
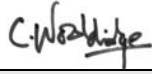


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Approved for EDF by: A. PETIT  Name/Initials  Date 6/07/2011		Approved for AREVA by: C. WOOLDRIDGE  Name/Initials  Date 6/07/2011		

### Resolution Plan Revision History

Rev.	Description of update	Date issued
0	Initial issuance	29/06/2011
1	Schedule Update	6/07/2011

#### 1.0 GDA ISSUE

GDA Issue Title	Main Assessment Area	Related Assessment Area
Hypothesis and Methodology Notes for Class 1 Structures	Civil Engineering	Not Applicable

<b>GDA Issue</b>	The specification, methodology and hypothesis notes for Class 1 civil structures have not been found to be fully adequate for use in the design of the UKEPR.
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#### 2.0 OVERVIEW OF SCOPE OF WORK

The use of ETC-C as a design code in conjunction with the hypothesis notes for the Nuclear Island buildings (i.e. Class 1 civil structures) were examined in detail during GDA. As part of this review ONR have identified that the Class 1 hypothesis notes require a rewrite to ensure they are consistent with UK expectations. This GDA Issue requests EDF/AREVA to provide revised hypothesis note(s) for the Nuclear Island, Safety Auxiliaries Building, Fuel Building, Nuclear Auxiliaries Building, Reactor Building, and the Diesel Buildings.

Following discussions during a GDA Civil Engineering topic meeting on March 16<sup>th</sup> 2011, ONR have indicated that EDF/AREVA's proposal to produce a new common Hypothesis Note for these buildings to addresses ONR's request is considered acceptable.

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### 3.0 GDA ISSUE ACTIONS AND RESOLUTION PLAN DELIVERABLES

#### 3.1 Action GI-UKEPR-CE01.01

Action I/D	Action Description
<b>GI-UKEPR-CE01.01</b>	<p>ONR raised concerns over the use of ETC-C as a design code in Step 3 of GDA. One key point raised in the response was that ETC-C needs to be read with the particular hypothesis notes for the building under examination. Hypothesis notes are typically prepared at three levels, the highest level by EDF (CNEN), the second level by Sofinel, and the third and most detailed level by the individual design teams for the building in question.</p> <p>A revised hypothesis note(s) for the Nuclear Island, Safety Auxiliaries Building, Fuel Building, Nuclear Auxiliaries Building, Reactor Building, and the Diesel Building structures shall be produced.</p> <p>The following areas of concern need to be addressed in the revised document:</p> <ul style="list-style-type: none"> <li>• The document should be UK specific including definition of ground conditions, climatic conditions and the structural classification.</li> <li>• The overall design life needs to be clarified.</li> <li>• Extensive references are made to French legislation and decrees as well as standards, which are of no relevance in the UK</li> <li>• The PSAR is constantly referred to.</li> <li>• A number of the key references have been superseded.</li> <li>• The document should reflect the latest position on load drops.</li> <li>• There are details on load combinations and replication of aspects of the ETC-C. This may not fully align with the 2010 version of ETC-C and the UK companion document requirements.</li> <li>• There are no apparent requirements to consider robustness or global stability of the NI structures in accordance with the UK Building regulations part A.</li> <li>• There is no reference to the need to consider the CDM regulations.</li> <li>• The document lacks detail in a number of areas including structural philosophy, analysis methods, interfacing with adjacent structures etc.</li> <li>• The sections on the treatment of earthquakes and foundations are inconsistent with the latest methodologies.</li> <li>• The foundation conditions are limited to those of Flamanville.</li> <li>• The use of an equivalent static load method for seismic cases is suggested, which is out with the requirements of ETC-C.</li> </ul>

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Action I/D	Action Description
	<ul style="list-style-type: none"> <li>• The guidance on the construction of the finite element models for the structure are very weak without reference to other guidance.</li> <li>• The treatment of APC scenarios is unclear.</li> <li>• It is stated that there is a requirement for the reactor vessel pit to be completely dry, however there is no further guidance on how this should be achieved.</li> <li>• For a number of the accident scenarios, the loading is not clearly defined; references are made to future work-scopes. This is the case for some reactor pit thermal loads, internal missiles, and pipework rupture.</li> <li>• There is no design guidance for the treatment of gaps between the NAB and SAB or Fuel Building.</li> <li>• There are a series of vague statements over the future monitoring of foundation movements and references to “current policy”.</li> <li>• The option for using projecting bars (bent down bars) in openings is allowed, this is not a practice which is generally permitted in the UK for Nuclear structures.</li> <li>• There are a large number of references to Règles Fondamentales de Sûreté (RFS) documents for derivation of loads. These have not been benchmarked against the UK expectations.</li> <li>• The document states that long term settlement does not need to be considered, which is seen as a shortfall.</li> <li>• There is no detailed discussion on the need for some floor elements to essentially be leak-tight.</li> </ul> <p>With agreement from the Regulator this action may be completed by alternative means.</p>

### 3.1.1 Planned submissions in response to GI-UKEPR-CE01.01

#### 3.1.1.1 Description of Scope of Work

EDF/AREVA will produce an overarching EPR Nuclear Island Civil Engineering Design Process Note for the Nuclear Island Buildings (i.e. Nuclear Island, Reactor Building, Safety Auxiliary Buildings, Fuel Building, Nuclear Auxiliary Building) and other Class 1 stand alone buildings (i.e. the Diesel Buildings). This overarching hypothesis note forms EDF/AREVA’s sole response for closure of action GI-UKEPR-CE01.01 and defines the interfaces with other current GDA documents, including reference to design data required from future site specific documentation.

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### 3.1.1.2 Description of Methodology to be employed

#### Task 1 of GI-UKEPR-CE01.01 – EPR Nuclear Island Civil Engineering Design Process Note

EDF/AREVA will produce an overarching EPR Nuclear Island Civil Engineering Design Process Note to address the ONR identified issue, including detail on the following:

- Applicable structures (description, and design philosophy).
- Design process: main requirements (safety, codes and regulations), input data (including site data and its associated hierarchical significance in the design), main steps/activities performed in the design (including interfaces) and associated requirements.

Additionally, as committed in EDF/AREVA Letter ND(NII) EPR00838N, clarification related to general aviation will be included in this Design Process Note.

This GDA issue GI-UKEPR-CE01 is also linked with the resolution of a separate GDA issue GI-UKEPR-CC01 Action 2 where clarification is requested on dedicated rules to be utilised for civil structures. Accordingly, identification and explanation of the necessary dedicated rules to be applied in the design of civil structures will be included in the Design Process Note generated in response to this action (GI-UKEPR-CE01.01).

To allow for presentation of the Nuclear Island Civil Engineering Design Process Note to ONR, it is anticipated that at least one (1) face-to-face meeting will be necessary to facilitate resolution of this GDA Issue Action. Accordingly, a workshop meeting has been planned for AREVA/EDF and ONR on 4-5<sup>th</sup> July 2011 to facilitate this resolution, along with subsequent progress meetings. These meetings have been accounted for in the work programme.

No calculation codes/software will be used for resolution of this GDA Issue Action. This action response represents development and documentation of the technical approach for the above mentioned civil structures.

#### Task 2 of GI-UKEPR-CE01.01 – PCSR Update – Sub-chapter 3.3

An update to PCSR Sub-chapter 3.3 is programmed following finalisation of the Nuclear Island Civil Engineering Design Process Note such that it can be integrated and the existing hypothesis/methodology references can be removed from the PCSR.

### 3.1.1.3 Deliverable description

#### Submission date to ONR/EA

EPR Nuclear Island Civil Engineering Design Process Note

12/08/2011

*This overarching hypothesis note defines the interfaces with other current GDA documents, including reference to design data required from future site specific documentation*

PCSR Sub-chapter 3.3 - Design of Safety Classified Civil Structures

01/12/2011  
(Adv. Vers.)

09/02/2012  
(Final Vers.)

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#### 4.0 SUMMARY OF IMPACT ON GDA SUBMISSION DOCUMENTATION

##### 4.1 GDA submission documents impacted by GDA Issue and scheduled to be created (C) or updated (U) within GDA

GDA Submission Documents	C/U	Related GDA Issue Action(s)	Submission Date to ONR/EA
<b>SSER sub-chapters</b>			
PCSR Sub-chapter 3.3 - Design of Safety Classified Civil Structures	<b>U</b>	GI-UKEPR-CE01.01	01/12/2011 (Adv. Vers.) 09/02/2012 (Final Vers.)
<b>GDA reference design documents (SDM in UKEPR-I-002)</b>			
EPR Nuclear Island Civil Engineering Design Process Note	<b>C</b>	GI-UKEPR-CE01.01	12/08/2011
<b>Other GDA submission supporting documents</b>			
Not Applicable		N/A	N/A

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## 5.0 JUSTIFICATION OF ADEQUACY

EDF/AREVA will support the ONR assessment of the engineering documentation and justification associated with this GDA Issue.

Accordingly, the resolution approach presented herein undertakes a scope of work which when completed will ensure that the hypothesis notes to be utilised for the UK are consistent, consider relevant UK regulations and standards, and present a clear approach on design and analysis which would be undertaken for the UK EPR. Furthermore, the resultant overarching note will have properly delineated and reconciled, where appropriate, all of the pertinent information from the reference design plant such that all pertinent UK design and analysis requirements have been considered. This will effectively result in an AREVA/EDF and ONR agreed design process to be undertaken by the Licensee in the future. Therefore, the approach delineated herein will adequately address this issue.

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## **6.0 TIMETABLE AND MILESTONE PROGRAMME LEADING TO THE DELIVERABLES**

Consult the following pages for the associated timetable and milestone programme.

