

**GENERIC DESIGN ASSESSMENT  
PROGRESS REPORT  
REPORTING PERIOD 1 April 2012 – 30 June 2012**

## FOREWORD

During this last quarter our focus has been on:

- continuing to assess EDF and AREVA's responses to the GDA Issues that we published in July 2011 for their UK EPR™ reactor;
- reviewing revised Resolution Plans provided by EDF and AREVA that set out how they will address the GDA Issues; and
- developing our own assessment work programmes to complete GDA in the light of the revised Resolution Plans.

We are pleased to report that we are continuing to make progress on the assessment and that a further two GDA Issues have been closed. We are also pleased that EDF and AREVA have responded to our call to strengthen their resources and improve the quality and timeliness of their submissions to us.

If EDF and AREVA sustain these improvements for the significant number of submissions that are still to be delivered and if they remain responsive to any questions that we raise, then we believe that the programmes that are set out in the revised resolution plans can be achieved. In that case, and if we are satisfied by the safety, security and environmental arguments that they put forward, then we might be able to close all of the remaining GDA Issues by the end of the year. This would enable us to consider whether we should issue a full Design Acceptance Confirmation and a full Statement of Design Acceptability for the UK EPR.

We do not underestimate the challenges that this poses to EDF, AREVA and ourselves. It requires sustained effort, rigorous project management, and key technical challenges to be addressed. But it is achievable and we will ensure that the resources that are required from both regulators are provided. It is in EDF and AREVA's hands to deliver their part.

We are also continuing to work with EDF, AREVA and EDF Energy's and Centrica's joint venture company, NNB Generation Company Limited (NNB GenCo) on improving confidence that GDA and the Hinkley Point C work programmes are aligned. We remain convinced that closing out GDA Issues and resolving key safety and environmental issues ahead of any regulatory permissions to commence nuclear island construction should lead to more predictable and achievable schedules for the proposed construction phase.

This is the first time that ONR's Programme Director for the Civil Nuclear Reactor Programme has signed the foreword to a Quarterly Progress Report. The ONR GDA team moved into this programme on 1 April, and this will further help alignment with the assessment work required before ONR considers licensing and permissioning the construction of the UK EPR reactor design at Hinkley Point C.

If you have comments on any aspect of this report then please send them to us at: [new.reactor.build@hse.gsi.gov.uk](mailto:new.reactor.build@hse.gsi.gov.uk).

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## CLOSURE OF TWO GDA ISSUES

- 1 On 29 June 2012 we advised EDF and AREVA that we are satisfied with their responses to GDA Issues GI-UKEPR-SI-02 and GI-UKEPR-RP-01 and that we now consider these closed. The closure letters have been published on our website, alongside the original GDA Issues at [www.hse.gov.uk/newreactors/gda-issue-close-out-uk-epr.htm](http://www.hse.gov.uk/newreactors/gda-issue-close-out-uk-epr.htm).
- 2 GI-UKEPR-SI-02 was about the surveillance of the material properties of the reactor pressure vessel as it is subjected to through-life irradiation. Monitoring of the irradiation damage to material properties is complicated by, among other factors, the presence of the heavy reflector in the pressure vessel which means that the neutron energy spectrum differs between the locations of the surveillance specimens and the vessel wall itself. In response to the GDA Issue, EDF and AREVA have revised the principles of the vessel surveillance programme and provided supporting evidence for the new proposals. We have judged these provide an adequate response to the GDA Issue.
- 3 GDA Issue GI-UKEPR-RP-01 sought evidence that the civil engineering concrete of the UK EPR provided adequate bulk shielding to ensure that workers and the public are protected from radiation emanating from reactor operation. In response to the Issue, EDF and AREVA have demonstrated that there is adequate shielding provision for all areas of the facility. They have provided a radiological zoning classification scheme and an overview document that summarises the dose rates and radiological classifications within all rooms and for all modes of plant operation (for example, power operation, outages, refuelling). The overview document summarises the results of shielding calculations to show that the predicted dose rates within each area meet the radiological classification. ONR's assessment has concluded that the shielding provisions of the facility have been designed to ensure that exposures to workers and members of the public to ionising radiation have been restricted so far as is reasonably practicable during all modes of plant operation and we have therefore judged this provides an adequate response to the GDA Issue.

## PROGRESS ON REMAINING GDA ISSUES AND RESOLUTION PLANS

- 4 The GDA Issues and Requesting Party resolution plans for both the UK EPR and the AP1000® reactors are published at (<http://www.hse.gov.uk/newreactors/2011-gda-issues-epr.htm>). These show what needs to be done to complete GDA and allow us to consider whether to grant a final Design Acceptance Confirmation (DAC, issued by ONR) and final Statement of Design Acceptability (SoDA, issued by the Environment Agency) for each reactor. The full background to each GDA Issue is detailed in the assessment reports for each technical area, which we published in December 2011. These can all be viewed at <http://www.hse.gov.uk/newreactors/regulators-issue-interim-dac-soda-gda-key-milestone.htm>
- 5 Our work during this last quarter has focused on two aspects: assessments of EDF and AREVA's responses to the GDA Issues; and review and re-scheduling of the work required to close out all remaining GDA Issues.
- 6 The metrics at Annex 1 provide a red, amber or green 'traffic light' indication for current and predicted progress and quality of interactions for each of the GDA Issues. In addition, the 'deliverable vs time' graph at Annex 2 illustrates the progress EDF and AREVA are making on sending us the planned submissions as identified in their resolution plans.
- 7 Progress on assessment of some of the GDA Issues is good, as indicated by the green metrics and, as noted above, some have already been closed – these are shaded-out, in grey. However some of the deliverables have been late or did not provide the required quality of arguments or evidence and these topics are highlighted by amber or red

metrics, indicating that, if actions taken do not continue to improve matters, it is unlikely that the GDA Issues will be closed-out on the timescales indicated in the resolution plans.

- 8 In response to the situation highlighted in the last Quarterly Report, EDF and AREVA agreed to deploy additional resource and to revise the resolution plan timescales with a view to re-establishing a predictable programme to achieve technical convergence on key issues and close-out of GDA for the UK EPR. During this last quarter we have therefore worked with EDF and AREVA to review, and agree the revised resolution plan delivery schedules. The revised schedules are available at <http://www.hse.gov.uk/newreactors/2011-gda-issues-epr.htm>. This is important as it enables us to programme our work to assess the submissions they will make with more confidence. We have also reviewed and increased our assessment team resources, and increased the intensity of our reviews and exchanges with EDF and AREVA.
- 9 Up until May, the metrics in Annex 1 were measured against EDF and AREVA's original resolution plan schedules. In June we started measuring the metrics against the revised schedules and this in part explains the improving trend in the metrics from the previous months. In addition, the increased resource deployed and renewed focus of EDF and AREVA has resulted in improvements to delivery of GDA Issue responses during this last quarter. For example 52 documents were delivered to us in June alone. Similarly, until May, Annex 2 was measured against the original resolution plan schedules but it has been updated from June to show deliverables received plotted against the revised resolution plan schedules.
- 10 The graph at Annex 2 has previously shown a worsening shortfall in the number of deliverables received when compared against EDF and AREVA's original plans, and this in turn was affecting our progress on assessment. It can now be seen from Annex 2 that the rate of document delivery has increased markedly as the increased resources deployed by EDF and AREVA begin to show benefit. If this improvement can be sustained then the delivery programmes identified in the revised resolution plan schedules can be met. In this case it also remains possible that we could close all the GDA Issues by the end of 2012, although for the majority this would not happen until the autumn based current deliverable plans.. This will be a considerable challenge as, there remains much work to be undertaken, and key technical challenges to be addressed, if this is to be achieved. We will be continuing to ensure that the responses to the GDA Issues provide robust justification for their closure. When all the GDA Issues have been closed we will be in a position to consider granting a DAC and SoDA.
- 11 EDF and AREVA continue to propose a number of modifications to the UK EPR design to take account of the solutions they have put forward for some of the GDA Issues. For example, they are currently developing improvements to the cooling water supply systems to the spent fuel cooling pond and they are examining the possibility of upgrading the heating and ventilation support systems which play an important role in cooling essential safety systems. We will work with EDF and AREVA on further development of these proposals during GDA, although the detailed design modifications will be progressed after GDA, during the site-specific design and construction phase.
- 12 It is ONR's current intent that we will not grant Consent for nuclear island safety-related construction for a power station based on the UK EPR™ reactor generic design before all the unresolved GDA Issues have been adequately addressed to our satisfaction.

## RESPONSE TO FUKUSHIMA FOR THE UK EPR

- 13 One of the GDA Issues required EDF and AREVA to inform us of how they are addressing the lessons learnt from the accident at Fukushima. During this last quarter EDF and AREVA have sent us four initial reports that consider how the UK EPR would respond to similar challenges to the Fukushima accident. The reports demonstrate the

robustness of the UK EPR design against earthquake, loss of electrical and cooling supplies, and highlight the design provisions for managing severe accidents. The reports also identify that protection against flooding is largely a site specific issue relating to the height above sea level of the nuclear island platform. Nevertheless, when considering extreme scenarios such as those at Fukushima, EDF and AREVA have identified some additional measures and design changes that could further improve protection and robustness. We are continuing to work with EDF and AREVA to ensure that they adequately address the issue, including any proposed design modifications, following which we expect to be able to close this GDA Issue.

## WESTINGHOUSE PAUSE

- 14 Westinghouse will not address any of the GDA Issues until it secures a UK customer. Accordingly, we have undertaken no work on the AP1000<sup>®</sup> reactor during 2012.

## INTERACTIONS WITH WIDER NEW BUILD PLANS

- 15 In parallel with GDA we are assessing the Nuclear Site Licence (NSL) and both the construction and operational environment permit applications for Hinkley Point C (see our websites at <http://www.hse.gov.uk/nuclear/newbuild.htm> and <http://www.environment-agency.gov.uk/hinkleypoint>). It should be noted however, that while provision of a DAC, SoDA and granting of a NSL would be significant steps, they do not themselves signal the start of nuclear safety-related construction. That would require a separate regulatory permission from ONR under a licence condition.
- 16 As part of the integration of the GDA and site specific projects we have continued to work closely with NNB GenCo, the company planning to build the first UK EPR, at Hinkley Point C. NNB GenCo is now taking a more prominent role in GDA, mostly to seek confirmation that the methodologies and strategies for addressing the GDA Issues will result in positive and early outcomes that support the Hinkley Point C design engineering sequence and the contracting process.
- 17 We have continued to have joint meetings with NNB Genco, EDF and AREVA, and together we have confirmed that the revised resolution plans will provide the information required to ensure a meaningful and complete GDA, as well as supporting the site specific plans for the proposed UK EPR construction at Hinkley Point C. We continue to believe that this additional effort, at an early stage in the overall programme, is helping reinforce the benefits of GDA in resolving key safety issues by achieving technical convergence ahead of any nuclear island construction, which enhances regulatory effectiveness and should in turn lead to more predictable and achievable schedules for the construction phase.

## OTHER PRESENTLY DECLARED POTENTIAL OPERATORS

- 18 Our interactions with Horizon Nuclear Power have reduced as it turns its attention to seeking new investors following the announcement that the parent companies RWE and EON are not pursuing the UK build programme for nuclear reactors at Wylfa and Oldbury. These are commercial activities but in due course we will be discussing with Horizon the implications for our work in ONR and the Environment Agency.
- 19 NuGen, the UK nuclear company owned by GDF SUEZ and IBERDROLA, who are planning to implement 3.6GW of electricity generation at its Moorside site adjacent to Sellafield, is progressing with its plans. Our interactions remain limited, however, reflecting the early state of development of this project

**MORE INFORMATION ON GDA**

To find out more about Generic Design Assessment (GDA) - visit: [www.hse.gov.uk/newreactors](http://www.hse.gov.uk/newreactors)

To receive the latest news and information on GDA, subscribe to our eBulletin by visiting [www.hse.gov.uk/newreactors/ebulletin.htm](http://www.hse.gov.uk/newreactors/ebulletin.htm)

**ANNEX 1**
**EPR Metrics Trending Summary - April 2012 - June 2012**

		Civil Engineering			Control and Instrumentation			Fault Studies			Internal Hazards			Reactor Chemistry			Structural Integrity			Electrical Power Systems			Radiation Protection			Human Factors			Cross Cutting 1			Cross Cutting 2			Cross Cutting 3 Fukushima					
GDA on track?	RP Progress	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green			
	ONR Progress	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green			
Likelihood the Resolution Plan will result in closure of the GDA Issue	EDF/Areva delivery/quality	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green			
	Predicted	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green			
	Issue 1	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green			
	Issue 2	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green			
	Issue 3	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green			
	Issue 4	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green			
	Issue 5	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green			
Issue 6	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green				
		A	M	J	A	M	J	A	M	J	A	M	J	A	M	J	A	M	J	A	M	J	A	M	J	A	M	J	A	M	J	A	M	J	A	M	J	A	M	J

**Process & Progress (Metrics 1 & 2)**

	RP generally on plan to deliver GDA Issue Actions in accordance with its Resolution Plan. Any delays capable of being recovered.
	An early warning signalling that significant, prompt action is required to avoid delays to the target closure date of the GDA Issues.
	Delays cannot be recovered and will impact on the target closure date for GDA Issues. If this occurs the Resolution Plan will need to be re-baselined and the target dates changed (via Change Order).

**Resolution Difficulty (Metric 3)**

	Green - Closure of the GDA Issue appears highly likely and there are no major risks which at this stage appear to threaten closure of the GDA Issue
	Amber - Closure of the GDA Issue appears feasible but significant risks exist requiring prompt attention. These appear resolvable at this stage and if addressed should enable closure of the GDA Issue. The text accompanying an Amber or Red metric should succinctly describe the rationale for their difficulty of resolution, any planned mitigation and be referenced to associated correspondence/ TQs / additional GDA Issue Actions as appropriate.
	Red - Closure of the GDA Issue is in serious doubt with major risks apparent. Resolution of the GDA Issue is unlikely to be achieved by performing the planned safety analysis or changes to the design of the NPP and further GDA Issue Actions and amendments to the Resolution Plan are required. The text accompanying an Amber or Red metric should succinctly describe the rationale for their difficulty of resolution and be referenced to associated correspondence/ TQs / additional GDA Issue Actions as appropriate. If this occurs the Resolution Plan and ONR's GDAI Resolution Baseline Schedule will need to be re-baselined (via Change Order).
	Grey - GDA Issues Closed
	Blank - Judgement on this issue can not be formed as insufficient assessment has been undertaken to date

The topic areas and the GDA Issues are defined in the Step 4 reports, which can be viewed at <http://www.hse.gov.uk/newreactors/regulators-issue-interim-dac-soda-gda-key-milestone.htm>

## ANNEX 2 – PROGRESS TOWARDS EPR GDA ISSUE CLOSE-OUT

GDA Issue Deliverables vs Time - June 2012

