Office for Nuclear Regulation

An agency of HSE

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EDF AND AREVA UK EPR GENERIC DESIGN ASSESSMENT

GDA ISSUE

HYPOTHESIS AND METHODOLOGY NOTES FOR CLASS 1 STRUCTURES

GI-UKEPR-CE-01 REVISION 1

Technical Area		**CIVIL ENGINEERING**	
Related Technical Areas		None	
GDA Issue Reference	**GI-UKEPR-CE-01**	**GDA Issue Action Reference**	**GI-UKEPR-CE-01.A1**
GDA Issue	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.		
GDA Issue Action	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. 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. The following areas of concern need to be addressed in the revised document: • The document should be UK specific including definition of ground conditions, climatic conditions and the structural classification. • The overall design life needs to be clarified. • Extensive references are made to French legislation and decrees as well as standards, which are of no relevance in the UK • The PSAR is constantly referred to. • A number of the key references have been superseded. • The document should reflect the latest position on load drops. • 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. • There are no apparent requirements to consider robustness or global stability of the NI structures in accordance with the UK Building regulations part A. • There is no reference to the need to consider the CDM regulations. • The document lacks detail in a number of areas including structural philosophy, analysis methods, interfacing with adjacent structures etc. • The sections on the treatment of earthquakes and foundations are inconsistent		

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	with the latest methodologies. • The foundation conditions are limited to those of Flamanville. • The use of an equivalent static load method for seismic cases is suggested, which is out with the requirements of ETC-C. • The guidance on the construction of the finite element models for the structure are very weak without reference to other guidance. • The treatment of APC scenarios is unclear. • 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. • 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. • There is no design guidance for the treatment of gaps between the NAB and SAB or Fuel Building. • There are a series of vague statements over the future monitoring of foundation movements and references to “current policy”. • 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. • 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. • The document states that long term settlement does not need to be considered, which is seen as a shortfall. • There is no detailed discussion on the need for some floor elements to essentially be leak-tight. With agreement from the Regulator this action may be completed by alternative means.		