

**Hitachi-GE Nuclear Energy, Ltd.**  
**UK ABWR GENERIC DESIGN ASSESSMENT**  
**Resolution Plan for RO-ABWR-0060**  
**(Diesel generator emissions)**

<b>RO TITLE:</b>	Environmental impact of emission to air from diesel generators	
<b>REVISION :</b>	0	
<b>Overall RO Closure Date (Planned):</b>	30th November 2015	
<b>REFERENCE DOCUMENTATION RELATED TO REGULATORY OBSERVATION</b>		
<b>Regulatory Queries</b>	-	
<b>Linked ROs</b>	-	
<b>Other Documentation</b>	-	

**Scope of work:** To carry out further work to demonstrate that the environmental impact of emissions to air EDGs and B/B DGs are at an acceptable level.

**BACKGROUND**

Hitachi-GE has provided some initial high level screening information on the combustion plant installation included in the UK ABWR design in support of the GEP submission for “Other Environmental Regulations”.

The UKABWR combustion installation consists of 3 emergency diesel generators (EDGs), 2 back-up building diesel generators (B/B DGs) and 2 auxiliary boilers. The initial impact assessment follows the screening methodology in the Environment Agency H1 Guidance.

The H1 screening methodology indicates the maximum calculated short term ground level concentration of nitrogen dioxide (NO<sub>2</sub>) from the operation of a single EDG could be as high as approximately 35,000 µg/m<sup>3</sup>. The short term environmental assessment level (EAL) for NO<sub>2</sub> is 200 µg/m<sup>3</sup>; this means the maximum short term NO<sub>2</sub> concentration from a single EDG is significantly greater than the EAL.

The calculated maximum short term NO<sub>2</sub> ground level concentration from the operation of a single B/B DG is approx 15,600 µg/m<sup>3</sup>, which is also significantly greater than the EAL.

At these levels the short term environmental impact of the NO<sub>2</sub> emissions from both the EDG and B/B DGs is unacceptable. Further work is required to demonstrate that the environmental impact from emissions to air from combustion plant will be at an acceptable level.

**Scope of Work**

This Resolution Plan shows the actions and milestones for the project plan and delivery of the work to demonstrate that the environmental impact resulting from the emissions to air from the UKABWR EDGs and B/B DGs will be at an acceptable level.

**Description of work:**

**RO-ABWR-0060.A1:**

It is proposed that four steps of work are undertaken to resolve the RO, as follows:

**Step1** - Undertake a screening assessment using a dispersion model (AERMOD) to supplement the work undertaken to date for the GDA (based on D1 and H1 methods).

**Step2** - Review of operating parameters for the diesel generators as a factor in reducing combustion emissions to air.

**Step3** - Review of options to decrease the environmental impact (if required).

**Step4** – Present the results of Steps 1-3 above in a Combustion Installation Topic Report.

### **Step1 – Screening Assessment**

The purpose of the further screening study will be to consider emissions from the EDGs and Back-up Building Generators (BBGs) for a generic site at a non-site specific coastal location in Wales. Discharges from the EDGs and BBGs will be modelled separately (i.e., not in combination) using the AERMOD dispersion model. In contrast to the Environment Agency H1 screening method used previously, the AERMOD atmospheric dispersion model to be used in this further screening assessment does take into account plume buoyancy, i.e., thermal and momentum effects, building downwash and a full range of wind conditions for 8760 hours of meteorological records.

The study will assess a range of stack heights with release heights from 3m above the associated building roof levels (of the EDG and Back-up buildings), up to the stack heights identified in the D1 assessment for the EDGs and BBGs respectively.

Hourly sequential meteorological data for Valley Meteorological station for the year 2014 will be used.

Terrain data will not be included in the model, as the generic site assumes flat terrain. The relevant buildings for the generic UK ABWR will be included, as described in the E9 Other Environmental Regulations.

The results from the screening assessment will provide the maximum short term ground level concentrations of oxides of nitrogen for on-site receptors and at the site boundary for the EDGs and BBGs; assessed against the ambient air criterion for the protection of public health for nitrogen dioxide.

### **Step2 – Review of Operating Parameters of the Diesel Generators**

Operating parameters of the diesel generators will be reviewed to determine the operating periods for the combustion plant. It should be noted that the generators are designed to be operated in an emergency situation and that their normal operational use will be for short periods only for testing and maintenance purposes.

### **Step3 – Review of options to reduce the environmental impact**

The purpose of Step 3 is to review further feasible options and their effect(s) to reduce the environmental impact of the EDGs or BBGs. The undertaking of this task is dependent on the results of Step 1 (the screening assessment) and the information available from Step 2: if the completion of these first two steps determines that the environmental impact is acceptable (taking into account the predicted ground level concentrations and the operating parameters of the generators), then Step 3 will not be required.

### **Step4 – Provide Topic Report**

A Combustion Installation Topic Report will be provided to present the results from Steps 1-3. This will provide all the necessary supporting information on the potential impact of short term emissions of NO<sub>x</sub> to air from the EDGs and BBGs at generic design stage. The Topic Report will also include the results from the H1 assessment for the contaminants other than NO<sub>x</sub>.

The submission of the Topic Report to the Environment Agency will represent the completion of Step 4.

**Summary of impact on GDA submissions:**

<u>Related RO Actions</u>	<u>GDA Submission Document Title</u>	<u>Document ID (Document No.)</u>	<u>Submission Date to the Regulators</u>
ROA1	Other Environmental Regulations	GA91-9901-0027-00001 (XE-GD-0098)	Rev. E, 10th Feb 2016
ROA1	Impact Assessment of the Combustion Installation	GA91-9201-0003-00265 (SE-GD-0247)	30th Oct 2015

**Programme Milestones / Schedule:**

Refer to the attached Gantt-chart for the programmed activities and the schedule for the resolution of the RO. Detail Gantt-Chart is not provided separately since full activity is shown in the Table 1.

**Reference:**

[1] “ Other Environmental Regulations ”, (Hitachi-GE, GA91-9901-0027-00001, XE-GD-0098, Revision D, Aug 2014)

**Table 1 RO-ABWR-0060 Gantt Chart**

Resolution Plan for RO-ABWR-0060			June			July				August					September				October				November				
Step	Start	Finish	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
1	Screening assessment	15/06/2015	10/07/2015	15	22	29	6																				
2	Review of Operating parameters to reduce the environmental impact	15/06/2015	10/07/2015	15	22	29	6																				
3	Review of options to reduce the Environmental impact	13/07/2015	02/10/2015																								
4	Provide Topic Report	05/10/2015	30/10/2015																								
5	Regulatory assessment	02/11/2015	30/11/2015																								