From: largeassociates [mailto:largeassociates@gmail.com]
Sent: Friday, January 27, 2017 12:31 PM
To: ONRenquiries@onr.gov.uk
Subject: Hinkley Point C HIC Equipment Qualification

I refer to the design and construction regulatory framework adopted by the Office for Nuclear Regulation with respect to the high integrity components (HIC) for the Hinkley Point C (HPC) primary circuit pressurised equipment - in this regard please:-

1) confirm or otherwise the ONR's requirements for the design and fabrication of the mechanical components (i.e. reactor pressure vessel (RPV) including the upper and lower heads) is the French RCC-M Code (*Règles de Conception et de Construction des Matériels Mècaniques des Ilots Nucléaires PWR*);

2) if ONR requires additional qualification for heavy forged carbon steel components in accord with paragraph M140 and prototype piece qualification according to paragraph M160;

3) if further qualification is required in terms of the quality and assurance of consistency and material heterogeneity throughout HIC equipment, such as the equivalent of the *European Pressure Equipment Directive 97/23/EC Équipements Sous Pression Nucléaire* of December 2005 (ESPN);

4) in account of items 1), 2) and 3) above and for if and where these apply, for HIC forged parts please state the minimum i) single test and ii) average of three tests results in Joules for material toughness yielded by the

Charpy test procedure; and iii) the limits of heterogeneity relating to the formation of segregates of carbon, in terms of the excess carbon percentage (%) by weight.

Also, specifically relating to the Hinkley Point C (HPC) RPV head(s) originally manufactured at le Creusot Forge in or around the period 2007 - 2010 but which has now been destroyed by material testing in support of the Flamanville RPV reported carbon anomaly heterogeneity, please provide the following information:-

5) during its entire design and manufacturing processing, was the now destroyed HPC RPV head fully compliant with the ONR's regulatory requirements including examination and quality controls - in this respect had ONR visited le Creusot Forge in order to qualify items 1), 2) and 3) above prior to the manufacturing process being undertaken;

6) for any remaining HPC RPV heads manufactured to date, has or is it the intention of ONR to consider a demonstration approach compiled by EdF-AREVA under Article 5 of French Decree 99-1046 that the remaining HPC RPV head(s) are fit for purpose - if so, has ONR received the Article 5 submission from EdF-AREVA demonstrating, for example, a satisfactorily relationship between the *Reference Temperature for Nil Ductility Transition* (RTNDT) and the *Linear Elastic Fracture Toughnes*s (KIC) via the so called *Master* or *Reference Curve* (e.g. ASME Case Code N-629 or its RCC-M equivalent);

7) noting the statement of the *Autorité de sûreté nucléaire* (ASN) of 12 September 2016 that *"ASN is not tasked with the oversight of Areva for the manufacturing of*

parts to be used abroad", confirm or otherwise that throughout the design, manufacturing, inspection and qualification etc., stages of production, all of the HPC HIC equipment has been subject to full ONR regulatory scrutiny;

8) if, on the other hand, the HPC HICs were not fully subject to ONR regulatory oversight, etc., please identify the authority under whose regulatory regime the HIC equipment was designed, manufactured, etc in anticipation of installation and operation at the Hinkley Point C nuclear power plant; and, finally,

9) I ask if ONR is to revise its conclusion that it is satisfied with the ability of EdF-AREVA to "*achieve inspections of adequate quality during manufacture of HIC"*, as expressed in the *GDA Close-out for the EDF and AREVA UK EPRTM Reactor GDA Issue GI-UKEPR-SI-01 Revision 2 Structural Integrity - Avoidance of Fracture* ONR-GDA-AR-12-005 of February 2013 by which time the HPC RPV heads had been manufactured ?

Please note that this request is made under the *Environmental Information Regulations 2004*, specifically S5 (2) for which the date of this request should be taken as 28 January 2017 - it would be helpful if you could follow the order of my itemisation above when responding.

John Large