

REGULATORY OBSERVATION	
REGULATOR TO COMPLETE	
RO unique no.:	RO-ABWR-0071
Date sent:	6th June 2016
Acknowledgement required by:	27th June 2016
Agreement of Resolution Plan Required by:	<i>To be determined by Hitachi-GE Resolution Plan</i>
Resolution of Regulatory Observation required by:	<i>To be determined by Hitachi-GE Resolution Plan</i>
TRIM Ref.:	2016/228286
Related RQ / RO No. and TRIM Ref. (if any):	
Observation title:	Turbine Gland Steam System: Discharges and Optimisation
Technical area(s) 14. MoS & QA 21. Generic Environmental Permitting	Related technical area(s) 10. Radiation Protection & (Level 3 PSA) 15. Radwaste & Decommissioning
Regulatory Observation	
<p>The Turbine Gland Steam System is a source of gaseous radioactive waste that is discharged to the environment. The Turbine Gland Steam System supplies sealing steam to the turbine shaft seal parts and the major valve gland parts [1]. The Gland Steam Evaporator receives makeup water from the Makeup Water Condensate System [1]. The Makeup Water Condensate System receives water from the Low Chemical Impurities Waste System (LCW) [2]. Alternatively, steam is supplied from the Heating Steam System. Air from the Gland Steam Exhauster is discharged to the exhaust stack [1].</p> <p>The Turbine Gland Steam System is not fully considered in the Generic Environmental Permit (GEP) submission Rev E and Pre-Construction Safety Report (PCSR). Regulators have therefore been unable to assess the Best Available Techniques (BAT) or As Low As Reasonably Practicable (ALARP) aspects of this system and the impacts of its discharges.</p> <p>In order to progress with the Generic Design Assessment of the UK ABWR design, regulators require appropriate information on BAT, ALARP argument, radioactive waste discharges (and any associated disposals) and radiological impacts arising from the operation of the Turbine Gland Steam System. This information should be provided as requested in the Process and Information Document (P&ID) [3] and Guidance to Requesting Parties [5].</p> <p>Reference</p> <p>[1] Generic PCSR Sub-chapter 17.5: Turbine Gland Steam System. Revision B. Hitachi-GE 2015. [2] Generic PCSR Sub-chapter 16.1: Water Systems. Revision B. Hitachi-GE 2015. [3] Process and Information Document for Assessment of Candidate Nuclear Power Plant Designs. Version 2. Environment Agency 2013. [4] Generic PCSR Sub-chapter 18.3: Off Gas Radioactive Waste Management System. Revision B. Hitachi-GE 2015. [5] New Nuclear Reactors: Generic Design Assessment Guidance to Requesting Parties. ONR-GDA-GD-001 Revision 2. Office for Nuclear Regulation 2016.</p>	
Regulatory Observation Actions	
<p>RO-ABWR-0071.A1 Provide details of the Turbine Gland Steam System including sources of steam, radionuclide content of steam, and discharge route(s).</p> <p><i>PCSR chapter 17.5 [1] provides a general introduction to the Turbine Gland Steam System. In order for regulators to fully assess this discharge route, more details are needed on this system. The details we require</i></p>	

include: the routing of the Turbine Gland Steam System including all routes that radionuclides reach the stack, the different sources of the water/steam, information on the radionuclide content of the steam used; and location and function of the radiation monitor used at the Gland Steam Condenser outlet point.

In addition, the exact location of the Gland Steam Condenser outlet point is not clear. Diagrams in the PCSR chapter 18.3 [4] show the Turbine Gland Exhauster entering the same line as the Mechanical Vacuum Pump to bypass the Off Gas system and discharge directly via the main stack. PCSR chapter 17.5 [1] states that 'air from the Gland Steam Exhauster is discharged directly to the exhaust stack' but the same document later states that 'the Off Gas system extracts the Gland Steam Exhauster discharge air to the exhaust stack'. Details of the exact location of the Gland Steam Condenser outlet point are required.

Resolution required by 'to be determined by Hitachi-GE Resolution Plan'

RO-ABWR-0071.A2

Demonstrate that the design and operation of the Turbine Gland Steam System is consistent with the application of Best Available Techniques (BAT).

The P&ID [3] requires justification that the UK ABWR design uses BAT to ensure that wastes arising are prevented or minimised in terms of radioactivity, volume and impact to people and non-human species. The GEP Rev E 'Demonstration of BAT' document does not consider BAT for the Turbine Gland Steam System. Regulators have not seen any claims, arguments or evidence to demonstrate that the Turbine Gland Steam System is consistent with the application of BAT. An adequate demonstration of BAT is required to show that the impacts of gaseous, liquid and solid radioactive wastes are minimised from the Turbine Gland Steam System. This should include details of operational controls that can be applied to minimise wastes and the monitoring arrangements that are relevant to the Turbine Gland Steam System.

The demonstration of BAT must consider the requirements of ALARP (see ROA3) to ensure that the design is optimised.

Resolution required by 'to be determined by Hitachi-GE Resolution Plan'

RO-ABWR-0071.A3

Demonstrate that the design and operation of the Turbine Gland Steam System reduces health and safety risks As Low As Reasonably Practicable (ALARP).

The ONR guidance to requesting parties [5] requires justification that the UK ABWR design meets the ALARP criteria for the reduction of health and safety risks. The identification of an additional waste stream with potential discharge of tritium to air means that the existing ALARP argument is incomplete. An adequate and comprehensive analysis of the Turbine Gland Steam System is required to demonstrate that the health and safety risks have been reduced As Low As Reasonably Practicable.

Resolution required by 'to be determined by Hitachi-GE Resolution Plan'

RO-ABWR-0071.A4

Provide information on the quantities of gaseous radioactive waste that will be discharged to the environment, either directly or indirectly, from the Turbine Gland Steam System. Provide any changes to the proposed discharge limits and radiological dose assessments related to discharges from the Turbine Gland Steam System.

The P&ID [3] requires quantification of radioactive waste disposals including discharges of gaseous and aqueous radioactive wastes. This is to include all aspects of normal operation. Regulators require quantification of the radioactive discharges from the Turbine Gland Steam System, plus details of any changes of proposed discharge limits and associated impacts on members of the public and non-human species. Quantification of discharges should include details of any variability of discharges during the operating cycle, including any short-term 'spikes' in discharges (including the quantity of radionuclides that may be present in any 'spike' and the time duration of any 'spikes').

Resolution required by '*to be determined by Hitachi-GE Resolution Plan*'

RO-ABWR-0071.A5

Ensure that the relevant GEP and supporting GDA documentation, including the documentation related to resolution of the UK ABWR source terms RI-ABWR-0001 and RO-ABWR-0006, are updated appropriately and are consistent with the response to this RO.

The GEP and supporting GDA documentation are to be updated as appropriate to reflect resolution of this RO. The updated documentation should include that provided in response to the UK ABWR source terms RI-ABWR-0001 and RO-ABWR-0006. Any information provided in response to this RO, which the Environment Agency assessors rely on for assessment of the UK ABWR design, is to be made available to the public if possible (as detailed in the P&ID [3]).

Resolution required by '*to be determined by Hitachi-GE Resolution Plan*'

RO-ABWR-0071.A6

Carry out a review of discharge routes to the environment, and confirm if there are any other significant sources which are not already detailed in the GEP Rev E.

Resolution required by '*to be determined by Hitachi-GE Resolution Plan*'

REQUESTING PARTY TO COMPLETE

Actual Acknowledgement date:

RP stated Resolution Plan agreement date: