

STRESS TEST – A MEMORANDUM FOR THE DECC/NGO MEETING

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Introduction

This paper examines, in brief, official reaction in the UK in terms of governmental and regulatory response to the Fukushima disaster of March 2011. It argues that the EU and ENSREG-imposed stress tests can only be seen as part of a larger set of reactions to an accident which many believed would fundamentally alter global attitudes to nuclear power but which, in the UK at least, prompted a speedy reassertion of the government's commitment to new build and what to many observers was an equally speedy reassurance from the regulators that the UK nuclear sector was fit-for-purpose. The stress tests in particular were designed to reassure and reinforce confidence but in practice, have they been undertaken in such a way as to increase unease and doubt about the real imperatives behind the post-Fukushima reaction?

Themes

The questions which dominates the post-stress test/post-Fukushima world are,

how much wiser are we now, as potential nuclear new build host communities, about how the lessons of Fukushima have been embedded in the nuclear safety culture?

to what degree have those communities been engaged in the processes which have resulted in the renewed confidence expressed by government and regulators in the existing and proposed nuclear programme? and

do we know – and should we be privy to - the details of the process which have caused the regulator to arrive at the conclusions which have given the green light to a continued nuclear renaissance in the UK?

European-ENSREG Stress Tests:

As a direct result of the radiological incident at the Fukushima Daiichi nuclear power plants in March 2011, the European Council requested the European Commission and the European Nuclear Safety Regulation Group (ENSREG) to ensure that the operators of nuclear plants undertook a series of comprehensive risk and safety assessments known as '*Stress Tests*'. They applied to all EU countries with nuclear facilities as well as Switzerland and Ukraine. The nature and scope of the stress tests was largely defined by the western European Nuclear Regulators Association (WENRA), covering extraordinary triggering events of natural origins, like earthquakes and flooding, human error and the consequences of any other external initiating events, such as accidental aircraft crash, any of which could lead to multiple loss of safety functions requiring severe accident management.

Stress Tests in Perspective of other post-Fukushima Assessments:

The European Commission/ENSREG stress tests assessments are just one element of the overall assessment and potential impact of the Fukushima Daiichi radiological disaster as it relates to the United Kingdom nuclear power generation industry.

The second element, independent of the European Commission/ENSREG stress tests assessment, followed the Secretary of State for Energy's requirement for the ONR to report on the implications of the incident at Fukushima Daiichi for the United Kingdom's nuclear industry, particularly in light of the nuclear new build programme then being developed, as a follow up to the 2006 Energy Review White Paper. This UK-centred reporting, which became known as the 'Weightman Report' after the Chief Inspector, Dr Mike Weightman, was primarily concerned with the continued operation of the UK's existing nuclear power plants (NPPs - mostly the AGRs and single PWR at Sizewell) and the introduction of the generation III NPPs (the AREVA EPR and the now withdrawn Westinghouse AP1000 design) was completed in two stages in May and October 2011.

The third element takes the form of a generic design assessment (GDA) requirement imposed by the ONR on AREVA-EdF to demonstrate the performance of the proposed EPR design when subject to

an initiating external event of Fukushima-scale severity, particularly when the plant is isolated in a station (power) black-out resulting in the loss of its ability to cool the fuel and the core (as at Fukushima Daiichi). This outstanding GDA Issue (along with another 28 such issues) has to be resolved if the Final Design Acceptance Compliance (F-DAC) which government has made it clear is to be issued by the target date of November 2012. Independent assessment of the GDA process has concluded that it is very unlikely that the F-DAC will be issued by the target date and consequently, initial site preparation works to the nuclear island for the first UK EPR NPP at Hinkley Point will be considerably delayed.

The fourth investigative outcome that has sway on the UK's progress into the new nuclear build programme is the continuing assessment of the Fukushima Daiichi incident itself. The ONR was also involved in the International Atomic Energy Agency (IAEA) mission to Fukushima Daiichi in May-June 2011 which reported on, amongst other aspects of the Fukushima radiological catastrophe, the immediate and interim aftermaths at the plant and in the public domain. This field investigation reported on technical aspects of the Fukushima Daiichi NPP design, expressing concern over the plants' resilience to earthquake, and on the ability of the local authority (here the Fukushima Prefecture) to provide, maintain and implement effective off-site emergency plans in the public sector.

Application and Processing the WENRA Stress Tests:

In each of the European Union Member States the stress tests were carried out under the supervision of the national regulatory authority, on the proviso that a universality of scope and detail applied across the Member States. International teams of inspectors visited plants in selected countries.

In the UK, the Office of Nuclear Regulation (ONR) required the nuclear plant operators to report on the function and performance of their NPPs when subject to WENRA specified stress tests. The ONR received these operator plant-specific assessments and compiled its 'National Final Report' of the assessed performance of the UK NPPs and associated nuclear fuel plants. The European Commission and ENSREG demanded that the stress tests process demonstrate a common level of rigour, openness and transparency, and that the operators' reports of assessment of the stress tests and the National Final Reports be made public (security concerns notwithstanding). However, unlike most other Member States, the ONR chose not to make public the operators' assessments of the stress tests, instead publishing just its own National Final Report in December 2011.

The next stage of the risk and safety assessment was for each National Report to be subject to Peer Review by panels of independent experts. Subject to the same degree of openness and transparency, not only were the peer reviews to be made public, but also each peer review outcome should be *'discussed both in national and European public seminars to which other stakeholders (from non-nuclear field [sic], from non governmental organisations etc)* would be invited, and that, intriguingly if not confusingly, *'full transparency but also an opportunity for public involvement will contribute to the EU stress tests being acknowledged by European citizens (sic)'*. Some public and NGO meetings were held and the regulators themselves held international seminars to review the outputs of these meetings and to strengthen international co-operation.

Despite these events, it is questionable if, how and to what extent this requirement for NGO and public involvement in the stress tests process has been satisfied in both the context and practice in the UK. Although the ONR's findings in terms of its conclusions and recommendations are clearly spelled out in its Final National Report, quite how and in what manner the ONR arrived at its recommendations for implementation by the operators and local emergency planning authorities remains unclear.

The 200 page ONR National Final Report was published in December 2011, expressing its view that, *'Neither the reviews undertaken by the licensees for the stress tests, nor the earlier national reviews has indicated any fundamental weaknesses in the definition of design basis events or the safety systems related to the stress tests to withstand them for UK NPPs'*. The report lists 88 *'considerations'* or *'potential areas for improvement'* aimed at EdF-run nuclear facilities and 13 for Magnox plants, all of which except Wylfa are shut down and undergoing the early stages of decommissioning.

In terms of comprehensiveness, both in technical detail and approach, observers have expressed considerable doubt about the ONR's approach and the detail available of the WENRA stress tests and other post-Fukushima assessments cited above. For example: despite the considerable ONR resources allocated to the WENRA stress tests and the apparent comprehensive nature of the final ONR report, NGOs and nuclear observers remain sceptical about the value of the recommendations and the speed with and degree to which the ONR's *'considerations'* will actually be implemented. Also attracting criticism is ONR's interpretation of the WENRA definition of external events which doggedly

omitted aircraft crash as a potential event precipitating station blackout, even though the WENRA model requirements specifically identified aircraft crash as a triggering external event. Moreover, ONR's own consultants, ERA Technology, recently advised that aircraft crash could result in a significant radiological incident at any of the UK's AGR NPPs.

ONR's response to the WENRA stress tests omitted any reference to the EPR design currently proposed for Hinkley Point and Sizewell, presumably on the basis that these NPPs had yet to be built. ONR's assessment of the EPR design for Fukushima-severity external events seems to rely exclusively on the submission of AREVA-EdF via the outstanding GDA Issues resolution plans, a process that has been found to be well behind on the F-DAC target timescale of November 2012. ONR's approach to its assessment of the EPR's resilience to severe external events (ie Black Swan events) compares poorly to its French equivalent ASN (l'Autorité de Sûreté Nucléaire) which demanded that the French operator (EdF) complete a series of Complementary Safety Assessments, including the EPR NPPs under construction at Flamanville and proposed at Penly.

Energy Strategy – Political Imperative: Key to these concerns are the political imperative which surrounds the UK new nuclear build programme and the emergency planning arrangements which, regardless of the lessons learned from Fukushima and any amount of reviewing ordered by government, are characterised by many observers as paper-based contingencies coupled with, or so it seems, fervent finger-crossing.

In its dealings so far, the ONR (and less so the Environment Agency) has not been prepared to reveal its detailed approach to maintaining confidence that existing and proposed new NPPs are acceptably safe and that any radiological incidents would be tolerable from a health detriment standpoint. The post-Fukushima and GDA reporting has not been sufficiently accessible or transparent to demonstrate that nuclear power, in both its existing and new build forms, is a choice in which the public can have full confidence.

The political dimension is not difficult to fathom: the government and the industry as well as what NGOs see as the enabling organisations – ONR, OND, NDA, EA and others – are required to deliver a nuclear programme upon which hangs the last vestiges of the coalition's energy strategy reputation. Put simply, government has to have concrete poured for the nuclear island basemats at least at Hinkley Point and then at Sizewell for it to retain any hope of maintaining the credibility of its plans to 'keep the lights on.' Within days of the Fukushima disaster, the process of shoring up the government's nuclear programme was put in place and announcements on the 'keep calm and carry on' strategy were made. The stress tests are seen in that vein: good and well-meaning actions but conducted over a very truncated period of time, hardly likely to knock the government off its course and, sadly, the doubts about the intent of the stress tests and the other assessments persist.

The emergency planning issue is a case in point. Regardless of the references to the detailed emergency planning zones (DEPZs) around nuclear installations, the report simply calls for a review of existing arrangements rather than a root and branch overhaul of what are clearly arrangements which would, at best, serve simply to create panic and confusion in the event of a significant off-site incident. The ONR is required under the Radiation (Emergency Planning and Public Information) Regulations (REPPiR) to sign off on these arrangements as being fit-for-purpose and, as such, is vulnerable to a legal challenge. While it had the opportunity to deal with this vulnerability in the stress test and other post-Fukushima assessment processes, it chose not to do so. 'Extendibility' seems to be the 'get-out-of-jail-free' card that ONR uses, along with DECC, to maintain the status quo and, in the process, jeopardise lives.

Complementing the suspicion that political imperatives are playing a key role in the outcomes of the post-Fukushima assessment process, these are the primary concerns associated with them:

- Speed of assessment of Fukushima and its impact on the UK nuclear programme: pronouncements about the limited affect of radiation releases and the dissimilarities between the UK and Japanese situations were quick to be made;
- Stress tests were carried out not by independent assessors but by the operators themselves;
- Similarly, the operators' stress tests assessments were reviewed by the ONR which may have been reluctant to identify any regulatory based flaws that contributed to the Fukushima Daiichi radiological catastrophe;

- While in France, the cost of implementing the stress test recommendations has been estimated at around Euros 40-50bn, no such figure has been calculated or projected in the UK;
- A timetable for the implementation of the ONR's recommendations and findings remains largely a mystery;
- The visibility of the implementation programme is likely to be equally obscure;
- The additional generic design assessment burden it places on an already stretched and increasingly incredible GDA programme is another imponderable;
- In terms of the transparency with which the ONR conducted its programme in the UK, it is still to be determined if ONR was guided by 'principles for openness and transparency' as adopted by ENSREG in February 2011; and
- It is also unclear what additional specifications were given to operators to review as part of the stress tests relating to security issues such as malevolent intent, terrorist acts or what, if any, exemptions were granted to operators.

Conclusions

The post-Fukushima reaction in the UK has been undertaken with energy and commitment. It has involved four distinct aspects – the 'Weightman Report', the EU-WENRA stress tests, the impact of the stress tests on the GDA process and the continuing assessment of the Fukushima accident and its knock-on effects in the UK with particular reference to emergency planning issues. Millions of person-hours have gone into the post-disaster assessments, processes which have recognised the high sensitivity of the issues under investigation to the fickleness of public opinion over what has traditionally been a deeply controversial industry.

This has led to an espoused commitment to openness and transparency, to a programme of engagement with the public and NGOs alike and to the publication of the operator's reports upon which the regulators made their recommendations. Yet the post-disaster period has not developed in the manner in which many NGOs expected and nor has it resulted in the sort of scrutiny programme they feel was warranted and leaves several vitally important issues unresolved as far as NGOs are concerned. Most important of these are the absence of aircraft crashes as potential initiating events and what many consider to be the missed opportunity for root and branch reform of the emergency planning arrangements around nuclear sites. In addition, the process itself has left much to be desired in that those who were charged with assessing the Fukushima situation and with peer reviewing the stress tests were specifically not drawn from the ranks of nuclear sceptics. The process itself has left much to be desired in respect of its openness and transparency particularly in respect of the processes by which conclusions were drawn and recommendations arrived at.

The suspicion remains that the entire post-Fukushima period has been driven by a political motive to press ahead with a nuclear programme regardless of events which have in other countries caused a reversal of such programmes. As a consequence, many issues have not been as rigorously or as openly examined as would have been optimum. Those who are being asked to host nuclear new build remain unaware now about how, by when, at what cost and with what improved safety results the recommendations made by the regulators about improving existing and future nuclear reactor designs will be implemented.