

Health and Safety Executive Board		Paper No: HSE/09/90	
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Trim reference:	2009/409922		
Status report on Nuclear New Build Generic Design Assessment (GDA)			

Purpose of the paper

1. To provide the HSE Board, via early sight of the GDA Quarterly Report, due to be published on 26 October, with an update on progress with the Nuclear New Build GDA.

Key messages for the HSE Board

2. Progress is still good even considering the summer holiday period. In particular we are on track to publish our Step 3 summary report, together with the suite of technical assessment reports, on 27 November 2009. Transition to Step 4 should be seamless and should still be complete in June 2011, although there are increasing issues developing with the Westinghouse outline design, which Westinghouse has been unable to 'freeze' or fully specify because of contractual negotiations with potential operators of the reactor.
3. The programme is now almost fully resourced, and is anticipated to be so by December 2009 through to the end of GDA in June 2011, thus allowing the back-end-loaded programme to deliver to time and quality.
4. The GDA Project Managers are starting to make a real difference in planning, process and tracking. Their impact on progress will come with time.
5. As discussed at the last Board meeting, we raised and published our first Regulatory Issue (RI) for some time (on the EPR Control & Instrumentation). This attracted considerable media attention, together with PQs, and DECC was concerned at the overall impact on GDA. The positive news is that discussion with Areva and EDF has led to them accepting the arguments in the RI, and proposing to address all of the points in it. We have signalled this positive outline position in the quarterly report, but will leave the metric as 'red' until we've seen and assessed the details of the future response.
6. The C&I issue has proved the true worth of GDA, allowing real and significant improvements to the design, rather than having to change it during construction. The Finnish regulator (STUK) has used the UK RI to gain a commitment from Areva to further improvements to the Olkiluoto 3 EPR, and the French regulator (ASN) has just written to Areva/EDF to request further work on the Flamanville EPR. We have agreed a template for a common UK/Finnish/French Press Release and 'lines to take'. Overall this has proved to be an excellent example of how independent regulators working closely together can promote a shared understanding and application of existing international standards, and promote the harmonisation of regulatory standards and reactor designs. We will strive collectively to ensure that the final designs in the UK, France and Finland will

each satisfactorily address the key issues to the satisfaction of the national regulators, whilst also leading to positive harmonisation of designs and improved safety and reliability of the generic and individual designs.

7. I recently visited Finland to meet with the Finnish regulator (STUK), Areva (designer/builder) and TVO (operator) of the new reactor (EPR) at Olkiluoto. The reactor is at an advanced stage of civil build, with the reactor building dome closed and the reactor pressure vessel on site in storage. Significant build activity is in progress, with over 4000 multi-national contractors on site on a shift rota basis, and highlights the need for advance regulatory resource planning when the similar situation arises in the UK. Contractual arrangements between operators and builders were highlighted as key, as was the future preference not to start significant building without a well defined safety case and design. I noted little evidence of the concept of the Operator being an intelligent customer for the build programme, both in what I saw or in discussions with the various parties.
8. The issues on the Westinghouse design are growing in number and significance, and with no 'buyer/operator' in place they are likely to propose significant contractual changes to the presently available GDA design following completion of the contractual negotiations. I've suggested at high-level to Westinghouse that they consider whether to continue with the present pace of GDA, or defer slightly to allow the contracted design to be fixed, with potentially a more complete GDA outcome. DECC Officials have been kept in the loop.

Background and Argument

9. GDA resources have improved during the quarter, and the team is very nearly at the desired strength to take it through Step 4. The gaps are now understood and should be plugged by December. We remain back-end loaded, and this will become apparent when the Step 3 reports are issued and show less than the originally expected progress in some areas of the assessment. To assist, 40 contracts have now been placed with the preferred Technical Support Contractors, worth approaching £2.7m, with a further £3.3m about to be added.
10. The IAEA IRRS mission recently visited ND, and whilst the Board members are expected to be updated on the outcome at a later date, in order to complete the picture on GDA in this paper, I can report that the IRRS team was very complementary about how we had addressed the earlier 2006 IRRS comments, and also how we were now addressing GDA. Suggestions were made about continuing to enhance openness and transparency both in GDA and as the work progresses into Licensing and the build phase.

Actions

11. None – this paper is for information.

Paper clearance

12. Produced and cleared by Kevin Allars.



Health and Safety
Executive



Environment
Agency

GENERIC DESIGN ASSESSMENT

PROGRESS REPORT

REPORTING PERIOD 1 JULY 2009 – 30 SEPTEMBER 2009

FOREWORD

We are pleased to present here the third Generic Design Assessment (GDA) quarterly report. This joint regulators' progress report, covering both HSE and the Environment Agency's work, summarises progress to date and the key challenges ahead.

In response to comments from government, industry and the public about providing greater clarity on our progress, our last report included some performance metrics. These are still in final development, but nevertheless have attracted generally positive comments. They have helped us to focus our discussions with the Requesting Parties, i.e. the companies that have asked us to assess their designs, onto the areas where progress is slow or significant issues are being identified. We will continue to include these metrics in future reports, and we are looking towards publishing them on our website each month.

In July, our GDA assessment passed the half-way point on our programme. Looking back over the last two years, we have achieved a lot, even with a fairly small team. The GDA programme has secured effective and efficient joint working by regulators including a one-stop point of contact provided by the Joint Programme Office. We have also introduced a level of openness and transparency not seen before on this type of project. We put in place a joint regulators website, the requesting parties have set-up new websites for GDA, and we have introduced a public comment process. We completed Step 2 ahead of schedule in March 2008 for four reactor designs and we published almost 50 reports describing our work. In Step 3 we increased our resources to match the increased detail of our assessment but, as this took some time to achieve, we had to delay the Step 3 end date by 6 months.

Looking forward, the next major milestones are the delivery of the HSE Step 3 reports on 27 November and the start of the Environment Agency's consultation, on that part of the assessment, around May/June 2010. Then, in GDA Step 4, HSE aims to move from a questioning and information exchange phase to one of clarifying issues and resolving them. Achieving these will of course depend significantly on the performance and timeliness and quality of responses of the Requesting Parties but, on the evidence of what we have seen so far, we remain confident that we will complete a meaningful GDA in June 2011.

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

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Health and Safety Executive

Joe McHugh
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Environment Agency

EXECUTIVE SUMMARY

Our focus this last quarter has been on progressing our assessment and discussing issues arising with the Requesting Parties (RPs) with a view to starting to write the technical reports that will be delivered at the end of HSE's Step 3. Despite this being the holiday period, good progress has been made and we are on-course to publish these reports on 27 November 2009.

The Environment Agency's assessment is also progressing well, although key aspects of the RPs' submissions have only recently been submitted, and the start date of the planned consultation in 2010 is being reviewed to ensure that, ahead of that start date, we have sufficient time to undertake a thorough assessment as important input to that consultation.

As indicated in our last quarterly report, HSE resources continue to improve and our assessment team is almost at full strength. We expect the final few to join us by the end of 2009, thus giving us a full team for GDA Step 4. This, plus the Technical Support Contract framework that we have put in place, should allow our assessment work to continue to progress rapidly and to complete GDA as planned in June 2011.

REPORT

Programme

- 1 HSE is on course to publish its Step 3 Reports on 27 November 2009 and to finish GDA in June 2011. The HSE team are therefore currently focusing on writing the Step 3 technical assessment reports and making preparations for these to be published on our website.
- 2 The Environment Agency is reviewing the start date of its planned public consultation in 2010 to ensure that, ahead of that start date, we have sufficient time to undertake assessment of key aspects of the submission that have only recently been received. If a delay to consultation is required, it should not impact the overall GDA completion date of June 2011.

Key Requesting Party (RP) Interactions

- 3 We have continued our regular and routine interactions with EDF, AREVA and Westinghouse. Over the reporting period, we have held a number of technical meetings in the UK, France, the USA and also in Finland.
- 4 In addition to routine GDA meetings, we have held high-level meetings with senior managers from both RPs, primarily to review GDA progress: both theirs and ours. This helps promote an open dialogue between senior managers and allows us to listen to their feedback and provide our views on what is considered to be working well or not working well.
- 5 For example, with EDF and AREVA we used these meetings to emphasise the fact that we are looking for physical plant modifications on the Control and Instrumentation system, and not just further safety studies. With Westinghouse, we have discussed the need to reach agreement on the safety submission freeze and the design reference point, and we have fed back concerns on the quality and timeliness of responses to our assessment, to which Westinghouse has responded positively.

GDA Assessment

- 6 Our additional resources are being used to good effect and the pace of our assessment is continuing to accelerate. One of the measures of this is the increase in the number of Technical Queries relating to both designs. This increase can be seen in the diagrams at Annex 2.
- 7 Further evidence of progress on our assessment work is that HSE has now awarded 40 contracts to our Technical Support Contractors, with a value of some £2.68m. More information is available at: <http://www.hse.gov.uk/newreactors/progress.htm>.
- 8 This increase in the pace of our work is a challenge to the RPs, who need to match it with deployment of increased resources to respond to the questions we are asking. A successful increase in effort, and maintenance of high quality responses by the RPs, will be crucial to our ability to deliver a meaningful GDA to programme. This is therefore something we are monitoring closely, and the acceptability will be reflected in the metrics that we will continue to publish.
- 9 During this last quarter, we published reports of the GDA team inspections of RPs' quality assurance and design control procedures that were undertaken in the USA and France. These are generally positive, but a number of resultant actions were agreed with both RPs. For example, we asked EDF and AREVA to improve the arrangements for managing and tracking non-conformances arising from audit activities, and for Westinghouse, although we found that their quality management system is sound, it is not fully applied to the UK GDA project. We have therefore asked them to implement a corrective action programme for full application during Step 4. More information is available at: www.hse.gov.uk/newreactors/reports.htm.
- 10 The safety submission freeze and the 'Design Reference Point' for GDA (sometimes referred to as the 'design freeze' for GDA) has continued to be the subject of debate with the RPs during this quarter. This is important because we need to have an assurance that the designs and safety cases are sufficiently advanced and are not subject to significant change throughout GDA. An agreed reference point is key to ensuring that there would be a sound basis against which to issue any GDA Design Acceptance Confirmation 'Certificates' (HSE) or Statements of Acceptability (Environment Agency), should this be appropriate at the end of our assessments.
- 11 The fact that neither design is complete makes agreement on a 'frozen' design reference point more difficult. For example the design of the squib valves (single action valves designed to allow a rapid release of pressurised fluid), proposed for the AP1000 is a novel design using a charged release mechanism. This is not yet fully defined so we are having difficulty in getting the level of detail we need for our assessment. In some areas the RPs are offering to supplement UK specific information with detailed design information from current non-UK construction projects, even though the designs might not be identical to the GDA generic design. For the EPR we are broadly content with the design reference point proposals and believe that we are now making progress towards an acceptable agreement for the AP1000 which will provide a design reference point on an acceptable timescale.

Metrics

- 12 As described previously, we have introduced performance metrics to provide clearer evidence of our progress and to highlight areas of present concern. These are shown in Annex 2, where it can be seen that five technical areas include 'red' indicators. This is an improvement from our last report where seven topics included red indicators. We consider this is a fair representation of the progress that has been made in several key technical areas. This does not necessarily mean that our questions have been satisfactorily resolved, but it is more likely to be an indication that we consider that there is now a better understanding by the RPs and they have provided appropriate plans for

further work. However, if these plans are not progressed towards timely and quality delivery, then the indicators could slip again.

- 13 On the Management of Higher Active Waste, including spent fuel, the RPs have sought advice from the Nuclear Decommissioning Authority (as the UK authoritative source in providing such advice) on the disposability of Intermediate Level Radioactive Waste (ILW) or spent nuclear fuel that might arise from these reactors. The RPs only forwarded this advice to us at the end of September and this is now too late to be considered in HSE's Step 3 assessment. As noted above, the Environment Agency is also reviewing its consultation programme to allow a thorough assessment of this information to be undertaken.
- 14 The present red indicators are:

For the AP1000

- Civil Engineering: progress remains slow in providing adequate responses to our questions on design codes and standards. We have not seen evidence that the civil structure design conforms to the kind of design standards we would expect to be applied to new nuclear construction.
- Human Factors: discussions with, and documents from, Westinghouse have failed to respond appropriately to the Regulatory Observation raised in this area; Westinghouse has not been able to frame the documentation and information they have into a safety context to facilitate our understanding of the relative risk contribution from human actions. There is a significant shortfall against our expectations for GDA in this topic area and we are in urgent discussion over Westinghouse's proposals for recovery.
- Mechanical Engineering: The size and nature of the squib valves requires an extensive design and development programme, on which we have issued a Regulatory Observation (RO). To date, Westinghouse have shown little progress in addressing our concerns, and we consider that there is a significant risk that Westinghouse have underestimated the depth of the issue and the resources and effort that are needed to close out the RO.
- External Hazards: The original submission on external hazards did not provide sufficient information. Westinghouse intends to fill the gap in its submission with a specific external hazards topic report. This has not yet been received and it is now delaying our assessment of the design. In addition, because of security considerations, it has taken some time for us to provide the input data required for Westinghouse to analyse the resistance to aircraft impact, and so the key analysis and assessment phase is late starting. We do have sufficient information for other external hazards, so those on their own would not be a red metric.

For the EPR

- Control & Instrumentation: our questions were significant enough to be raised as a Regulatory Issue (RI). During September we had fruitful discussions with EDF and AREVA and anticipate that these will confirm that an acceptable position can be reached for GDA (see paras 15 and 16 below). Until we have had time to consider the details, the indicator will remain red.
- External Hazards: Because of security considerations, it has taken some time for us to make suitable arrangements for the transfer of information with EDF and AREVA, including the input data required for them to check that their reference design has adequate resistance to aircraft impact. As a result, the key

assessment phase is late starting. We do have sufficient information for other external hazards, so those on their own would not be a red metric

Regulatory Issues

- 15 As described in the last report, we are continuing to progress many technical questions and issues on a variety of topics and it is possible that some of these could become significant enough to be formalised as Regulatory Issues (RI), i.e. where we judge that a particular feature of the design might not meet UK regulatory standards.
- 16 Currently we have only one Regulatory Issue, which is on the Control & Instrumentation architecture of the UK EPR. During September we had fruitful discussions with EDF and AREVA and at the end of the month they gave us a written commitment to undertake modifications that appear to respond to the issues we raised in the RI. We will need time to consider these and we will need to see further details, but we are hopeful that these will confirm that an acceptable position can be reached for GDA, and that the RI can be closed-out, and not result in an Exclusion to the GDA.

Working with Overseas Regulators

- 17 Both the HSE and Environment Agency are working with overseas regulators, particularly those in the USA, France and Finland, which is where the two designs emanate from and/or are being constructed. We use these regulatory information exchanges both to inform our assessment (and theirs) and to confirm that we are applying the best international standards.
- 18 During this last quarter some of our staff have visited the EPR construction sites at Flamanville in France and Olkiluoto in Finland. Experiences of the construction have been discussed with EDF, AREVA, ASN (the French regulator), TVO (the site licensee in Olkiluoto) and STUK (the Finnish regulator).
- 19 In September a member of the French Nuclear Safety Authority (ASN) started work with ND's GDA team, reciprocating the NII Inspector who went to work with ASN earlier this year. These exchanges promote information flow between the two organisations and improvements in understanding of ways of working.
- 20 We have continued with bilateral information exchanges and meetings with our overseas counterparts and during this quarter these have included the topics of reactor fuel, fault analysis, human factors, reactor chemistry, and radioactive waste. In addition, multinational meetings have been held including MDEP (Multi National Design Evaluation Programme) meetings on EPR and AP1000, and these have included the topics of C&I, civil engineering, and squib valves.
- 21 To help widen the knowledge of MDEP activities and accomplishments to date, and what is planned for the future, we attended a conference in September, where the work of MDEP was presented to and discussed with an audience including reactor vendors, operators, regulators and representatives from engineering standards organisations - see http://www.nea.fr/mdep/events/conf_sept_2009/agenda.html. During this conference, and at other international conferences held in the last month, there have been calls from industry for regulators to accept designs that are already certified by other nations. This is in fact a very complex issue, which has political and social as well as technical implications. Our position on this is described on our website (<http://www.hse.gov.uk/newreactors/ngn05.pdf>). The industry has also lobbied for improved standardisation of reactor designs in different countries. We support the idea of having similar designs in different countries, as this helps improve operating experience, and our work with other regulators helps promote harmonisation of standards. However, we stress that reactor vendors have a responsibility to ensure that they adopt best international practice and thus ensure that their designs can meet safety requirements in each of the countries in which they wish to market them.

Stakeholder Engagement

- 22 We continue to engage with a wide range of stakeholders in a variety of ways and continue to develop our GDA website.
- 23 Following the 25 June seminar we organised for Non-Government Organisations (NGOs), we have been progressing answers to the 100 questions that emerged. We intend to respond proactively to these shortly.
- 24 We have also provided updates on GDA at the World Nuclear University's international forum on harmonisation of reactor design requirements on 2 September, the Nuclear Industry Association's new build working group meeting on 15 September, and we are also engaging with COGENT and the National Skills Academy on the work necessary to secure the skilled staff to take new nuclear build forward in the UK.

WORKING WITH DEPARTMENT FOR ENERGY & CLIMATE CHANGE (DECC)

- 25 We continue to provide expert advice to DECC's Office for Nuclear Development (OND), the sponsoring Government Department for new nuclear development. OND is leading on topics such as siting, regulatory justification, waste and decommissioning costs, and the nuclear National Policy Statement. For more information go to: <http://www.berr.gov.uk/consultations/page47143.html>.

PLANNING FOR SITE LICENSING/INTERACTION WITH FUTURE OPERATORS

- 26 Before construction of nuclear power stations begins, a Nuclear Site Licence, Security Plan and various environmental permits are required. We have therefore been engaging with potential future operators to advise them on the regulatory requirements for site preparation, licensing, construction, and the permitting process. In addition, we have been reviewing our own organisations to start to put in place the structures that will be required to manage these activities. This site licensing and permitting work is normal business for us but we remain committed to learning the positive lessons from GDA and combining these with our long experience of regulation of existing reactors in the UK. We will develop an increasingly dynamic, effective and efficient regulatory process for new nuclear build, as well as for all other nuclear regulatory activities undertaken by HSE and the Environment Agency.

CONCLUSIONS

- 27 In conclusion, we continue to make good progress on our assessment and on improving our assessment resources. We are working closely with the Requesting Parties and overseas regulators to ensure we can appropriately identify and address relevant safety, security and environmental issues during GDA.
- 28 The HSE is on track to publish its Step 3 reports on 27 November 2009, and the Environment Agency is making good progress in its assessment but is reviewing its consultation programme to allow sufficient time to robustly assess recently submitted information. Together, we are confident, subject to the provision of the necessary information from the industry, that we will meet the published timetable for completing a meaningful assessment of the generic design proposals by June 2011.

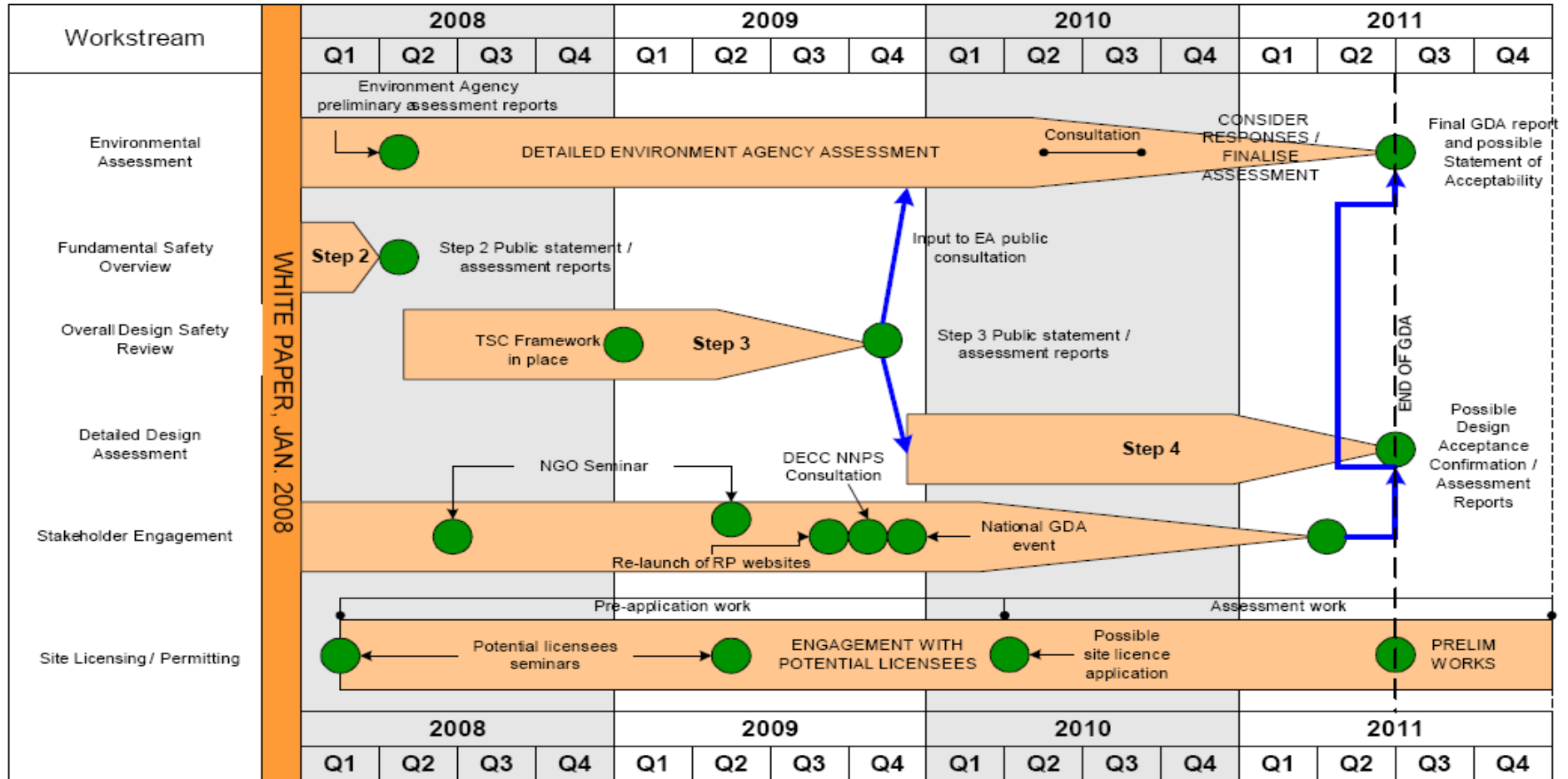
To find out more about Generic Design Assessment (GDA) - log onto:

<http://www.hse.gov.uk/newreactors/index.htm>

Receive the latest news and information on GDA - subscribe to our free e:mail bulletin -

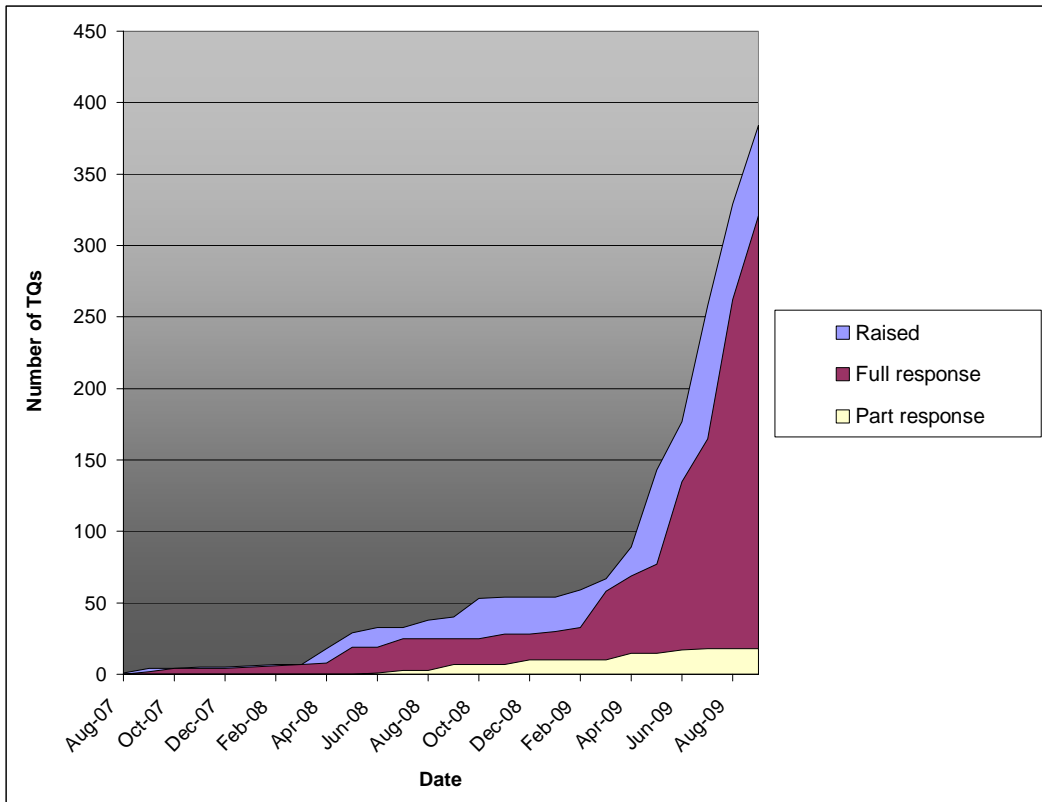
<http://www.hse.gov.uk/newreactors/ebulletin.htm>

GENERIC DESIGN ASSESSMENT INDICATIVE TIMELINE

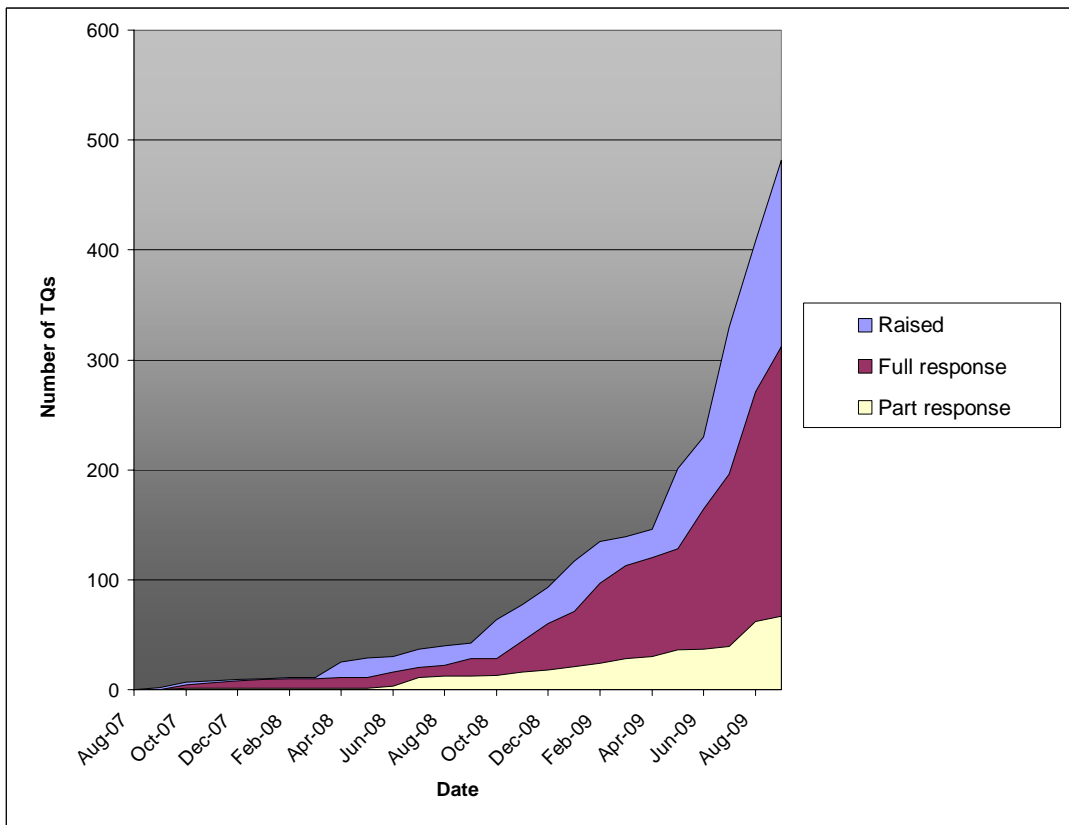


Annex 2 GDA Interaction Metrics

Westinghouse response to TQs (as at 30 September 2009)



EDF and AREVA response to TQs (as at 30 September 2009)



Annex 2
GDA Interaction Metrics

MEETING SUMMARY DURING Q3 2009

Westinghouse 49, of which 42 were in the UK, and 7 in the USA

EDF and AREVA 45, of which 24 were in the UK, and 21 in France

Overseas regulators meetings: France (3); USA (3); Finland (2); Multi-National (1).

**REGULATORY COSTS CHARGED TO RPs to end June 2009
(one quarter behind the rest of this report):**

Westinghouse: £3.6m; EDF and AREVA: £3.9m

GDA DASHBOARD SUMMARY

REPORTING PERIOD - 1 SEPTEMBER 2009 TO 30 SEPTEMBER 2009

Requesting Party - WESTINGHOUSE

GDA METRICS SUMMARY FOR WESTINGHOUSE - 1 SEPTEMBER 2009 TO 30 SEPTEMBER 2009

<p>Technical Area</p> <p>Item</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Internal Hazards (12)</td></tr> <tr><td>Civil Engineering (2)</td></tr> <tr><td>External Hazards (3)</td></tr> <tr><td>Probabilistic Safety Analysis (6)</td></tr> <tr><td>Fault Studies (5)</td></tr> <tr><td>Control & Instrumentation (6)</td></tr> <tr><td>Essential Electrical Power Systems (7)</td></tr> <tr><td>Fuel Design (8)</td></tr> <tr><td>Reactor Chemistry (4)</td></tr> <tr><td>Radiation Protection & Level 3 SA (10)</td></tr> <tr><td>Mechanical Engineering (11)</td></tr> <tr><td>Structural Integrity (2)</td></tr> <tr><td>Human Factors (3)</td></tr> <tr><td>Management for Safety & Quality Assurance (4)</td></tr> <tr><td>Radio Waste & Decommissioning (5)</td></tr> <tr><td>Environmental Issues (6)</td></tr> <tr><td>Security (7)</td></tr> </table>	Internal Hazards (12)	Civil Engineering (2)	External Hazards (3)	Probabilistic Safety Analysis (6)	Fault Studies (5)	Control & Instrumentation (6)	Essential Electrical Power Systems (7)	Fuel Design (8)	Reactor Chemistry (4)	Radiation Protection & Level 3 SA (10)	Mechanical Engineering (11)	Structural Integrity (2)	Human Factors (3)	Management for Safety & Quality Assurance (4)	Radio Waste & Decommissioning (5)	Environmental Issues (6)	Security (7)
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<p>* Is GDA on track to complete a meaningful assessment by June 2011?</p>	
<p>Is the depth, quality and timeliness of interactions, submissions and the responses to Qs, ROs and Ris adequate?</p> <p style="text-align: right;">- to date - predicted</p>	
<p>Exclusions</p> <p style="text-align: right;">- potential - difficulty of resolution</p>	

Notes:
 * Includes ND resource and assessment progress.
 Items judged RED are discussed in the main text of the quarterly report.

Key:

- not assessed (e.g. insufficient information or assessment to be able to form judgement)
- meets regulator expectations at this time
- shortfall against regulator expectations
- significant shortfall against regulator expectations

