



**European Economic and Social Committee**

**NUCLEAR SAFETY: A MUCH NEEDED DEBATE**

**FUNDAMENTAL FLAWS IN THE WORLDWIDE  
NUCLEAR SAFETY REGULATORY REGIME**

**JOHN H LARGE**

LARGE & ASSOCIATES  
CONSULTING ENGINEERS  
LONDON

**MONDAY 12<sup>TH</sup> DECEMBER 2011 9.30 AM TO 6.30 PM  
EESC HEADQUARTERS -2 RUE VAN MAERLANT- 1040 BRUSSELS  
VM 3 ROOM**

**L&A REF N° R3200-SUMMARY**

1 <sup>ST</sup> ISSUE	REVISION N°	APPROVED	CURRENT ISSUE DATE
7 DECEMBER 2011	R3211-PRESENTATION-R2		<b>11 DECEMBER 2011</b>

## FUNDAMENTAL FLAWS IN THE WORLDWIDE NUCLEAR SAFETY REGULATORY REGIME

NUCLEAR SAFETY: A MUCH NEEDED DEBATE  
EUROPEAN ECONOMIC AND SOCIAL COMMITTEE  
MONDAY 12 DECEMBER – EESC HEADQUARTERS – VM3

Delegates

In the context of the radiological and economic disaster at Fukushima, I have three axiomatic points to make at this stage of our debate – these address the purpose and application of the European Commission's *Stress Tests*:

My first point is that much the same standards and protocols of operation, as practised by TEPCO at Fukushima, exist in Europe and elsewhere in the World – the nuclear power industry is a pan-global in operation and there is little that sets aside the key nuclear safety processes and procedures in Europe from Japan or elsewhere internationally.

The second axiom is that similar and virtually identical light water cooled nuclear power plants operate throughout Europe: these plants like the BWRs at Fukushima cannot stand alone when subject to a prolonged *station blackout*; all light water reactors share the same unstable zircaloy nuclear fuel systems; and most have much the same, now shown to be somewhat vulnerable, multiple barrier containments inhibiting unconstrained radioactive release.

The third is that, again, much the same nuclear safety regulatory regime applies in Europe as in Japan: similar safety standards, codes of practice, limitation systems and, importantly, the same probabilistic approach to defining and determining the risks and hazards apply worldwide, all under the auspices of the IAEA.

In this way, the overall safety composite of a nuclear power plant comprises my previous points one, two and three – that is a combine of the nuclear safety of operation; its generic and engineered design, both strengths and weaknesses; and, importantly, the ways and means by which nuclear safety is defined, determined and regulated.

It is, I put to this debate, the third component that is fundamentally flawed, not just in Japan but worldwide, including the Western European nuclear plants now subject to the WENRA defined *Stress Tests*.

This is because nuclear safety regulators, the likes of ENSREG, should not have relied so heavily on probability to determine the likely frequency and severity of threats to nuclear plants – that is relying on a framework of ‘*as chance would have it*’ - this probabilistic risk approach gambles that if the risk of accident is ‘*acceptable*’ then the consequences have to be ‘*tolerable*’ – this compact *Acceptable Risk* and *Tolerable Consequence* sometimes incorrectly juxtapositions high frequency occurrences only with low and tolerable accident severity.

At Fukushima, just what was the chance of a combination of earthquake and tsunami, what was the chance of a swamping tsunami wave height, what was the chance of the electricity grid collapse, the emergency generators failing, and so on and so forth?

The Japanese regulator would have judged the product or cascade of all of these chances to have been so low as to have been incredible, so low that it was so unlikely ever to happen so, it follows, so low that it could be ignored so no plans for its eventuality had to be made or rehearsed.

In this important respect, it was not just TEPCO but also the Japanese nuclear safety regulator that was at fault – it permitted, indeed, licensed the Fukushima Daiichi utility TEPCO to operate unsafe nuclear power plants – that is plants that were not sufficiently robust to withstand an improbable event that actually happened - the people of Japan are now paying the price of TEPCO's and NISA's losing gamble that a sufficiently severe earthquake-tsunami was never likely to happen.

Yet the derivation and make-up of the European Commission's specification for the *Stress Tests* continues with this same remorseless logic of the probabilistic approach.

This allows European nuclear plant operators to continue their over-reliance upon probabilistic risk projections to determine the frequency and severities of the threats that could confront their nuclear plants – PRA remains a permissible means of analysis and evaluation for the *Stress Tests*.

The implication is twofold:

First, it provides operators, as we have seen with TEPCO at Fukushima, opportunity to disqualify some '*incredible*' events because their existing plants are vulnerable to certain extreme situations – for example, the United Kingdom regulator has ruled out aircraft crash from the *Stress Tests* solely on the basis of its assumed low probability and, associated with this, terrorist attack by aircraft because, even in account of 9/11, because it is not a '*reasonably foreseeable*' event.

Particularly worrisome to my mind, is that continuing with the existing probabilistic approach permits operators and designers to *shoehorn* new and existing designs, safety protocols and practices into compliance with an often overly bureaucratic regulatory framework – this confuses the role of the regulator with that of the engineering designer, a crucial function that the regulator is least-experienced and ill-qualified to undertake.

In a nutshell, the European Commission's *Stress Tests* simply do not address the role and approach of the nuclear safety regulator – *Stress Testing* should apply to all components of the nuclear system, including the regulator and the regulatory framework.

Delegates, Thank you.

**JOHN H LARGÉ**  
**LARGE & ASSOCIATES**  
**CONSULTING ENGINEERS**  
**LONDON**