi-GE are to develop suitable documentation that describes the functionality of the SSLC HMI. This should include a description of the high-level functionality and the modes of operation in which the HMI is used. References should be included to Human Factors documentation.

Resolution required by February 2015

Resolution Plan

Hitachi-GE will undertake the analysis required to identify the functionality needed of the SSLC HMI using a joint team of Human factors and C&I engineers. The team will develop the documentation that describes the functionality of the SSLC HMI that will include a description of the high-level functionality and the modes of operation in which the HMI is used. Hitachi-GE will refer the Human Factors analysis documentation.

RO-ABWR-0028 Action 2 :

The RO action states that:

Hitachi-GE are to develop suitable documentation that describes the design of the SSLC HMI and the selected technology. This should include a high-level description of how the design protects against fault propagation and corruption of information.

Resolution required by April 2015

Resolution plan

C&I engineers will identify the technology that is suitable to deliver the functionality and meet the requirements of it being Class 1. This will meet the commitment given in the response to RQ 0156 of 'The intention is to make the local the operator interface such that its connection to the Class 1 SSLC is commensurate with the overall classification of the system'. Hitachi-GE will develop the high level description of architecture of the SSLC HMI using the selected technology; this will be captured in engineering process documents, e.g. the SDD etc. for the SSLC; note the detailed engineering design documents will be produced in the implementation phase. The high level description of architecture of the SSLC HMI will also be documented in the SSLC BSC and Topic Report to identify the selected technology, showing how the design of the interface protects against fault propagation and corruption of information.

RO-ABWR-0028 Action 3 :

The RO action states that:

Hitachi-GE are to develop suitable documentation that justifies the technology selected for the SSLC HMI. An important part of the justification will be an initial high-level compliance analysis against standards such as IEC 61513. This analysis should be focused on the architectural aspects.

Resolution required by September 2015

Resolution plan

Hitachi-GE will develop the documentation (the SSLC Topic Report) that justifies the technology selected for the SSLC HMI against the requirements for class 1 systems. Regardless of the selected Class 1 HMIS technology, Hitachi-GE's justification will include the statement of compliance with relevant SAPs and TAGs, and appropriate standards for Class 1 HMIS architecture using selected technologies, such as IEC 61513. As the exact device to be applied for Class 1 HMIS is not finalized at this stage, statement of compliance will be mainly for architecture level, not for device level.

Summary of impact on GDA submissions:

GDA Submission Documents (Title / Document I.D.)	Related GDA RO actions	Submission Date to ONR	Potential Impact
Submitted Document			
Generic PCSR Chapter 14 / GA91-9101-0101-14000 Rev. A	Action 1 Action 2	August 2015 (to submit Rev. B)	Revised to include a description of technology and outline design of the SSLC HMI
Generic PCSR Chapter 21 / GA91-9101-0101-21000 Rev. A	Action 1 Action 2	August 2015 (to submit Rev. B)	Revised to include a description of technology and outline design of the SSLC HMI
Basis of Safety Cases on Safety System Logic and Control / GA91-9201-0002-00073 Rev.0	Action 1 Action 2	August 2015 (to submit Rev. 1)	Revised to include the claims made of the SSLC HMI and to introduce the argument that the technology and outline design meets the claims
Basis of Safety Cases on Main Control Room Human-machine Interface / GA91-9201-0002-00060 Rev.0	Action 1 Action 2	August 2015 (to submit Rev. 1)	Revised to include the claims made of the SSLC HMI and to introduce the argument that the technology and outline design meets the claims
Planned Submissions			
Support Document on functionality of SSLC HMI / TBD	Action 1	February 2015	
Support Document on design of SSLC HMI and the selected technology / TBD	Action 2	April 2015	
Topic Report on Safety System Logic and Control / TBD	Action 3	June 2015	To include the detailed design and justification of the chosen technology of the SSLC HMI. The completed justification will be in a later revision of the Topic Report.

Programme Milestones/ Schedule:

See attached Gantt Chart (Table 1).

Reference:

-

Table 1 RO-ABWR-0028 Gantt Chart

C&I Resolution Plan for RO-ABWR-0028 (2014)				October				November				December				
				6	13	20	27	3	10	17	24	1	8	15	22	29
Level	Action Title	Start	Finish													
1	Preparation of Submissions and Closure of RO Actions	10-Dec-14	30-Sep-15													
1.1	RO Action 1	10-Dec-14	28-Feb-15													
1.2	RO Action 2	10-Dec-14	30-Apr-15													
1.3	RO Action 3	10-Dec-14	30-Sep-15													

C&I Resolution Plan for RO-ABWR-0028 (2015)				January				February				March					April				May				June				July				August				September				October				November				December			
				5	12	19	26	2	9	16	23	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
Level	Action Title	Start	Finish																																																			
1	Preparation of Submissions and Closure of RO Actions	10-Dec-14	30-Sep-15																																																			
1.1	RO Action 1	10-Dec-14	28-Feb-15																																																			
1.2	RO Action 2	10-Dec-14	30-Apr-15																																																			
1.3	RO Action 3	10-Dec-14	30-Sep-15																																																			