

REGULATORY OBSERVATION	
REGULATOR TO COMPLETE	
RO unique no.:	RO-ABWR-0028
Date sent:	1st December 2014
Acknowledgement required by:	22nd December 2014
Agreement of Resolution Plan Required by:	23rd December 2014
Resolution of Regulatory Observation required by:	30th September 2015
TRIM Ref.:	2014/440740
Related RQ / RO No. and TRIM Ref. (if any):	
Observation title:	Safety System Logic & Control (SSLC) Class 1 HMI
Technical area(s) 6. Control & Instrumentation	Related technical area(s) 13. Human Factors
Regulatory Observation	
Summary	
<p>Hitachi-GE's Step 2 Preliminary Safety Report (PSR) and Chapter 14 of the Pre-Construction Safety Report (PCSR) provides high level information relating to the design of the Human Machine Interfaces (HMI)s. The information is limited to describing the type, location and some high-level functions that are performed using the HMI for individual systems. Both reports indicate that the UK ABWR Safety System Logic and Control (SSLC) system, which has a safety Classification of 1, has a HMI connected to it. The function of this HMI is not fully described but both reports state that it is a "Flat Display". During technical meetings and a visit to Hitachi Omika works it has become evident to ONR that the SSLC Flat Display uses touch screen technology as one means for the plant operator to interact with the safety system.</p> <p>During Step 2 a Regulatory Query (RQ) was raised (RO-ABWR-0028) requesting clarification that the classification of the SSLC HMI was commensurate with the SSLC classification. The response to this RQ (GA91-9201-0003-00112) indicated there is two way communications between Flat Display Panels and the SSLC for the Main Control Console and the Wide Display Panel. The RQ response goes on to state that it is Hitachi-GE's intention to;</p> <p><i>" make the local the operator interface such that its connection to the Class 1 SSLC is commensurate with the overall classification of the system. The nature of the interface has not been determined and a study into the nature of the operator interface is currently being undertaken".</i></p> <p>The current C & I safety case submissions or information provided in the response to RO-ABWR-0028 does not include sufficient information on how Hitachi-GE propose to provide a Class 1 HMI for the SSLC. The purpose of this regulatory observation is to provide guidance on the regulatory expectations of the HMI for the Class 1 SSLC.</p>	
Background	
<p>HMIs provide information to the plant operators about the plant's status as well as on the status of control and instrumentation systems and equipment which are required in order to monitor, maintain and operate the systems important to safety and to keep the plant within its design basis envelope. Protection against fault propagation is an important principle in all C&I systems but it is particularly important to Class 1 safety systems such as the SSLC. In the case of the Class 1 SSLC the integrity of information which is written and read to and from the SSLC and the protection against fault propagation from other systems and equipment connected to it is a key part of demonstrating the adequacy of the overall SSLC.</p> <p>It is ONRs expectation that any subsystem (for example HMI) or component which is a part of the overall</p>	

architecture of a safety system should be of the same class. Therefore in the case of the SSLC, which has a safety classification of 1, the HMI connected to it should also meet the requirements of safety class 1 for both hardware and software.

The Hitachi-GE submissions received to date have neither provided a substantiation of the use of touch screen technology for use in class 1 systems nor clearly described the functions that the SSLC HMI provide. It is ONR's opinion that the justification of touchscreen technology to meet the safety standards specified for Safety Class 1 will be onerous.

This RO is therefore focused on ONR obtaining a clear understanding of the design of the SSLC HMI Hitachi-GE propose for the UK ABWR and of the functions that the HMI will provide.

The key products of this section of the RO will be:

1. A description of the functions the SSLC HMI provides for the operator. This should include the modes of operation and the high-level functionality.
2. A description of the SSLC HMI design and the technology it will use and any design changes Hitachi-GE propose and how these impact on the operation of the UK ABWR. This information should be a high-level description.
3. A justification for the selected technology and interface arrangements for the SSLC HMI against standards such as IEC 60880 for software and IEC 60987 for hardware.

An important outcome of this RO will be the agreement with ONR that the design of the SSLC HMI meets the classification requirements of the overall SSLC. In addition the functions performed by the SSLC HMI will be considered by the ONR Human Factors Specialist Assessor and form part of the overall Human Factors assessment.

This Regulatory Observation is linked to the ROs on Embedded and Smart Devices and Production Excellence (References to be added)

Regulatory Observation Actions

RO-ABWR-0028.A1

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

RO-ABWR-0028.A2

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

RO-ABWR-0028.A3

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

REQUESTING PARTY TO COMPLETE

NOT PROTECTIVELY MARKED

Actual Acknowledgement date:	
RP stated Resolution Plan agreement date:	

NOT PROTECTIVELY MARKED