

# Japanese earthquake and tsunami: Implementing the lessons for the UK's nuclear industry

Office for Nuclear Regulation  
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# Office for Nuclear Regulation

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## Foreword

On 11 March 2011 Japan suffered its worst recorded earthquake. The epicentre was 110 miles east north east of the Fukushima Dai-ichi (Fukushima-1) nuclear power site which has 6 Boiling Water Reactors. Reactor Units 1, 2 and 3 on this site were operating at power before the event and on detection of the earthquake shut down safely. Initially 12 on-site back diesel generators were used to provide the alternating (AC) electrical supplies to power essential post-trip cooling. Within an hour a massive tsunami from the earthquake inundated the site. This resulted in the loss of all but one diesel generator, some direct current (DC) supplies and essential instrumentation, and created massive damage around the site leading to the loss of back-up cooling. With the loss of cooling systems, Reactor Units 1 to 3 overheated leading to severe damage (including, most likely melting of fuel in the reactors) and several explosions as a result of hydrogen generated by reaction of the fuel clad with hot steam. These events led to major releases of radioactivity, initially to air but later by leakage of contaminated water to sea.

This was a serious nuclear accident, with an International Nuclear and Radiological Event Scale (INES) rating of Level 7 (the highest level). Over one hundred thousand people were evacuated from a zone extending 20km from the site, and in some locations more than 30km from the plant. Although some of these restrictions have now been eased, there are still tight restrictions in some areas beyond the 20 km zone to the northwest of the site. So far, the indications are that the acute public health effects from radiation exposure are not great, though the effects of stress brought on by the fear of the unknown and the trauma of being uprooted from homes and communities is significant, as are the societal and economic impacts.

The Secretary of State (SoS) for Energy and Climate Change requested on 14 March 2011 that I examine the circumstances of the Fukushima accident to see what lessons could be learnt to enhance the safety of the UK nuclear industry. I was asked to provide an Interim Report by the middle of May 2011, which was published on 18 May 2011, and a Final Report six months later which was published in October 2011. In that Final Report I signalled my intention that an update, this report, would be provided in a year's time on progress in implementing lessons for the UK's nuclear industry.

This current report on implementing lessons covers all types of nuclear installations in the UK and, in addition to considering the recommendations from my Interim and Final Reports, includes updates on the progress in addressing the outcomes from the European Council "Stress Tests" undertaken in the UK. Reports on the outcome of these stress tests were put in the public domain in December 2011 for the nuclear power plants and May 2012 for the non power generating nuclear facilities.

There is still more to be done to implement the lessons already identified in the UK, and that further information and knowledge will emerge from the ongoing Japanese recovery programme which will require review and analysis to determine what further lessons can be learned. ONR will remain focussed on both of these tasks and ensure that the necessary processes and procedures to achieve them are in place. ONR will also be rigorous in ensuring that all my recommendations and the detailed findings and considerations from the stress tests are followed up to completion, and reported on.

As with my Interim and Final Reports, this ONR report on progress does not examine nuclear policy issues. These are rightly matters for others and outside my organisation's competence and role.

Finally, I wish to acknowledge the tremendous efforts of ONR staff in undertaking the rigorous assessment of licensees' submissions, challenging them, and producing such a detailed review of progress. All of which was done alongside their other work.



Mike Weightman  
HM Chief Inspector of Nuclear Installations  
October 2012

## Executive Summary

On the 14 March 2011 the Secretary of State (SoS) for Energy and Climate Change requested that HM Chief Inspector of Nuclear Installations examine the circumstances of the Fukushima accident to see what lessons could be learnt to enhance the safety of the UK nuclear industry. The aim of that report was to identify any implications for the UK nuclear industry, and in doing so, to cooperate and coordinate with international colleagues. The SoS requested that an Interim Report be produced by the middle of May 2011, with a Final Report six months later. These were achieved with the Interim Report focusing on lessons for the UK nuclear power plants. The Final Report was published in September 2011 and contained a commitment from the Chief Inspector to produce a further report which would provide an update on progress in implementing the lessons for the UK's nuclear industry. This report fulfils that commitment.

ONR's 'final' report made a number of recommendations relating to various stakeholders, including a request that the stakeholders provide us with an update on their progress in implementing the recommendations relevant to them. **All stakeholders have responded positively, and we have received those updates.**

In addition to the Final Report, ONR also produced two national reports on the European Stress Tests focussing on licensees. The first covered all civil nuclear power plant with the second, on the instructions of the Chief Inspector, covering all of the remaining UK nuclear installations. In both of these reports, areas for potential improvement (known as "considerations") were identified by licensees. These considerations were augmented by Stress Test Findings identified by ONR. As with the Final Report, we requested an update on progress relating to considerations and stress test findings contained in the national stress test reports, recognising that in many cases such progress would be less mature given the more limited time the nuclear industry has had to develop its proposals. **All licensees have provided responses to the outcomes of the UK Stress Test Reports.**

In this progress update, we summarise the responses we have received from all of the stakeholders and where appropriate ONR's views on those responses. In general we have followed the order of the recommendations in the Chief Inspector's Final Report, although where we consider the responses from the nuclear industry, we have included the stress test outcomes. ONR recognises that this report deals with progress as of June 2012, some nine months after publication of the Final Report and that, in many cases, implementation of learning from Fukushima is still underway. Consequently this report also sets out our approach to monitoring, regulating where necessary, and open reporting of future progress. Finally we reflect on the significance of international cooperation and ONR's part in these activities.

### General Recommendations

The general recommendations of the "Final Report" were principally aimed at the UK's response to civil nuclear emergencies from both an international (IR1<sup>1</sup>) and a national perspective (IR2, IR3, FR6 and FR7). Also included in this section were recommendations relating to UK involvement and support for global safety standards (FR9), the adequacy of planning controls for developments near nuclear licensed sites (FR5), and openness and transparency (IR4 and FR8).

#### *Response to Nuclear Emergencies*

The UK Government has confirmed that it continues to work with its partners internationally to progress work on enhancing nuclear safety standards, and to work towards improving the dissemination of information under the Convention on Early Notification of a Nuclear Accident. In addition the UK has become a member of IAEA's global Response and Assistance Network, RANET.

In terms of the national situation, the Nuclear Emergency Planning and Liaison Group (NEPLG) has re-evaluated the UK's radiation monitoring capability and clarified requirements for delivery of data and information in the event of a prolonged incident in the UK. NEPLG has also assessed the central Government arrangements for response and, in particular, the provision of scientific and technical advice in the event of a nuclear emergency in the UK or overseas. ONR is also working towards an even more robust testing regime for emergency exercises, including more extensive testing of the extendibility arrangements. Work on characterising potential source terms associated with wider variety of nuclear accidents is well

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<sup>1</sup> IR1 stands for recommendation 1 from the interim report; FR6 is recommendation 6 from the final report. The final report endorsed all of the recommendations from the interim report.

underway with the objective of allowing more rapid assessment of the likely dispersion of radioactive materials and the potential impact on the UK or its citizens, and information to support decisions on possible countermeasures.

### *Global Nuclear Safety Standards*

In relation to international safety standards (FR9), ONR actively cooperates with other nuclear regulators worldwide, including under the auspices of the International Atomic Energy Agency (IAEA), the Organisation for Cooperation and Development's (OECD's) Nuclear Energy Agency, the European Nuclear Safety Regulators Group (ENSREG) and the West European Nuclear Regulator's Association (WENRA). Furthermore licensees have also re-affirmed their support for international organisations such as IAEA, and their intentions to use their interactions with such bodies to further enhance the safety of their plants. The UK also welcomes international peer reviews of its regulatory approach, and has already agreed dates for the next IAEA Integrated Regulatory Review Service (IRRS) missions to the UK.

### *Planning Controls*

ONR has included the specific recommendation on examining the adequacy of planning controls in its response to the Government's consultation exercise for its proposed National Planning Policy Framework for England. As planning is a devolved matter, the Government has confirmed that it will pursue the issue with the UK's Devolved Administrations. There is more to be done to ensure that planning controls in the vicinity of nuclear installations are adequate.

### *Openness and Transparency*

The final part of the general recommendations related to delivery of more open and transparent communications with the public and other stakeholders (IR4 and FR8). Both ONR and the Government recognise the importance of an open and transparent regulator. In particular, the creation of ONR as a statutory body outside of the civil service, the establishment of ONR's Board, establishing the post of the Chief Nuclear Regulator in statute for the first time and the endowment of ONR with statutory nuclear regulatory powers and duties in its own right as (not currently the case), should lead to greater transparency and will provide clear evidence of the independence of ONR from any undue influence from government or other body associated with the promotion or development of nuclear energy, or related activities. For ONR, openness and transparency means adopting a presumption of proactive disclosure, and a specific work stream has been put in place to ensure that as much of our work as we can is made publicly available, such as the publication of project assessment reports (PARs), which explain the rationale for regulatory decisions on nuclear safety issues.

## **Recommendations on ONR**

The recommendations we placed on ourselves fall into three groups: review of safety assessment principles (SAPs) (IR5), consideration of emergency response arrangements (IR6 and IR7), and oversight of nuclear safety research (FR10).

### *Safety Assessment Principles*

ONR established a project to review the SAPs in the light of Fukushima in 2011. To date, ONR's review of the SAPs has confirmed that there are no significant gaps in the SAPs, although a small number of technical areas have been identified for which amplification and clarification of the principles would be beneficial, mainly related to coverage of severe accidents. The majority of the changes to be made to the SAPs are effectively to bring them up to date in terms of the six years' of operating experience we have gained working with the current version, and to reflect changes to the industry and ONR over this period.

IAEA and WENRA are also working to update their guidance in light of lessons learnt from Fukushima. ONR is playing an active part in the development of updated IAEA and WENRA guidance and is committed to ensuring our guidance is aligned and consistent with wider good practice and with international safety standards.

## *Emergency Response Arrangements*

The future nuclear emergency exercise programme for fixed nuclear installations within the UK has secured opportunities to test the on site and off site response for prolonged periods. Such exercises are intended to test the prolonged delivery and sustainability of the on site, the off site and central government responses. The exercises are also intended to highlight areas for further improvements which will inform reviews of on site and off site emergency plans and feed into future work programmes. The findings will inform reviews of the duration of the future nuclear emergency exercises.

Even though ONR's established arrangements were shown to have been effective in responding to the Fukushima accident, and have proven effective in the few instances in which we have had to respond to minor events in the UK, the Fukushima accident did highlight some opportunities for improvement, particularly in relation to ONR's capability itself to provide a sustained response to a prolonged emergency. A review has since resulted in a proposal for improvements to ONR's response to initial notifications of nuclear emergencies (including severe accidents), and for ensuring the prompt deployment of trained staff to remote locations and to ONR's central emergency response centre - the Redgrave Court Incident Suite (RCIS). Examples of improvements include: developing arrangements for early plotting of possible radioactive plumes and potential off-site doses (ongoing work) and improvements to the nature of nuclear site and plant information available in the RCIS for all the licensed sites, and real time up to date data during an event.

ONR remains firmly committed to improving the effectiveness and robustness of its own emergency preparedness and response arrangements, in order that it is better placed to respond to a prolonged nuclear event either in the UK or overseas.

## *Research*

Since the nuclear accident at Fukushima, ONR has undertaken a review of its strategic oversight of nuclear safety and security related research, and its arrangements for commissioning and managing research and specialist technical support. The review is being used to inform the development of an ONR Research & Technical Support Strategy, which will be published shortly. This strategy, which is supported by a detailed implementation plan, sets out the important role research and technical support plays in underpinning our regulatory decisions, the challenges we face going forwards, and how we plan to overcome these. ONR is establishing a Chief Inspector's Independent Advisory Group, whose role will include advising HM Chief Nuclear Inspector on the adequacy and balance of ONR's research strategy and programme.

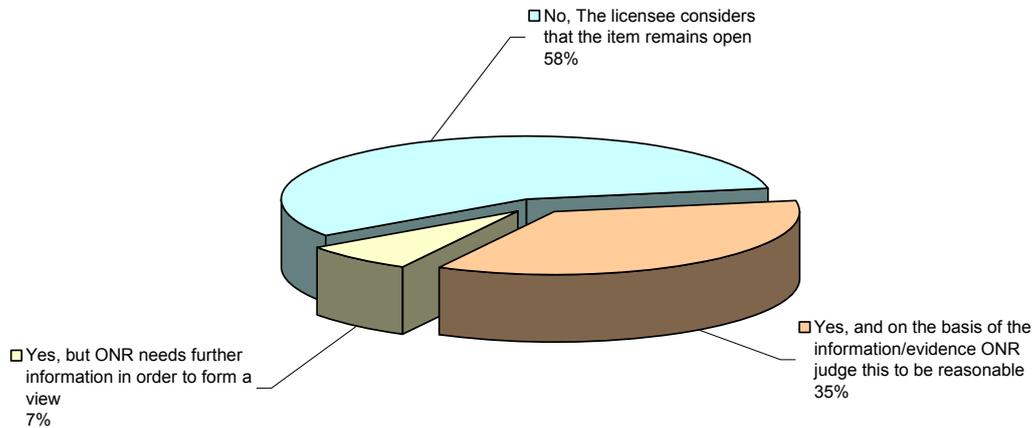
The main vehicle used by ONR to take forward its research priorities is the Nuclear Research Index (NRI), which is part of ONR's Research & Technical Support Strategy and represents ONR's view of what research is needed to support existing nuclear facilities. This is used by the nuclear site licensees to inform the development of their own research strategies. ONR is able to commission any research areas not taken forward by the nuclear site licensees and then recover the costs from the licensees via a levy. ONR will also publish a Chemical Plant Nuclear Research Index alongside a revised NRI, to provide an equivalent framework for taking forward research relating to Sellafield and other non power generating nuclear facilities. ONR's intention going forwards is to publish a single ONR Research Index in 2013 covering all of ONR's research requirements.

## **Progress by the nuclear Industry – Recommendations and Stress Test Outcomes**

There were a significant number of recommendations and stress test findings placed on the nuclear industry as well the industry's own considerations developed during the undertaking of the stress tests. Although ONR has reviewed progress against all of these, for all licensees, they are too numerous to feature individually here. Instead we have summarised the outcome of our considerations and present these in a simple form in which ONR's judgments on the licensees' responses are grouped into categories representing progress to date.

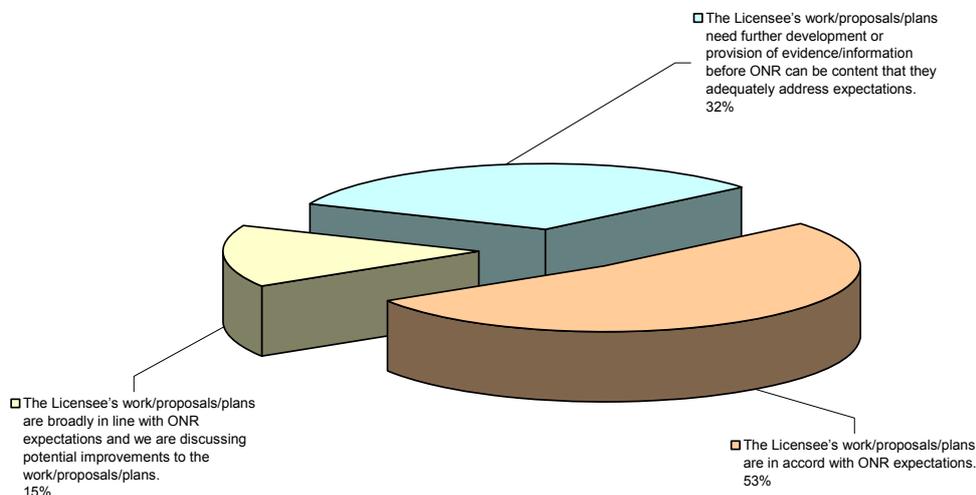
The first chart illustrates the proportion of recommendations, findings and considerations that are considered closed by the licensee and ONR's concurrence or otherwise with those claims:

**Overall Totals** - "Is the recommendation, finding or consideration considered closed by the Licensee?"



The next chart shows the status of responses or proposals judged on the basis of a comparison with ONR's technical expectations. This provides an insight not only on those recommendations or findings that are considered closed, but on the content of plans and proposals that are still being worked on:

**Overall Totals - "Is there a reasonable match with ONR technical expectations?"**



The fact that for 30% or so of issues covered in chart 2, further discussions are needed between ONR and licensees should not come as a surprise; ONR is a goal setting, largely non-prescriptive regulator. This means that we expect the licensees to make proposals on how they intend to meet the required safety outcomes, and to justify why their proposal represents the safest reasonably practicable option for improvement. ONR will then challenge the basis for these proposals, and the associated timescales, to see if any more can be done that is reasonably practicable to reduce risks further. In many cases this process requires significant interaction as licensees strive to convince ONR that their proposals are adequate. If we are not satisfied, ONR will require licensees to revisit the issue, undertake further work as appropriate, and provide further evidence to justify their proposals. The chart above reflects that this process is in progress for around 30% of the issues. We are confident that this approach is suitably robust and that it will deliver the appropriate safety outcomes. Ultimately, ONR would take enforcement action to ensure that appropriate measures are put in place.

Although it is clear that much work is still to be done to implement the lessons from Fukushima, there are many examples of physical improvements to sites that are in place or have been committed to.

For instance, EDF NGL has committed to providing a range of back-up emergency equipment. This equipment will be stored in regional AGR depots that are being established, and the new Sizewell B Emergency Response Centre (ERC) that is to be built by the end of 2013. These depots will contain:

- Off-road vehicles;
- Debris moving vehicles (route clearance for example);
- Personal protective equipment;
- Electricity generators;
- Water pumps – for reactor and fuel cooling;
- Reverse osmosis equipment to supply clean water;
- Damage repair equipment;
- Dewatering pumps;

- Waste water treatment facilities;
- Temporary structures for response coordination and staff welfare;
- Mobile communications equipment, including deployable instrumentation facilities;
- Inert gas supplies;
- All necessary ancillary equipment required to use these facilities, including fuel stocks.

Furthermore, for Sizewell B, passive autocatalytic recombiners, which safely remove hydrogen produced in the event of a severe accident, are planned to be installed in 2013. Work to deliver a filtered containment ventilation system is underway.

For Magnox Ltd, examples of safety improvements already implemented include:

- Increased CO<sup>2</sup> and fuel stocks on-sites, well above the existing operating rule requirements;
- A new diverse pond water emergency filling line at Oldbury (one also planned a Sizewell A);
- Provision of backup feed water/fire pumps on-sites to provide further defence in-depth;
- Development and implementation of improved training in respect of the Symptom Based Emergency Response Guidelines (SBERGs) and Severe Accident Management Guidelines (SAGs);
- Additional stocks of essential equipment (e.g. basic tools, flash lights etc.) on sites stored in diverse locations;
- Purchase of a water tanker for transport of water from a nearby fresh water source to site (Wylfa).

At the Sellafield site there has also been improvements implemented on site, with more yet to be delivered. These improvements include:

## Highly Active Liquor Evaporation and Storage Facilities

- Improvements to the Emergency Cooling Water Systems;
- Improvements to the backup electrical power systems;
- Improvements to Access Control Point communication systems.

## Legacy Ponds and Silos Facilities

- Enhance emergency equipment storage facilities and equipment;
- New fully equipped emergency trailer for Access Control Point;
- New diesel power generator and lighting tower;
- Additional bunding and containment equipment.

## Infrastructure Facilities

- Improvements to the existing emergency electrical supply systems;
- Facilitated deployment of mobile Diesel alternator sets;
- Improvements to on and off site water supply systems.

A number of the recommendations and the Stress Tests outcomes called for reviews or additional analyses, and these are in progress; but things will not stop as a result of these reviews, the expectation being that they will identify further measures to enhance safety at nuclear sites.

## Way Forward for the Nuclear Industry

This report contains a summary of ONR's assessment of the progress made by the UK nuclear industry in responding to the lessons learnt from the Fukushima accident. As anticipated, there are a range of longer-term improvements or ongoing activities that will need to be delivered over timeframes extending beyond those for the production of this report.

ONR acknowledges the significant progress made by UK nuclear site licensees over the last year, and the commitment of reactor site licensees to deliver the more significant and pressing improvements arising from learning from Fukushima by the end of 2014. However, ONR will continue to satisfy itself that these improvements are effective, and will continue to press for the delivery of these more significant improvements to this timescale (taking into account, particularly in relation to Sellafield, other priority safety activities and the availability of funding).

ONR will monitor and assess the adequacy of progress made by the industry over the longer term, until it is satisfied that the significant lessons learnt from the Fukushima event have been adequately discharged and will, if necessary, use its regulatory powers to ensure that reasonably practicable improvements are implemented.

ONR will deliver secure such oversight by embedding ongoing "Fukushima learning" oversight activities into its operational regulatory programmes (e.g. which relate to civil nuclear reactors, Sellafield, decommissioning and waste management, and relevant UK defence sites).

This approach offers a number of distinct benefits in that it:

- secures longer term oversight by ONR of improvements relating to the lessons learnt from the Fukushima event;
- is both effective and efficient in terms of future use of regulatory resources;
- ensures that, in the overall interests of nuclear safety, such improvements are delivered taking into account the relative significance of all activities on the site; and
- That such improvements are regulated, as appropriate, under the provisions of the licence conditions attached to each nuclear site licence.

Whilst ONR does not intend to produce further discrete Fukushima Implementations reports, it is committed to continuing to monitor and assess progress, to publish summary updates for stakeholders on our website and site stakeholder reports and to continue to advise government on the adequacy of progress made by the industry.

## International

The importance of international cooperation and shared learning has been clearly demonstrated in the aftermath of the Fukushima accident. ONR continues to take a full and active role internationally. We are fully engaged with the IAEA, and the Fukushima related activities under the Convention on Nuclear Safety. ONR has also engaged with ENSREG in the development, conduct and peer review of the European Stress Tests and is currently assisting ENSREG in the development of a specification for National Action Plans that all European Countries with NPP will be producing at the end of 2012.

ONR is committed to international collaboration and cooperation and in addition to meeting the commitments to report on progress (for example the ENSREG action plan), will also support and encourage the openness of this process by ensuring that its reports are placed into the public domain.

## Conclusions

Uncertainty over technical details related to the accident has not prevented us drawing conclusions and seeking to ensure that early significant lessons were recognised and measures put in place. This report provides an update on the progress made in the UK. The Final Report recommendations and conclusions remain valid.

We have been encouraged by the positive response of all stakeholders to our requests for updates on progress with implementing the lessons for the UK's nuclear industry, and also with the progress being made. We recognise that there is still much to do, and recognise the need for all stakeholders to follow through to completion the programmes of work that will deliver the improvements that are required. Overall ONR concludes that:

- 1 **all relevant stakeholders have shown an appropriate level of commitment to address the Chief Inspector's recommendations and the relevant findings of the Stress Test reports**
- 2 **there is clear evidence that adequate progress is being made, with improvements either in place or planned**
- 3 **however, more needs to be done and it is important that all involved sustain their efforts to ensure that all recommendations, considerations and findings are closed out, and that the intended safety benefits are realised**
- 4 **ONR will press for the industry to complete the more significant improvements arising from learning from the Fukushima event by the end of 2014 (taking into account, particularly in relation to Sellafield, other priority safety activities and the availability of funding),**
- 5 **ONR will deliver proportionate and effective oversight of this by monitoring ongoing "Fukushima learning" activities through its operational regulatory programmes (e.g. which relate to civil nuclear reactors, Sellafield, decommissioning and waste management, and relevant UK defence sites).**
- 6 **ONR will continue to report the progress of Government, ONR and licensees in addressing the recommendations, findings and considerations in appropriate routine reports via its website**
- 7 **International cooperation and shared learning will continue to be a significant ONR activity to ensure that the UK nuclear industry maximises the learning from others and share their own experiences to the benefit of others.**

## Contents

INTRODUCTION .....	1
Background .....	2
<i>The Fukushima Events</i> .....	2
<i>UK Response</i> .....	3
<i>European Response</i> .....	3
<i>Other International Responses</i> .....	4
SUMMARY OF UK CHIEF INSPECTOR RECOMMENDATIONS.....	6
CURRENT POSITION AT FUKUSHIMA .....	7
Current State of the Fukushima-1 Reactors.....	7
Wider Impact of the Accident in Japan.....	10
<i>Health</i> .....	14
<i>Contamination</i> .....	15
<i>Other Impacts</i> .....	15
Japanese Response.....	15
<i>Site Remediation</i> .....	15
<i>Off-site Remediation</i> .....	17
<i>Regulatory Regime</i> .....	18
PROGRESS IN IMPLEMENTING THE GENERAL RECOMMENDATIONS.....	19
PROGRESS IN IMPLEMENTING RECOMMENDATIONS RELEVANT TO THE REGULATOR (ONR).....	26
PROGRESS IN IMPLEMENTING RECOMMENDATIONS RELEVANT TO THE NUCLEAR INDUSTRY.....	31
EDF Energy.....	31
NNB GenCo .....	37
Magnox Ltd .....	39
Horizon Nuclear Power Limited.....	42
NuGeneration Ltd .....	42
Generic Design Assessment (GDA).....	43
Sellafield Limited .....	43
Restoration Sites .....	48
<i>Dounreay Site Restoration Ltd</i> .....	48
<i>Research Sites Restoration Ltd</i> .....	50
Commercial Sites .....	52
<i>Sellafield Capenhurst Ltd</i> .....	52
<i>Urenco UK Ltd</i> .....	52
<i>Springfields Fuels Ltd</i> .....	54
<i>GE Healthcare Ltd</i> .....	55
<i>Studsvik UK Limited</i> .....	57
<i>Low Level Waste Repository Limited</i> .....	58
<i>Imperial College of Science, Technology and Medicine</i> .....	59

---

Defence Sites .....	61
<i>Atomic Weapons Establishment (AWE) (Aldermaston &amp; Burghfield)</i> .....	61
<i>Nuclear Fuel Production Plant and Neptune Reactor, Derby</i> .....	62
<i>Devonshire Dock Complex, Barrow in Furness</i> .....	64
<i>Devonport Royal Dockyard, Plymouth</i> .....	65
<i>Rosyth Royal Dockyard</i> .....	67
DISCUSSION AND CONCLUSIONS.....	69
Introduction .....	69
General Recommendation .....	69
Recommendations on ONR .....	71
Progress by the Nuclear Industry – Recommendations and Stress Test Outcomes .....	72
Future Reporting .....	81
International .....	82
GLOSSARY AND ABBREVIATIONS.....	83
REFERENCES .....	88
ANNEX 1: RECOMMENDATIONS FROM THE CHIEF INSPECTORS FINAL REPORT (REF)...	92
ANNEX 2: OUTCOMES OF THE UK STRESS TESTS.....	98
ANNEX 3: ONR EXPECTATIONS FOR LICENSEE RESPONSE TO RECOMMENDATIONS ..	137
ANNEX 4: ONR JUDGEMENTS ON LICENSEE RESPONSES .....	155
Studsvik - Summary of Assessment of Licensee Compliance with ONR Expectations .....	156
GE Healthcare - Summary of Assessment of Licensee Compliance with ONR Expectations.....	161
Low Level Waste Repository Ltd - Summary of Assessment of Licensee Compliance with ONR Expectations.....	165
Imperial College - Summary of Assessment of Licensee Compliance with ONR Expectations .....	170
Research Sites Restoration Limited - Summary of Assessment of Licensee Compliance with ONR Expectations.....	175
Springfields - Summary of Assessment of Licensee Compliance with ONR Expectations.....	181
Urenco UK Limited - Summary of Assessment of Licensee Compliance with ONR Expectations .....	187
Dounreay - Summary of Assessment of Licensee Compliance with ONR Expectations .....	195
Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations.....	204
Rosyth Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations	218
AWE - Summary of Assessment of Licensee Compliance with ONR Expectations .....	226
Rolls Royce Marine Power Operations Limited - Summary of Assessment of Licensee Compliance with ONR Expectations .....	236
BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations.....	254
Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations .....	270
EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations.....	284
Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations.....	321

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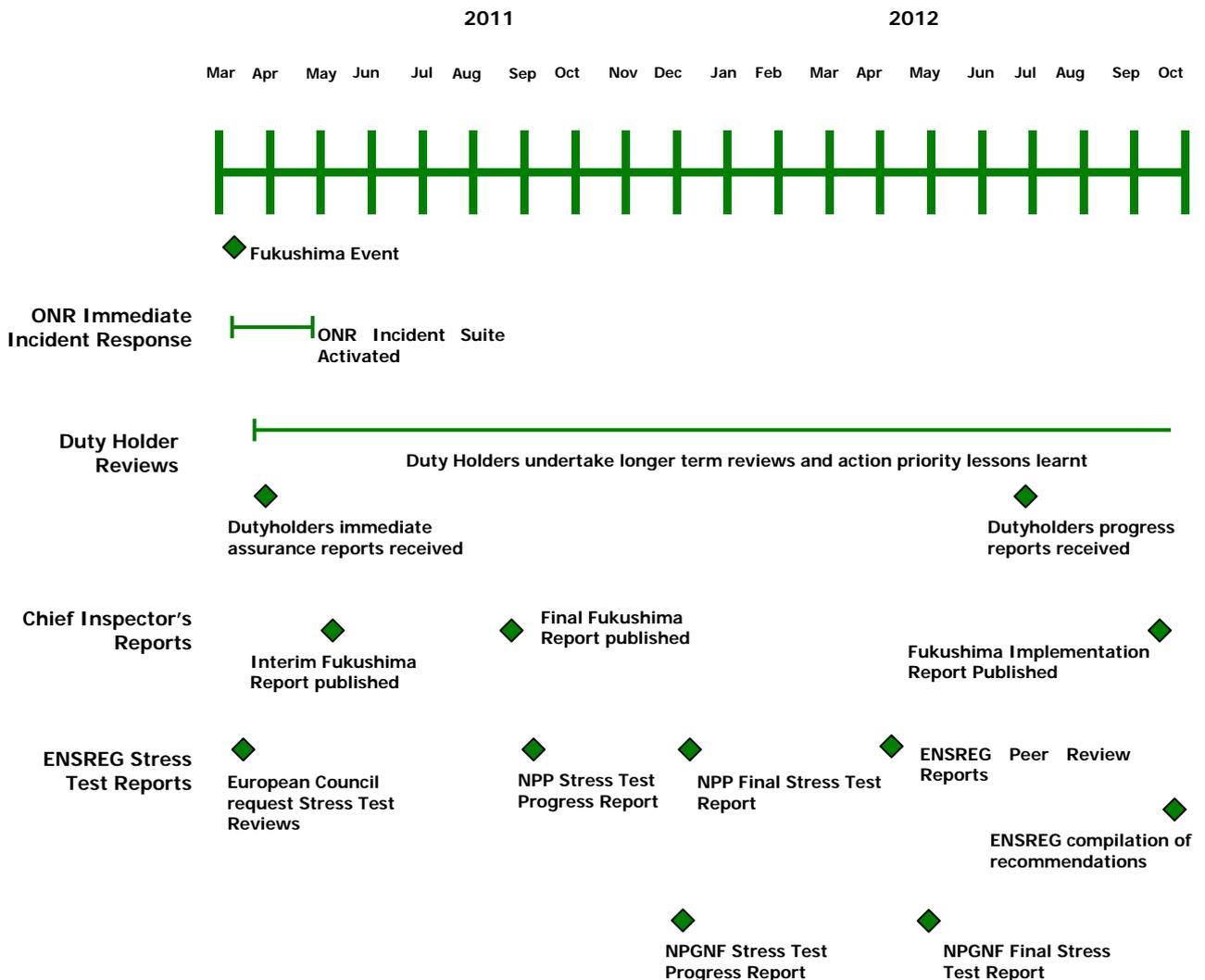
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ANNEX 5: UK'S NATIONAL ACTION PLAN FOR ENSREG.....	361
CONTACTS .....	369

## Introduction

- 1 This report fulfils the commitment given in the HM Chief Inspector of Nuclear Installations (HMCINI) report on the implications of the Fukushima accident for the UK nuclear Industry (Ref.1) to provide a summary of the progress that has been made in addressing his recommendations. In addition, this report also covers the outcome of the European stress test reports, both in terms of the national reports for the UK and the European level Peer Review. In common with the earlier reports, it is intended that this report will be:
  - independent and impartial without fear or favour for any particular stakeholder or group of stakeholders in line with his duty;
  - open and transparent and published with public access to all contributions so far as security and other considerations (such as the willingness of those submitting evidence or information to allow open disclosure) permit
- 2 Both HMCINI's report and the national stress test reports requested those stakeholders on whom the recommendations or findings were placed to provide an update on progress in addressing the recommendations or findings at the end of June 2012. Hence, the bulk of the information in this report is based on information available at that time. To compile this report ONR has used the responses provided by stakeholders and, importantly and where relevant, ONR's assessment of those responses. This report therefore represents a large undertaking which has called on significant ONR resources to carry out the assessment, produce reports, follow up and discuss with the stakeholders. These resources have been drawn from the same pool of resources used for all of ONR's activities. ONR recognises the large resources deployed by the stakeholders in addressing the recommendations and findings and, indeed, in providing the responses to ONR.

3 The diagram below gives a pictorial overview of milestones to date in establishing the lessons learnt from the Fukushima accident.



## Background

### The Fukushima Events

4 On 11 March 2011, Japan suffered its worst recorded earthquake, known as the Tohoku event. The epicentre was 110 miles east north east of the Fukushima Dai-ichi (Fukushima-1) site. There were six Boiling Water Reactors (BWR) on this site. Reactor Units 1, 2 and 3 were operating at power before the event and on detection of the earthquake, shut down safely. Reactor Units 4, 5 and 6 were shut down for maintenance, and further, Reactor Unit 4 was defuelled but with short cooled fuel in the reactor building spent fuel pool. Off-site power was lost and, initially, emergency diesel generator (EDG) power was used to provide essential post-trip cooling. Less than an hour after shutdown a massive tsunami from the earthquake inundated the site and destroyed the capability for on-site generation of alternating current (AC) electrical power with the exception of one emergency diesel generator serving Reactor 6. Significant amounts of electrical switchgear was lost, as well as loss of control and instrumentation equipment. Subsequently, alternative back-up cooling was lost and, with the loss of cooling systems, Reactor Units 1 to 3 overheated and the temperature of the spent fuel pools increased. The overheated zirconium cladding in the reactors underwent chemical reaction with water and steam, generating

hydrogen, which resulted in several explosions causing damage to building structures. Major releases of radioactivity occurred, initially to the atmosphere but later by leakage to sea. The operator struggled to restore full control. The sequence of events that unfolded was in line with current severe accident understanding for prolonged loss of cooling at Light Water Reactors (LWR).

- 5 This was a severe nuclear accident, rated at an International Nuclear and Radiological Event Scale (INES) Level 7 (the highest level). The Japanese authorities instigated a 20km evacuation zone, a 20 to 30km sheltering zone and other countermeasures.
- 6 An update of the position is given in Section 3, although the key factors remain unchanged from our earlier reports.

## UK Response

- 7 In response to the Fukushima accident, the UK Government used the Cabinet Office Briefing Room (COBR) to monitor developments. The Government Chief Scientific Advisor set up and chaired a Scientific Advisory Group for Emergencies (SAGE). HMCINI and other senior ONR staff provided significant inputs to both COBR and SAGE. The Redgrave Court Incident Suite (RCIS) in Bootle was continuously staffed by ONR experts from early in the accident and for over two weeks it acted as a source of expert regulatory analysis, advice and briefing to central government departments and SAGE.
- 8 The Secretary of State for Energy and Climate Change requested HMCINI to examine the circumstances of the Fukushima accident to see what lessons could be learnt for the UK nuclear industry. ONR set up a dedicated project team covering aspects of the Fukushima accident that were likely to be important for learning lessons. HMCINI also set up a Technical Advisory Panel (TAP) of external independent experts to advise him during this work.
- 9 HMCINI published his Final Report on 11 October 2011 (Ref. 1). This report built on the findings of the Interim Report, published in May 2011, and overall contained 17 conclusions and 38 recommendations. The recommendations are discussed in Section 2.

## European Response

- 10 On 24 and 25 March 2011, the European Council declared that:
- “the safety of all EU nuclear plants should be reviewed, on the basis of a comprehensive and transparent risk assessment (“stress tests”). European Nuclear Safety Regulators Group (ENSREG) and the European Commission are invited to develop, as soon as possible, the scope and modalities of these tests in a coordinated framework, in light of the lessons learnt from the accident in Japan and with the full involvement of member states, making full use of available expertise (notably from the Western European Nuclear Regulators’ Association (WENRA)). The assessments will be conducted by independent national authorities and through peer review; their outcome and any necessary subsequent measures that will be taken should be shared with the Commission and within ENSREG and should be made public. The EC will assess initial findings by the end of 2011, on the basis of a report from the Commission”.*
- 11 ENSREG members agreed on the initial independent regulatory technical definition of the stress tests and how it should be applied to nuclear facilities across Europe at their plenary meeting on 12–13 May 2011. In addition to taking an active role in the European stress test for nuclear power stations, HMCINI requested that all nuclear installations in the UK, regulated by ONR under nuclear site licenses, should carry out the stress tests, although it was recognised that the stress test process and requirements would not always be applicable to non-power generating nuclear facilities (NPGNF) on the basis that they had been specifically derived for nuclear power plants (NPPs). The timeline for the stress test reports was as follows:

Date	European “Stress Tests” (EST)
June 2011	ONR initiated licensee “Stress Tests” NPP and NPGNF
October 2011	NPP licensees submit final reports
December 2011	ONR produces final UK national report on NPPs
December 2011	NPGNF licensees submit final reports
May 2012	ONR produces final UK NPGNF report
April 2012	European peer review output on NPP national reports

- 12 All of these reports were put into the public domain.
- 13 Following completion of the peer review of the UK’s NPP stress test report in April 2012 (Ref. 2) the European Commission presented its final report to the European Council in June 2012. (Ref. 3). This report set out high level findings based on the peer reviews of all of the country reports. Since the publication of that report ONR has been working with ENSREG on the development of a specification for national action plans that all of the participating countries aim to produce by the end of 2012. As well as each country taking account of the various reports, ENSREG have produced a compilation of recommendations and suggestions which were endorsed at its meeting on 27 September 2012. For ONR we expect that this implementation report, and the assessment carried out in support of it, will provide the bulk of the information that the national action plan will need. A table mapping the European stress test and peer review findings onto the relevant UK recommendations and STFs is contained in Annex 5, together with the compilation of recommendations and suggestions. The table shows that the earlier HMCINI report recommendations cover the areas subsequently addressed in the stress tests, but at a more strategic level, with the stress tests adding site-specific details to the overall picture.

## Other International Responses

- 14 HMCINI led an International Atomic Energy Agency (IAEA) high level team of international nuclear experts in a fact-finding mission to Japan in May 2011 and reported back to a ministerial conference of the IAEA in June 2011. The mission visited the Fukushima-1 site, along with Fukushima-2 and Tokai. A report on the mission (Ref. 4) was published shortly afterwards. A crucial initial finding of the mission team was that the tsunami risk for several sites in Japan had been underestimated. It also concluded that regulatory systems should ensure that there are adequate arrangements for addressing extreme events, including periodic review of those arrangements.
- 15 The IAEA developed an action plan, which aimed to widen the scope for lessons learnt to all member states. The plan was endorsed by IAEA at its general conference in September 2011. The Japanese government has provided two reports on the accident to the IAEA: to the ministerial conference, published in June 2011 (Ref. 5), and to the general conference, published in September 2011 (Ref. 6). In the intervening period, the Japan parliamentary independent investigation reported on many organisational factors.
- 16 An Extraordinary Review Meeting of the Convention on Nuclear Safety (ERMCNS) to review contracting parties’ progress against the action plan was held in Vienna 27-31 August 2012. In order to best use the time during the ERM, each contracting party (CP) was asked to submit a National Report by 13 May 2012. The UK report (Ref. 7) was submitted to time.
- 17 At the opening plenary session of ERMCNS, following remarks by the IAEA Director General and the CNS President, a Deputy Director-General of NISA (Nuclear and Industrial Safety Agency) provided an update regarding the situation at TEPCO’s (Tokyo Electric Power Company) Fukushima Dai-ichi nuclear power plant.

- 18 The ERM CNS had six working sessions open to all CPs on the topics within the national reports.
- 1 External Events
  - 2 Design Issues
  - 3 Severe Accident Management and Recovery (on site)
  - 4 National Organisations
  - 5 Emergency Preparedness and Response and Post-accident Management (off site)
  - 6 International Co-operation
- 20 These sessions summarised the national reports, and enabled discussion and comment regarding each topic. These working sessions informed the summary report (Ref. 8) that forms the output from this ERM. The effectiveness of the CNS was also discussed during this ERM.
- 21 The summary report not only captures working session discussions, but also indicates the issues to be considered in national reports for the Sixth Review Meeting and the proposals to amend the CNS text and guidance documents.
- 22 The UK has contributed to a significant number of other international meetings and bilateral discussions relating to the Fukushima accident since March 2011, and this is expected to continue. ONR's staff, led by HMCINI, will continue to play an active role in these meetings.

## Summary of UK Chief Inspector Recommendations

- 23 HMCINI's report (Ref. 1) to the Secretary of State for Energy and Climate Change was published in September 2011. The report reaffirmed the conclusions and recommendations of the Interim Report and contained a number of further recommendations. The recommendations were addressed to a range of stakeholders including the UK Government and the nuclear industry and ONR itself. These recommendations are reproduced in full in Annex 1 of this report, and summaries of the progress made by stakeholders in implementing the recommendations can be found in Sections 4, 5 and 6.
- 24 In addition, the UK nuclear Industry undertook stress tests (Ref. 9) which were reviewed by ONR. Subsequently, two stress test reports covering the UK's civil nuclear power stations (Ref. 10) and non-power generating nuclear facilities (Ref. 11) were published. The stress test reports contain a summary of the UK nuclear industry's own proposals and plan to address issues arising from their stress test process, referred to as "considerations", together with a number of additional matters, known as stress test findings (STFs) which were raised by ONR following review of the UK nuclear industry's stress test reports. The considerations and STFs are listed in Annex 2.
- 25 The stress tests, by design, were focused on the analysis of initiating events (earthquakes, flooding and bad weather), loss of safety function (electrical power and cooling) and severe accident management and, as such, the considerations and findings in these areas are closely related to recommendations in the Chief Inspector's report (Ref. 1) which had already identified the most significant issues early in the process. The considerations and stress test findings were grouped together with the appropriate recommendations in ONR's stress test reports (Ref. 10 and Ref. 11) and these groupings are reproduced in Annex 2.

## Current Position at Fukushima

### Current State of the Fukushima-1 Reactors

- 26 The sequence of events, the loss of crucial safety functions, and subsequent radioactive releases at the Fukushima Daiichi plant were described in detail in HMCINI's Final Report (Ref. 1) and have not been repeated here. There has been no substantive change to the understanding of what happened in March 2011 although the Japanese authorities are continuing with their investigations and analyses which from time to time reveal further details or clarifications to the extant knowledge. Four notable sources of information on the events at Fukushima Dai-ichi in March 2011 are references Ref. 5, Ref. 12, Ref. 13 and Ref. 14.
- 27 It has recently been suggested (Ref. 15) that Unit 1 could have suffered some impediment to key safety systems before the tsunami. It had previously been stated by TEPCO that all the reactors were successfully shut down following the initial tremors and cooling systems started as designed, with problems only initiating from the tsunami when it reached the site approximately 50 minutes later. However, Ref. 15 challenges TEPCO's account that the isolation condenser on Unit 1 was shutdown deliberately to maintain a controlled reactor cool down rate (prior to the tsunami). It reports that its investigations have revealed accounts of the operators deliberately shutting down the isolation condenser to determine whether there was a coolant leak from the system. Ref. 15 also reports that there are questions as to whether a safety relief valve on Unit 1 opened after the earthquake as planned. This same report suggests that the claims for the reactors' seismic resistance had not been fully substantiated.
- 28 TEPCO has provided a response to some of these suggestions in reference Ref. 14. It acknowledges that because the tsunami hit less than one hour after the initial earthquake, station workers had been unable to verify the extent of damage to station facilities caused by the initial tremors. However, Ref. 14 reasserts that TEPCO believes the high pressure injection systems, including the isolation condensers operated with no problems or abnormalities prior to the tsunami. Subsequent visual inspections of the pipework and valves associated with Unit 1's isolation condenser outside of the Primary Containment Vessel (PCV) have found no damage which could cause a loss of reactor coolant. It is still not possible to inspect the status of the isolation condenser pipework inside the PCV. Ref. 14 does recognise and discusses in some detail problems with how valves on the isolation condenser failed "closed" following the loss of power across the site, which prevented the system restarting, regardless of why it was initially shut down.
- 29 There remains uncertainty on the exact status of the reactor cores, Reactor Pressure Vessels (RPVs) and PCVs as inspections have either been impossible or inconclusive despite the use of robots and endoscopes. For the time being, computer models provide the best indications of what could have happened but there are limitations in the modelling and some inconsistencies in the model predictions. Nevertheless it is clear that the reactor cores suffered severe damage as evidenced by the generation of hydrogen and the subsequent explosions.
- 30 It was widely believed that Unit 2's suppression chamber was damaged by an explosion on 15 March 2011. However, Ref. 14 presents new information which indicates that the large vibrations and noises experienced on Unit 2 were actually from the hydrogen explosion in Unit 4 reported on the same day and not a separate event. TEPCO is now attributing the drop in the Unit 2 suppression chamber pressure (that coincided with the reports of vibrations) to instrumentation failure rather than a real effect, and visual inspections by robots have revealed no signs of damage or an explosive event in that area. Despite the uncertainties, TEPCO still believes Unit 2's reactor core was damaged with significant quantities of hydrogen being generated. However, the earlier explosion at the neighbouring Unit 1 reactor was known to have opened a blow out panel on the top of Unit 2's reactor building, which probably allowed the generated hydrogen to escape.

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- 31 These new details do not affect the long-standing conclusion that the reactors experienced external hazards of a magnitude beyond that which they had been designed to withstand, and the conclusions and recommendations in the Chief Inspector's report remain valid.
- 32 TEPCO continues to pump water into the RPVs of Units 1, 2 and 3 at a rate between 5 to 7m<sup>3</sup>/h, which is maintaining the bottom of the RPVs at temperatures between 30 and 50°C (Ref. 16). Since early on in the accident, this injected water has been leaking from RPVs into the PCVs and then to the reactor and turbine buildings. As of 25 May 2012, it was estimated that there was 2m depth of water in the PCV of Unit 1, 60cm in Unit 2 and 5m in Unit 3 (Ref. 17). The turbine hall basements remain flooded to a depth of around 3m (Ref. 18).
- 33 TEPCO has been transferring and storing water from building basements to the centralised radiation waste processing building. Since June 2011, water processing facilities have been installed to remove salt (initially sea water was injected into the reactors) and radioactive materials, allowing the inventory of highly contaminated water on the site to be reduced and to provide a recyclable source of water for reactor injection.
- 34 TEPCO has put in place redundant and diversified facilities to ensure water injection to the reactors in the event of breakdowns, storms, further earthquakes and tsunamis etc. These include alternative water supplies, multiple off-site power supplies, temporary diesel generators (stored on the hill above the site); backup emergency reactor pumps and several fire engines. As a result, TEPCO states that it should now be able to resume water injection from back-up systems within 30 minutes. Even if all "engineered" systems fail, the fire brigade could provide water injection to the reactors within three hours (Ref. 19). Note: in October 2011, it was estimated that further damage to the cores could be prevented if water injection was resumed within 18 hours. At this present time, as a result of the further reduction in decay heat being produced within the reactors, the time window available to restore cooling is even longer.
- 35 Despite the systems in place to process and recycle the reactor injection water, dealing with the accumulation of highly contaminated water remains a significant environmental challenge on the site. To prevent contaminated water leaking into the ocean, TEPCO took some short-term steps to fill trenches and block intakes. There was already some existing protection in place to prevent the permeation of radioactive material into the ocean but this was damaged by the tsunami. New pipe sheet piles have been placed in a number of locations in the existing structure to repair degraded areas. Significantly, TEPCO has begun the construction of a new major shield wall in front of the existing sea wall of Units 1 to 4. This is scheduled to be completed in 2014 (Ref. 20).
- 36 In addition to the reactor injection water, ground water has also been flowing into the reactor and turbine buildings, adding to the volume of contaminated water. TEPCO is developing plans to lower the groundwater level in the areas surrounding the reactor buildings. On the presumption that leaked radioactive materials have already been deposited on the seabed, the seabed of the site harbour has been covered and solidified with a mixture of cement and clay to fix these deposits in place.
- 37 The threat from aerial releases of radioactivity is considerably reduced compared to the days immediately following the earthquake. To mitigate the emissions to atmosphere, during April to June 2011, TEPCO sprayed ~560,000m<sup>2</sup> of the buildings and site grounds with a dust inhibitor. A reactor building cover has been installed at Unit 1 to mitigate the release of radioactive material, the original top levels of the building having been destroyed by a hydrogen explosion. In addition to the structure itself, an exhaust gas system has been installed to further reduce radioactive releases (Ref. 21).
- 38 Units 1, 2 and 3 have all had PCV gas control systems installed. In addition to reducing the PCV emissions, the systems can also analyse radioactive isotopes (the low levels detected of xenon 135 provide confidence that there are no recurring criticality events) and measure the hydrogen concentration. It does not appear that TEPCO has been able to measure the concentration of gases such as carbon dioxide which would be an indicator of core-concrete interactions (although hydrogen is also an indicator here, as water driven off from the concrete can react with steel reinforcement).

- 39 The fuel ponds in Units 1 to 4 still contain the fuel they held on 11 March 2011. All four have operating cooling water systems which are maintaining the water temperatures between 20 and 30°C (Ref. 16) and the water level 7m above the top of the fuel. Hydrazine has been added to raise the pH (to minimise corrosion) and to control bacteria. Mobile desalination facilities have also been utilised to remove the salt water added during the initial accident response.
- 40 There have been repeated concerns raised in the media about the status of the fuel pond in Unit 4 following the earthquake and subsequent explosion that occurred in the reactor building. TEPCO has reinforced the bottom of the fuel pond through the installation of steel posts and a concrete wall. More recently, inspections and analyses have been undertaken to show that the building is not tilting and can withstand an earthquake equivalent to the one that occurred in March 2011. ONR has no reason to doubt this conclusion reached by experts with first hand knowledge of the plant.
- 41 Work is underway to clear away rubble and install gantries on the upper parts of the reactor buildings of Units 3 and 4. Work has also started on Unit 4 to construct a cover over the fuel pond ahead of plans to place spent fuel into casks and move it to the common pond. TEPCO is aiming to start fuel removal from Unit 4 in 2013 (Ref. 20).
- 42 TEPCO's worker plan for 2012 projected a need for about 11,700 workers for the year (Ref. 20). It is anticipated that the actual figure will exceed this. Full facemasks are no longer needed on many parts of the site (away from the damaged reactors). However, the working conditions continue to be difficult, with heatstroke presenting a significant challenge during the summer months (Ref. 22).
- 43 To facilitate the on-site work, a containment structure has been installed, enclosing Reactor Unit 1.



**Figure 1 : Containment structure enclosing reactor 1**

## Wider Impact of the Accident in Japan<sup>2</sup>

- 44 A number of assessments have been undertaken of the amount of radionuclides released into the environment and ocean due to the accident. IAEA has summarised some of these assessments in reference Ref. 23, the results of which are repeated in Table 1 and 2 below.

**Table 1: Estimate of Releases into the Air from the Accident in March 2011. Ref. 23**

	Released amount (PBq) <sup>1</sup>				
	Rare gas	I-131	Cs-134	Cs-137	I-131 equivalent (INES) <sup>3</sup>
TEPCO	About 500	About 500	About 10	About 10	About 900
JAEA Nuclear Safety Commission (12 Apr 2011– 12 May 2011)	-	150	-	13	670
JAEA Nuclear Safety Commission (22 Aug 2011)	-	130	-	11	570
JAEA (6 March 2012)	-	120	-	9	480
NISA (12 April 2011)	-	130	-	6.1	370
NISA (6 June 2011)	-	160	18	15	770
NISA (16 February 2012)	-	150	-	8.2	480
IRSN (Institut de Radioprotection et de Sûreté Nucléaire)	2000	200	30		-
Accident at Chernobyl Nuclear Power Plant [Reference]	6500	1800	-	85	5200
<sup>1</sup> PBq = 1x10 <sup>15</sup> Bq <sup>2</sup> The value estimated by TEPCO has been rounded off to one decimate place, being a figure in Bq at the time of being released. The value for rare gas is one equivalent to 0.5 MeV [sic] <sup>3</sup> I-131 equivalent is a value of an activity of released isotope(s) that shows relative significance to public health in comparison to iodine 131. I-131 was chosen as a reference isotope in INES ratings for large releases because it would generally be one of the more significant isotopes released. Eg. equivalence value of Cs-137 is 40 (i.e. 10 PBq of Cs-137 would be equivalent to 400 PBq of I-131)					

<sup>2</sup> We are grateful for the help and advice given by Health Protection Agency in writing this section of the report

Table 2: Estimate of Releases into the Sea from the Accident in March 2011. Ref. 23

	Period of assessment	Released amount in PBq <sup>1</sup>		
		I-131	Cs-134	Cs-137
TEPCO	26 March to 30 September <sup>2</sup>	11	3.5	3.6
JAEA	21 March to 30 April <sup>3</sup>	11.4	-	3.6
IRSN (Institut de Radioprotection et de Sûreté Nucléaire)	21 March to mid-July	-	-	27

<sup>1</sup>PBq =  $1 \times 10^{15}$  Bq

<sup>2</sup>The released amount from March 21, when the measurement of the concentration of radioactive materials in seawater near the water discharge canals was started, to March 25 was calculated tentatively to be about 0.1 PBq for <sup>137</sup>Cs; the ratio of I-131 and Cs-137 suggests the predominance of release into the atmosphere. [sic]

<sup>3</sup>Includes the releases into the atmosphere.

- 45 As a result of the accident and these releases, reference Ref. 15 states that 146,520 residents were evacuated in response to directives from the Japanese government. A 20km “Restricted Area” was established around the plant, within which residents were required to evacuate quickly, and with return prohibited to all except emergency response workers (see Fig 2). A “Deliberate Evacuation Area” extending beyond 30km north-west of the damaged plant from which residents were requested to leave (in a planned manner, over a period of a month) was also established due to concerns that the cumulative dose over a one-year period could exceed 20mSv. Some specific localised areas outside of the Deliberate Evacuation Area were also identified for evacuation. Other areas within a 20-30 km radius of the plant were told to prepare for evacuation in the event of a further emergency (Ref. 24).

Restricted Area, Deliberate Evacuation Area, Evacuation-Prepared Area in case of Emergency And Regions including Specific Spots Recommended for Evacuation (As of August 3, 2011)

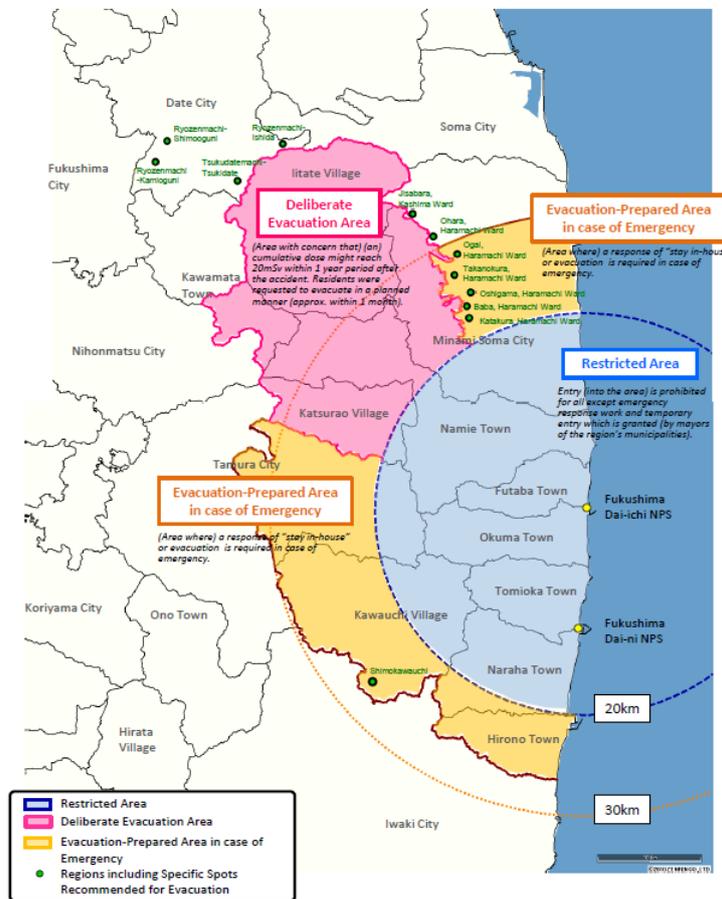


Figure 2 : Restricted Area, Deliberate Evacuation Area, Evacuation-Prepared Area in case of Emergency and Regions including Specific Spots Recommended for Evacuation (As of 3 August 2011)

46

In March 2012, the Japanese government revised the zones (Ref. 25). Some areas within the 20km zone to the north and west of the plant have had the restrictions eased on the basis that the annual dose will be less than 20mSv. However, tight restrictions remain in some areas outside of the 20km zone to the north-west of the plant (see Table 3 and Fig 3), reference Ref. 26 and Ref. 23.

**Table 3: Practical Operations for Designating Areas to which Evacuation Orders have been Issued as Newly Designated Areas**

	<b>Basic Definition of the Areas</b>	<b>Details of Practical Operations</b>
<b>Area 1</b> Areas to which evacuation orders are ready to be lifted	Areas where it is confirmed that the annual integral dose of radiation will definitely be 20mSv or less	<p>1. People concerned can pass through the areas along main roads, return home temporarily (staying overnight is prohibited), and enter the areas for the purpose of public benefit.</p> <p>2. People concerned can : [a] resume businesses such as manufacturing, but regarding such businesses for the residents in the areas such as hospitals, welfare facilities, or shops, work is limited to that for preparation for resuming their businesses; [b] resuming farming * and [c] start other work involving [a] and [b], such as conducting maintenance, repair, or transport-related activities.</p> <p>3. People are not required in principle to take or carry out protection measures, such as screening or measures to control the radiation dose when they enter the areas temporarily.</p> <p>This depends on the degree of limitation on rice planting and the extent to which radiation has been removed from the ground.</p>
<b>Area 2</b> Areas in which residents are not permitted to live	Areas where the annual integral dose of radiation is expected to be 20mSv or more and where residents are ordered to remain evacuated in order to reduce the risk of radiation exposure.	<p>1. The operations applied to the deliberate evacuation areas are also basically applied to these areas.</p> <p>2. People can temporarily return home in the areas (but staying overnight is prohibited), pass through the areas along main roads, and enter the areas for the purpose of public benefit, such as for repairing the infrastructure or conducting disaster prevention-related work.</p>
<b>Area 3</b> Areas where it is expected that residents will face difficulties in returning for a long time	Areas where the annual integral dose of radiation is expected to be 20mSv or more within five years and the current integral dose of radiation per year is 50mSv or more.	<p>1. People are legally required to evacuate from the areas, for which physical barriers to entry such as barricades are placed at the boundaries of the area.</p> <p>2. People may temporarily return home to meet domestic needs and requirements as far as possible, while those who are in charge thoroughly screen people for radiation, control individual doses of radiation, and require the people entering the zone to wear protective gear.</p>

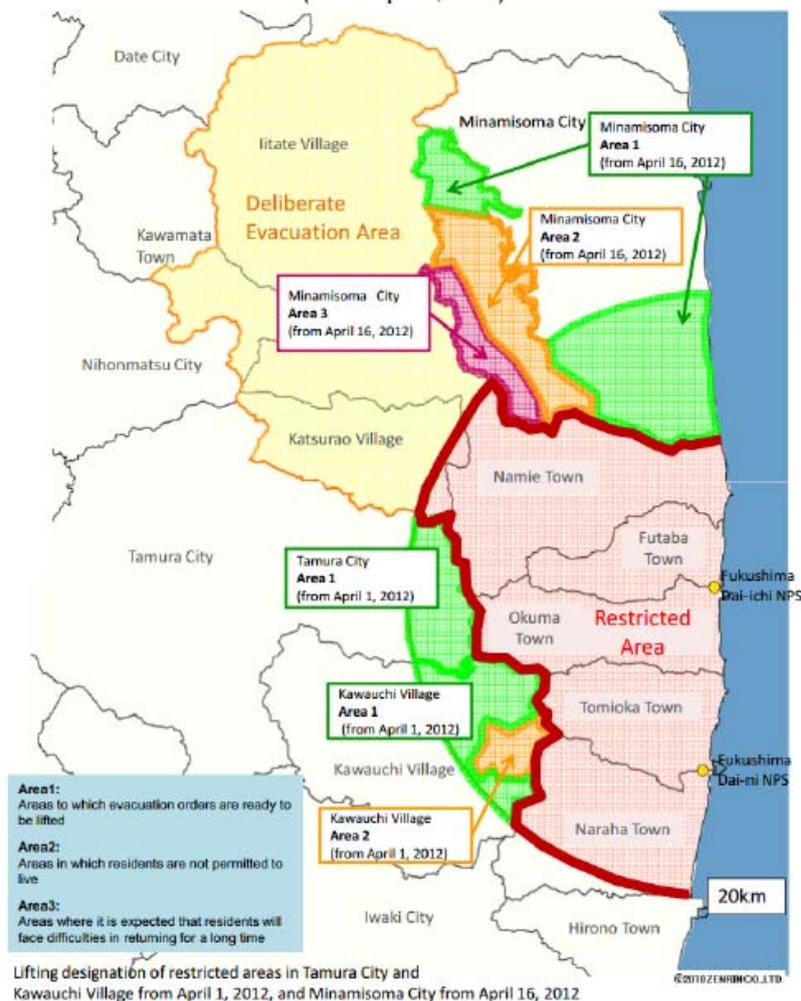


Figure 3 : As figure 2 but with lifting of restricted areas April 2012

## Health

- 47 Estimates reported in Ref. 15 show that 0.7% of residents were exposed to 10mSv or more, 42.3% were exposed to less than 10mSv, but more than 1mSv, and 57% to 1mSv or less. A discussion of radiation, radioactivity and the risks to humans from exposure was provided in Ref. 1 and is not repeated here. However, by way of comparison, the average annual background radiation received by a member of the public in the UK is approximately 2.5mSv per year, rising to approximately 10mSv per year in some areas such as Cornwall. The direct health implications from the nuclear accident are therefore likely to be relatively low in comparison to those caused by the tsunami itself. In addition, it is widely commented that the effects of stress brought on by the fear of the unknown and the trauma of being uprooted from homes and communities can be significant. Ref. 15 also notes that 60 people – hospital patients - died as a result of complications related to the evacuation itself, which is a reminder that evacuation is not a zero risk option.
- 48 The World Health Organisation (WHO) initiated its own public health risk assessment following the accident. This is being carried out in two parts: preliminary dose estimates were published in May 2012 (see Ref. 27) and an assessment of the possible health risks from these exposures, with a report on this in preparation. The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) is also considering the radiological impact of the release and is carrying out an extensive programme of work to consider the impact on the public, workers and

the natural environment. Initial results of the study were presented at the annual meeting of UNSCEAR in May 2012 (Ref. 28).

## Contamination

- 49      Fallout from the dispersion of the radioactive isotopes from the reactors has contaminated parts of the countryside, and therefore crops that may be used for human and animal consumption. The local marine environment has also been affected. The Japanese government (the Ministry for Health, Labour and Welfare) has a programme of food testing, which it publishes on its website, and is still enforcing restrictions on the distribution of food from specific regions which it updates on a regular basis: <http://www.mhlw.go.jp/english/topics/2011eq/index.html>
- 50      There were 18,350 food products tested of which 642 exceeded the limits. The products found to be outside the limits adopted by the Japanese belonged to the following categories (Ref. 29):
- leafy vegetables (e.g. spinach), flower vegetables (e.g. broccoli), and root vegetables (e.g. turnips);
  - fruit from fruit trees (Japanese apricot, fig, pomegranate, persimmon, yuzu, loquat, kiwi) and chestnuts;
  - tea leaves and the leaves of medicinal plants;
  - bamboo shoots;
  - cereals (wheat, rape, rice);
  - mushrooms;
  - farmed meat (beef) and game (boar, pheasant, etc.);
  - cow's milk;
  - sea and river fish;
  - shellfish and crustaceans;
  - marine algae.

## Other Impacts

- 51      There has been a range of other societal impacts in Japan and internationally, including: use of nuclear energy; shut down of or non re-start of NPPs; import of replacement electricity. Other wider impacts include economic aspects such as balance of payments, effects on industrial capacity, as well as political impacts.

## Japanese Response

### Site Remediation

- 52      TEPCO has published a mid- and long-term roadmap towards decommissioning the Fukushima Dai-ichi Units 1 to 4 (Ref. 30). A three-phase approach has been identified over a 40-year period:
- Phase 1: From achieving the stated objective of *bringing the release of radioactive materials under control and radiation doses significantly held down* to the start of fuel removal from the spent fuel pool – Target ~2 years from December 2011.
  - Phase 2: From the end of Phase 1 to the start of fuel debris removal (i.e. the resolidified material formed from fuel and cladding when the cores lost cooling) - Target ~10 years from December 2011
  - Phase 3: From the end of Phase 2 to the end of decommissioning - Target ~30 to 40 years from December 2011.

53 This phased approach is summarised in figure 4.

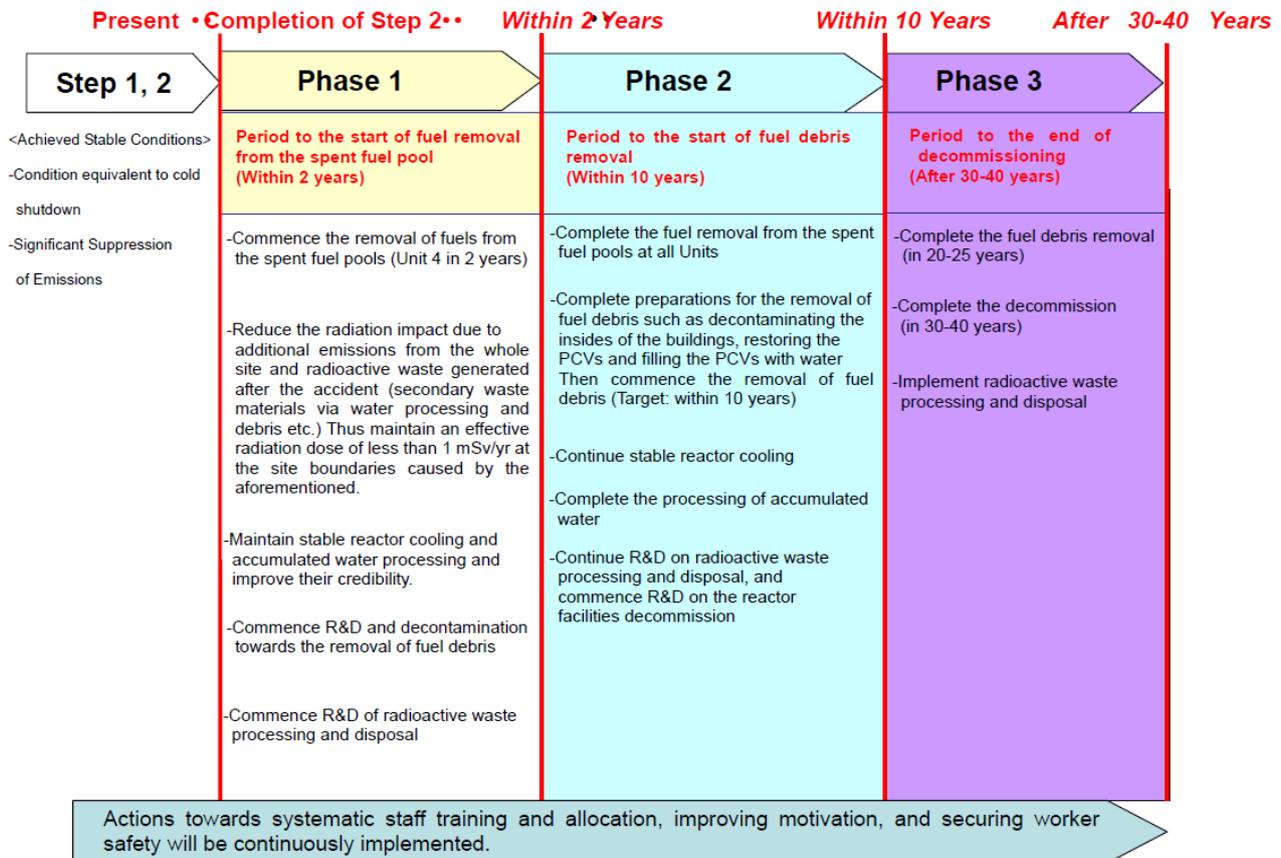


Figure 4 : Phased approach for site remediation

54 TEPCO has defined a programme up to the end of 2014 (including Phase 1). The plans for further years are less well defined and are subject to major change in response to on-site circumstances, research and development etc.

55 Amongst the key tasks identified on the roadmap are:

56 **Reactor cooling** - During Phase 2, the intention is to systematically and progressively change the source of recycled water injected into the reactors from the turbine hall basements, to the basement levels of the reactor buildings and then, ultimately, from water within the PCVs. This will be facilitated by the blocking of inter-building leakages and the reinforcement of the leakage points in the PCVs. Once the PCVs have been made water-tight, the interiors of the PCVs will be filled with water, rendering the cooling of the fuel debris more stable.

57 **Fuel removal from the spent fuel pools** - As has already been discussed, rubble has been removed from the upper parts of the reactor building on Unit 4 and construction of a cover has commenced. The target date for the start of fuel removal from Unit 4 is 2013 (two unirradiated fuel assemblies have already been removed for investigation). A similar approach is proposed for Unit 3 approximately a year later. A specific plan for Unit 1 is to be formulated based on the knowledge and experience gained from Units 3 and 4. For Unit 2, the current intention is to explore decontamination and shielding technologies to allow the existing fuel handling equipment to be approached, investigated, repaired and, subsequently, used to remove the fuel. At present, the intention is to start fuel removal from Units 1 and 2 midway through Phase 2. TEPCO has estimated in reference Ref. 30 that it will take approximately 2 years to remove the fuel from Unit 2 once started and between 1.5 and 3 years for the other units.

- 58 **Fuel debris removal** - There are many steps to be undertaken before the fuel debris can be removed and there are uncertainties associated with all of them, not least that the status and location of the fuel debris is not known at this time. TEPCO has established a goal of beginning fuel debris removal within ten years and it surmises that all Units could be emptied in 20 to 25 years from now. To achieve this, TEPCO has recognised that there will need to be collaboration with government, industry and research institutes to develop the necessary technologies and methodologies.
- 59 **Dismantling of the reactors** – TEPCO has set out its intention to complete the dismantling of the reactor buildings Unit 1 to 4 within 30 to 40 years.
- 60 **Radioactive waste processing and disposal plan** – TEPCO is establishing a research and development plan in 2012 to consider the post-accident waste, including a sampling and analysis programme to help distinguish contaminated waste from ordinary debris. The intention is to start processing and disposing of waste in Phase 3, after the development of a disposal facility and the creation of a disposal plan.
- 61 TEPCO regularly publishes a progress status update against the mid- and long-term roadmap on its website.

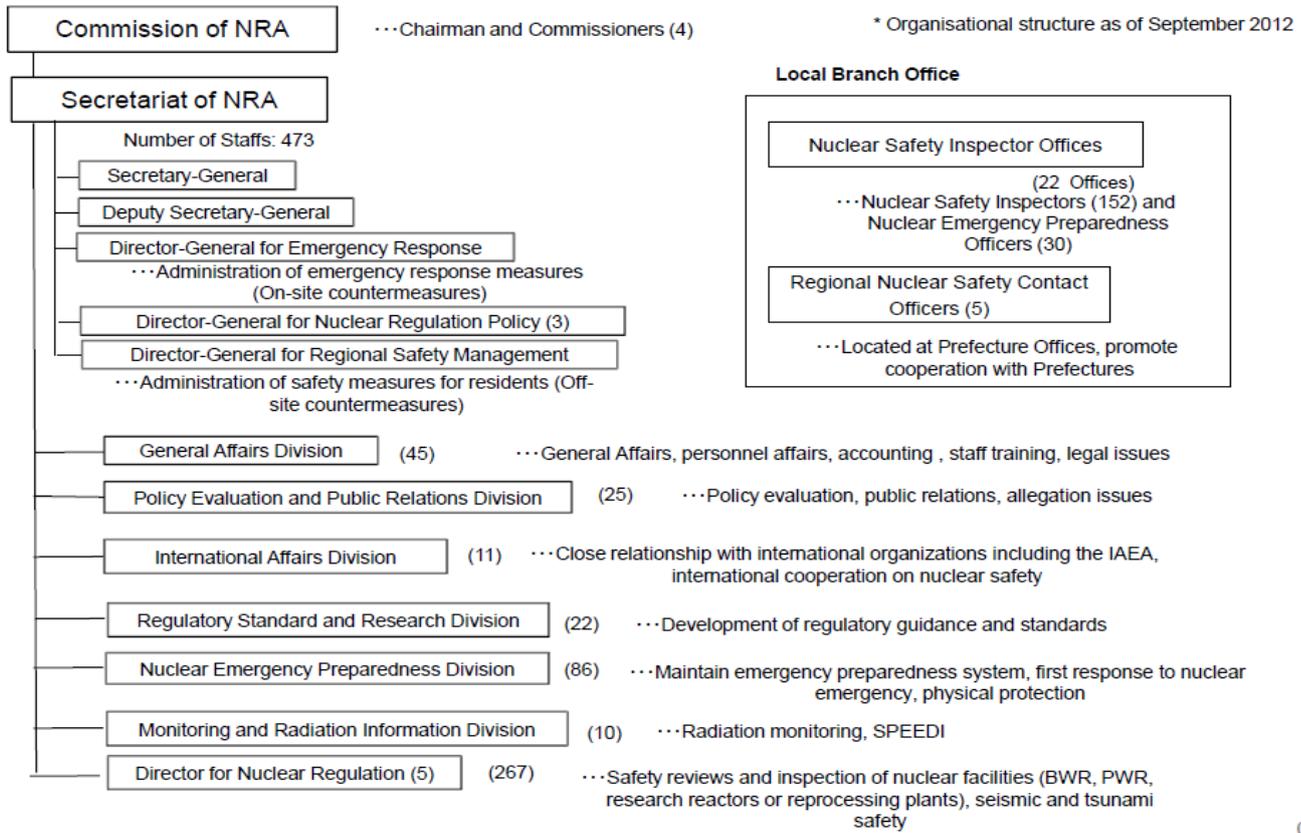
## Off-site Remediation

- 62 A wide area around the Fukushima Dai-ichi NPP was contaminated by the large releases of radioactive material during the Fukushima accident. The major contaminants are Caesium isotopes, which have half-lives of about two years in the case of Cs-134 and 30 years for Cs-137.
- 63 The Japanese government strategy for decontamination (Ref. 31) includes:
- reducing the size of the areas, where the estimated annual additional exposure is larger than 20mSv, through systematic decontamination activities;
  - reducing the annual additional exposure in the areas where it is currently below 20mSv to below 1mSv on a long-term basis. Tentative goals are to realise at least a 50% reduction of the annual additional exposure in two years, giving the highest priority to exhaustive decontamination of children's environments (schools, playgrounds etc.) with a view to reducing their effective annual additional exposure to 1mSv as soon as practicable;
  - pursuing regional decontamination in the case of highly contaminated areas and removal of “hot spots” in the case of relatively low contamination areas where annual exposures are below 1mSv (e.g. in areas where contamination could concentrate like sludge removal from drains or gutters).
- 64 Decontamination is being achieved in a number of ways, often in combination:
- cleaning by high pressure water jet;
  - removal of soil, moss and grass;
  - decontamination of swimming pool by mixing with zeolite, adding flocculants to agglomerate with suspended solids and subsequent filtration to clean the water.
- 65 Good examples of successful decontamination at a school indicate a ten fold reduction in dose rate (from 40mSv/hr to 4.2mSv/hr).
- 66 One of the biggest challenges facing the Japanese has been to identify and to agree, between national and local authorities, suitable places to store the contaminated soil and waste accrued during the decontamination activities. The Japanese are actively pursuing volume reduction technology.

## Regulatory Regime

- 67 Observations on the adequacy of the nuclear regulatory framework in Japan were made in several reports written following the accident at Fukushima, including reports written by the Japanese government itself (Ref. 32), and especially the Japanese Parliament's independent investigation committee report (Ref. 15) which, amongst other things, severely criticised the lack of an independent nuclear regulator.
- 68 NISA of METI was responsible for safety regulation as a primary regulatory body, which in turn was overseen by the Nuclear Safety Commission of the Cabinet Office, and relevant local governments and ministries were in charge of emergency environmental monitoring. It was therefore not clear where the primary responsibility lay in ensuring citizens' safety in an emergency. Ref. 32 also concluded that the organisations and structures at the time hindered the mobilisation of capabilities in promptly responding to the large-scale nuclear accident.
- 69 As a result of these findings, the Japanese government undertook to separate NISA from METI and to review the frameworks (including the Nuclear Safety Commission (NSC) and relevant ministries) for the administration of nuclear safety regulations and for environmental monitoring.
- 70 The outcome of that review has led to a new Nuclear Regulatory Authority (NRA) being established in September 2012 as an external arm of the Ministry of the Environment. This ensures that what was the nuclear safety regulatory function of NISA is now functionally separated from METI (see Figure 5). It also unifies relevant functions of other ministries, creating an organisation of ~500 staff and a budget of 50 billion yen.

### New Nuclear Regulatory Organization of the NRA



**Figure 5 : Japanese Nuclear Regulatory Authority**

## PROGRESS IN IMPLEMENTING THE GENERAL RECOMMENDATIONS

71 HMCINI's Final Report (Ref. 1) brought together 38 recommendations focused on determining whether, in the light of Fukushima, any reasonably practicable improvements to the safety of the UK nuclear industry can be made. Two of the recommendations (IR26 and FR12) were for responses to be made by stakeholders to ONR on the progress being made to address the recommendations. These two recommendations have now been completed. The Final Report General Recommendations are reproduced in Annex 1, and the responses from those on whom the recommendations fell are reproduced below:

### **Recommendations IR1 and FR9 - International arrangements for response and global nuclear safety**

72 Recommendation FR9 applied to the Government, the nuclear industry and ONR and the text below reflects contributions from all of these parties. The UK Government's response to FR9 also included their response to recommendation IR1.

#### **UK Government**

73 In response to these recommendations (IR1 and FR9) the UK Government has confirmed that it continues to work with its partners in the G8 governments, G20 governments and in other international fora to ensure better compliance with international conventions and push forward work on enhancing nuclear safety standards established under the auspices of the International Atomic Energy Agency (IAEA).

74 The UK has participated in the IAEA activities that led to the development of the Director General's action plan and will continue to work with the IAEA to help ensure the delivery mechanism for the Action Plan is both robust and realistic - especially bearing in mind the significance of the work it proposes.

75 In meeting the actions proposed by the plan, the UK have already committed, through the UK's statement at the IAEA Ministerial Conference, to participate in further Integrated Regulatory Review Service (IRRS) peer review missions. The UK has also become a member of IAEA's global assistance mechanism in the event of a nuclear emergency Response and Assistance Network (RANET).

76 The UK Government is also committed to working with our international partners to consider how the dissemination of information under the Convention on Early Notification of a Nuclear Accident can be further improved in terms of both efficiency and substance.

77 Currently, the UK is not proposing any changes to the existing suite of international Conventions as it believes that there is a need to fully analyse the lessons learnt from events at Fukushima and the stress test initiatives being undertaken before any informed decisions can be made on how the International Nuclear Safety Framework could/should be enhanced. Nonetheless, in general the UK believes that the existing conventions provide an adequate framework in which continuous improvement can be achieved and is committed to taking these forward with vigour.

78 The UK continues to be an active member of a range of international organisations including the IAEA, the Nuclear Energy Agency (NEA), the G8 Nuclear Safety and Security Group, and European Nuclear Safety Regulators Group (ENSREG). In addition, the UK has established bilateral links at government level with our closest neighbours – primarily France – to ensure the maximum benefits are gained through co-operation and sharing of information and expertise in ensuring nuclear safety.

79 The UK continues to welcome periodic peer review of our regulatory approach to ensuring nuclear safety, and has already agreed a date for the next IRRS missions (follow-up missions and full mission). Also, the UK has fully participated in the European stress test initiative, which includes a peer review process, thereby fulfilling the requirement to undertake a comprehensive assessment of safety at the UK's nuclear power plants (NPP).

## Operating organisations

- 80 Major UK licensees with operating nuclear plant (EDF NGL, Sellafield Ltd, and Magnox Ltd), one organisation proposing to build new nuclear plant (EDF NNB GenCo), and the majority of other licensees have provided information on their links and activities with respect to international co-operation.
- 81 All major licensees have said that they will respond appropriately to any requests from the relevant government departments and offer support as required, and all have individually noted that they are fully engaged with the relevant regulators, industry bodies and government departments to support the development of improved processes. This includes formal links with the international nuclear organisations IAEA and the World Association of Nuclear Operators (WANO), which are specifically set up to ensure good international co-operation. The licensees also receive bulletins from the Institute of Nuclear Power Operators (INPO), which is predominately the United States' operators association, which carries out many similar functions to WANO.
- 82 Magnox Limited supports international efforts to improve the process of review and implementation of IAEA and other relevant nuclear safety standards and initiatives and supports the development of robust and effective two-way communications with IAEA (and other similar organisations).
- 83 EDF NGL notes that, as a learning organisation, it takes proactive roles in these international nuclear organisations and, as such, looks to national and international operating experience to learn from and enhance the safety and operational aspects of its plants. Examples of these include working with WANO to provide guidance on the emergency planning, performance objectives and criteria so that operators can be peer reviewed against international best standards, and continued involvement in IAEA post-Fukushima safety management and emergency response meetings.
- 84 Sellafield Ltd has confirmed that it treats its membership of WANO and INPO very seriously and implements all mandatory requirements. Sellafield Ltd also notes that its international engagement has also included support to ENSREG through participation in the Technical Advisory Panel (TAP), and IAEA, through participation in Expert Reviews.
- 85 NNB GenCo has confirmed that, as part of EDF Energy, it takes the same proactive role in the various international nuclear organisations as EDF NGL, above, and for similar good reasons. It is also, similarly, working as an active member of WANO on the same issues.
- 86 Formal responses have been received from a number of other operating organisations who have confirmed that they will continue to progress support for international efforts, primarily through the UK Government or the Office for Nuclear Regulation (ONR), to improve the process of review and implementation of IAEA and other relevant nuclear safety standards and initiatives in the light of the Fukushima accident to the extent of their organisational capacity.

## Regulatory organisation (ONR)

- 87 There is existing good co-operation between ONR and nuclear regulators worldwide, including through various international nuclear bodies. This latter grouping includes:
- the IAEA;
  - the Organisation for Economic Co-operation and Development's (OECD) Nuclear Energy Agency (NEA);
  - ENSREG;
  - the Western European Nuclear Regulators' Association (WENRA).
- 88 All have had meetings since the Fukushima accident at which lessons to be learnt were discussed. Additionally, at both the triennial Review Meeting of the Convention on Nuclear Safety (April 2011) and the Review Meeting of the Joint Convention (May 2012) special attention was paid to the Fukushima accident and lessons learnt. ONR staff, led by HMCINI, play an active part in all these meetings, the outcomes of which include:

- IAEA - A ministerial conference convened by IAEA later in June 2011 followed by the development of an action plan where ONR provided independent and objective advice to the UK Government in support of its participation;
- NEA - A special conference under the auspices of NEA in Paris of nuclear regulators and stakeholders in early June 2011;
- ENSREG - The development of European Council “Stress Tests”, the submission of national reports and the subsequent peer review process;
- WENRA – The development of the technical content of the ENSREG stress tests and the process for peer review. A subsequent programme of further work including a review of safety reference levels;
- Convention on Nuclear Safety - An Extraordinary Review Meeting of the Convention on Nuclear Safety to review contracting parties’ responses to the Fukushima accident in August 2012. The UK National Report was delivered in May 2012 and ONR participated fully in the meeting.

89 In addition, ONR has close bilateral links with other nuclear regulators, in particular the French Autorité de Sûreté Nucléaire (ASN) and the United States Nuclear Regulatory Commission (US NRC). These links have been very useful in the immediate response to the accident and in co-ordinating work.

90 HMCINI has had bilateral discussions with several other chief nuclear regulators from around the world and with the director generals and senior staff of IAEA and NEA, and similarly with the Director General for Energy of the European Council.

91 ONR has led the UK’s participation in the European stress test process. All UK licensees have produced a submission against the ENSREG stress test specification. Subsequently, ONR has published two national stress test reports. The first report dealt with NPP’s and has undergone European peer review, the results of which are reported in an ENSREG country report and published on the ENSREG website. The second report dealt with all other remaining UK nuclear facilities; this was beyond the scope of the ENSREG stress test specification and therefore has not undergone European peer review; however, this has been the subject of bilateral discussions with ASN.

92 Additionally, HMCINI led an IAEA high-level team of international nuclear experts to conduct a fact-finding mission to Japan, initially to inform the IAEA Ministerial Conference. Subsequently under bilateral arrangements he has had meetings with the Japanese regulator, members of both sides of the Japanese Parliament and the Japanese Parliament’s independent investigation team. Such co-operation has greatly enhanced ONR’s ability to respond to the Fukushima accident. Such co-operation will continue.

93 Overall, ONR considers that the responses from the UK Government, UK operating organisations and from within the regulatory body (ONR) are sufficient to demonstrate that support for international efforts to improve the process of review and implementation of IAEA and other relevant nuclear safety standards and initiatives in the light of the Fukushima-1 accident have effectively become “normal business” and therefore, Recommendation FR9 is closed.

## **Recommendation IR2 – National emergency response arrangements, review of Japanese response to the emergency**

94 The UK Government’s response was as follows:

The Government has carried out a review of the Japanese response to the widespread civil emergency that occurred following the Tohoku earthquake and tsunami of March 2011. We are now comparing our findings with our own civil contingency planning to identify whether there are lessons that can be learnt from the Japanese experience to improve our own planned response to (catastrophic) emergencies.

The review has considered:

- what happened in Japan: the earthquake and tsunami and their impact;
- the Japanese response to the range of diverse impacts that occurred across a large geographical area.

The current phase of the review is focusing on:

- current UK risk identification, contingency planning and capacity building processes;
- key issues arising from the Japanese experience which have read across to UK contingency planning – to enable us to identify lessons that may be learnt to make our planning even more robust.

We have consulted with, and gained valuable evidence from, the Japanese government and the Foreign and Commonwealth Office (FCO), as well as a range of publicly available reports that have already been written about the emergency. In order to complete this review in a timely way, we will use the evidence currently available to inform our thinking, but the Japanese response to this crisis is still ongoing and further evidence continues to emerge: it is unlikely that final conclusions will be able to be drawn before the Japanese have been able to complete and evaluate their response in full; we will therefore aim to publish our findings once the Japanese work has been completed.”

95 Recommendation IR2 remains open.

### **Recommendation IR3 - National emergency response arrangements, review of national arrangements**

96 The UK Government’s response, on behalf of the Nuclear Emergency Planning Liaison Group, was as follows:

“In May 2011, the Nuclear Emergency Planning Liaison Group (NEPLG) agreed, in response to Recommendation 3 of the Interim Weightman Report, to conduct a review of the UK’s national nuclear emergency arrangements in light of the experience of dealing with the prolonged Japanese event.

As part of that review and in further work the NEPLG examined the decisions and actions that were taken in Japan to protect the public, and considered any lessons that the UK could learn from those actions. This included a re-evaluation of radiation monitoring capacity/capability and recommended that central government clarify the requirements for delivering the data and information in the event of a prolonged incident in the UK and that these arrangements be tested annually. Exercises of off-site emergency plans are being reviewed so that they regularly include aspects such as extendibility, dealing with prolonged events and the deployment of Reassurance Monitoring Units. The NEPLG work also assessed central government response arrangements and, in particular, the provision of scientific and technical advice in the event of a nuclear emergency in the UK or overseas to ensure that COBR has one source of advice and recommended that the Overseas Nuclear Emergency Response plan be tested fully through the Nuclear Energy Agency International Exercise programme.

The report also recommended that ONR should enforce a stronger testing regime which includes extendibility arrangements and overseas nuclear accident response. A range of options for taking forward extendibility have been debated and discussed via the NEPLG Local Authority (LA) Sub Group. This has also been supplemented with a number of face-to-face visits with several LAs to further discuss the enhanced clarity required for extendibility. A draft paper detailing the preferred ONR option has been produced and is currently being finalised. Exploration of the legislative vehicle for implementation of extendibility has been concluded with advice provided by the Treasury Solicitors (TSoL) and ONR. Finally, the work recommended that NEPLG and central government continued to work on the capacity and capability of the emergency services including emergency exposure levels, to ensure that the Fire, Ambulance and Police Services have a clear understanding of radiation exposure levels and the circumstances in which they can carry out their work, recommending that emergency services and operators should liaise formally to determine emergency exposure. The recommendations referring to emergency services, in particular exposure levels for emergency responders have been handled by NEPLG. Further information on

exposure levels for the Ambulance Service see Ref. 55. For the Fire and Rescue Service, information is contained in the Generic Risk Assessment (GRA) found at Ref. 33. In addition there is a new Fire Service 'HazMat' manual that has a radiation chapter and this will be published at the end of June 2012. Guidance on Police exposure levels is currently in production and is due to be published shortly.

The opportunities and recommendations identified by NEPLG form part of a wider programme of work being taken forward by the Department of Energy and Climate Change (DECC).

In looking to answer the recommendations from the NEPLG work and other further work DECC has developed and agreed, with key delivery partners across Whitehall, industry and the regulator, a new National Strategic Framework. This framework significantly strengthens governance arrangements and, in particular, provides clear lines of tasking, communication and decision making between operational delivery and ministerial involvement.

As mentioned in the report, and driven by the new strategic framework, initial comprehensive assessments have been completed for the UK's capacity to plan for and respond to nuclear emergencies – both at “reasonably foreseeable” and “reasonable worst case” scenario level and DECC/NEPLG are currently developing options for closing any gaps where they are found to exist.

In addition, as part of addressing IR3, DECC, under the new strategic framework, is also taking forward a number of international projects in order to better understand the risks the UK faces and strengthen our ability to respond. This work includes for example, a new joint UK-France framework on emergency planning and the international benchmarking of UK emergency arrangements. DECC is also working with NEPLG on the guidance for responding to malicious incidents and events overseas.”

- 97 Some of this work has still to be implemented so recommendation IR3 remains open. With regard to enhanced arrangements for extendibility, ONR will work with DECC, MoD and other interested parties to ensure we are able to provide the necessary regulatory oversight.

## **Recommendation FR6 - National emergency response arrangements, source term estimation**

- 98 The UK Government provided a coordinated response on behalf of the nuclear industry. The response was as follows:

- 99 “The Office for Nuclear Regulation (ONR), the Met Office (MO), the Health Protection Agency (HPA) and the Radioactive Incident Monitoring Network (RIMNET) team at DECC continue to work together to further develop the capability to be able to respond quickly to any incident at a nuclear site anywhere in the world. The objective of this capability is for the UK to be able to draw upon the collective resources and expertise of the operators, regulators and others, as necessary.

The work has been building upon existing arrangements in place for incidents in the UK whilst developing an appropriate basis and supporting procedures for overseas responses. ONR and UK operators will advise on the plant status and potential source terms and progress has been made on the development of an initial set of pre-defined source terms in conjunction with the nuclear industry. MO have further developed their tools to model dispersion of radioactive materials in the atmosphere based on guidance provided by HPA on the most appropriate pathways and other dose factors required to estimate doses to individuals.

Together these provide an auditable means of rapidly assessing the potential impact of an incident on the UK or its citizens. Any results will be displayed using DECC's RIMNET system.

This work is being co-ordinated by DECC with input from other government department and agencies, including GO Science. The aim is to have an initial tool available for use by summer 2012.”

- 100 The Government's response shows a positive and coordinated approach being adopted by all of the parties concerned with recommendation FR6. With respect to the work on source terms, this has focused in the first instance on high hazard UK sites (operating civil nuclear power reactors and the Sellafield site) but this will be extended to other UK sites. In addition to providing an auditable means for rapid assessment of the potential impact on the UK or its citizens, the work will also inform any need for possible countermeasures. So far the effort has been targeted at

airborne rather than waterborne or marine releases, as these have the highest initial impact on members of the public. Recommendation FR6 remains open.

## Recommendations relevant to the UK Government – Recommendation FR7

101 The UK Government's response was as follows:

102 "In the event of a radioactive release from a nuclear site, the operators are responsible for carrying out monitoring in the immediate vicinity with HPA co-ordinating monitoring further afield; this information together with emergency plans is used for the immediate emergency response. These arrangements are kept under review by NEPLG. There are a number of other initiatives in this area, including a review of RIMNET, which is the UK Government's emergency management system for overseas nuclear accidents, which comes DECC. It supports, in addition to its original function, the national level response to civil and military incidents that may occur within UK borders.

In addition, HPA, the Environment Agency the Scottish Environment Protection Agency (SEPA) and the Northern Ireland Environment Agency (NIEA) all carry out or co-ordinate routine environmental monitoring for radionuclides. In the event of a radiological emergency, this routine monitoring would be enhanced if necessary and used to provide information that would support later decisions on emergency countermeasures. Met Office has the capability for providing atmospheric dispersion information in real time following any incident in the UK and worldwide. Met Office is part of a collaboration, co-ordinated by DECC, with contributions from ONR and HPA to develop a tool for estimating the spatial distribution of radiation doses in real time following a radiation release in the UK or elsewhere. The different initiatives should ensure that information is available to support decisions on emergency countermeasures."

103 Although progress has been made, this response does not address recommendation in full; there is a need to ensure that adequate environmental dose measurements and predictions can be provided in the circumstances of severe external hazards. Much of the environmental monitoring equipment around Fukushima-1 did not work satisfactorily after the earthquake and tsunami. We are aware that mobile monitoring teams from HPA, EA, SEPA and NIEA, and other government organisations, alongside volunteered industry and commercial personnel can be mobilised in the event of a nuclear emergency and that the HPA has a co-ordination role for these monitoring teams to ensure their most effective use. However, it is still to be firmly established that there would be sufficient capability following severe external hazards. The progress towards a tool for real-time dose estimation is welcome, but it is not yet in place so efforts here need to continue. Recommendation FR7 remains open.

## Recommendation FR5 - Adequacy of planning controls

104 The Government's response was as follows:

"ONR has included Dr Weightman's recommendation on planning controls around nuclear sites in their consultation response to the Government's proposed National Planning Policy Framework for England (NPPF). The NPPF has now been published and is available at Ref. 34.

Planning is a devolved matter and, as such, the Government's NPPF process only applies to England. However, we will continue to work closely with our colleagues in the devolved administrations on this issue."

105 ONR welcomes the progress already made on this and notes the Government's intention to pursue the issue with the devolved administrations. However, the outcome is not yet clear. Recommendation FR5 remains open.

## Recommendation FR8 - Openness and transparency

106 The UK Government's response was as follows:

"The work that is currently taking place on the creation of a statutory ONR has at its heart the transparency of the regulator and its relationship with government (including bodies concerned with the promotion or utilisation of nuclear energy). The intention is for the statutory ONR's five-year strategy, annual plan, annual report and accounts to all be shown to Parliament as well as

widely published by the statutory ONR itself. In addition, the Secretary of State will report to Parliament on any directions that he gives to the statutory ONR, as well as the use of his powers such as making appointments to the statutory ONR Board. In addition, the statutory ONR will report every five years to Parliament on the functioning of the nuclear regulatory regime.

All of these measures, the creation of the statutory ONR's Board and giving the statutory ONR powers and duties over nuclear regulation in its own right (not currently the case), will lead to greater transparency. This will help to clearly show the statutory ONR's effective independence from anybody concerned with the promotion or utilisation of nuclear energy.

The inclusion of an Energy Bill in the second session of Parliament was confirmed by the Queen in her speech at the state opening of Parliament on 9 May 2012. The Energy Bill will contain provisions to create the Office for Nuclear Regulation as an independent statutory corporation. The Bill will be introduced when parliamentary time allows.”

107 Pending legislation, ONR was set up as a non-statutory agency of the Health and Safety Executive (HSE) on 1 April 2011.

108 As a statutory body ONR will retain the best of current practice whilst creating a modern independent regulator based on the better regulation principles of transparency, accountability, proportionality and consistency. ONR will build on its current strengths as a world-class regulator and will be better placed to respond quickly and flexibly to current and future regulatory challenges while retaining its focus on securing the protection of people and society from the hazards of nuclear generation. As a result, there will be a more transparent statutory arrangement under which ONR will have legal responsibility for this core, and other, functions. Additionally, transparency and independence will be enhanced by creating the role of Chief Nuclear Inspector in statute for the first time and, in practice, delegating all of the regulatory functions to the Chief Nuclear Inspector.

## PROGRESS IN IMPLEMENTING RECOMMENDATIONS RELEVANT TO THE REGULATOR (ONR)

109 The recommendations relevant to the regulator are reproduced in Annex 1 and statements on progress to date are listed below:

### **Recommendation IR4 - Openness and transparency**

110 Over the last seven years, the UK nuclear regulator has been enhancing its openness and transparency agenda. This was seen from the outset for the Generic Design Assessment (GDA) for potential new reactors with the publication of requesting parties' safety submissions and periodic reports from the regulator as the project proceeded. In addition, all of the GDA assessment reports produced so far have been placed in the public domain.

111 ONR has stated that openness and transparency mean adopting a presumption of disclosure, and a specific work stream is in place to ensure more work is made publicly available. An example of improvements made include the online publication of over 100 executive summaries of project assessment reports (PAR) which explain the rationale for regulatory decisions on nuclear safety issues and demonstrate that decisions are balanced, consistent and evidence based. These provide a brief overview of the regulatory decision, and can be readily understood by non-technical experts.

112 Following the success of these summaries, ONR has now moved towards publishing entire PARs on its website. These contain significant technical details that are necessary to inform the regulatory decision. Details remain in the document, unless it is necessary to redact them under normal Freedom of Information (Fol) exemptions. To date, full PARs have been published for many of our regulatory decisions and this is becoming a well embedded process as part of ONR's regulatory activity. ONR is continuing to build on this work and is striving to publish more of its output, covering aspects of all its regulatory activities.

113 Although ONR is intending to publish much more of its work, it is by no means the only way ONR communicates with its stakeholders. HMCINI and other senior managers in ONR meet on a twice yearly basis with non-governmental organisations (NGO) to share information and listen to their concerns. The groups understand that they will not always agree but recognise that this has created an environment for sharing and engagement. The minutes of these meetings are published on ONR's website. At NGO meetings, and at the annual forum with leaders of the nuclear sector, openness and transparency have been on the agenda.

114 ONR has both attended, and held, events for members of the public interested in HMCINI's report on events at Fukushima and what it means for the UK. There has also been a general forum for communities living near to the Sizewell and Hinkley nuclear sites to hear from inspectors responsible for regulating safety and security at the plants. There are, in addition to the many presentations at conferences and other meetings, routine site inspection reports to local communities.

115 ONR inspectors attend site stakeholder groups to answer questions from the public about specific sites and produce quarterly reports, available to all online, that give an overview of their inspection work there.

116 The website is a key channel for ONR with regards to its commitment to being open and transparent. Quarterly news, an online publication, gives an overview of ONR's work during the previous three months and every month an external eBulletin is sent to over 12,000 subscribers.

117 Recommendation IR4 is closed.

## Recommendation IR5 - Safety Assessment Principles

- 118 ONR's formal review of the SAPs began in August 2011 and proceeded in stages (A to C, as described in our 2011 Final Report) through to June this year. The stages have been designed to ensure that our review work remains in-step with developing thinking both in the UK and internationally. For example, our review has considered explicitly developments in nuclear safety guidance deriving from the ENSREG stress tests and their subsequent international peer review.
- 119 To date, ONR's review has confirmed our earlier conclusion that there are no significant gaps in the SAPs, though a small number of technical areas have been identified where amplification and clarification of the principles would be beneficial. The principal improvements identified so far in light of the Fukushima accident relate mainly to our coverage of severe accidents; these sections are to be expanded. Otherwise, the majority of the changes to be made to the SAPs are to bring them up to date based on our six years' operating experience working with the current version and to reflect changes to the industry and ONR over this period.
- 120 Work has now begun to draft text for the updated version. The process will include an opportunity for stakeholder comment, currently targeted for later this year. We aim to re-issue the SAPs during the first half of 2013.
- 121 IAEA and WENRA have also embarked on processes to update their guidance in light of Fukushima. In the case of IAEA, this process is likely to be somewhat slower than ONR's, though WENRA's process is expected to run to broadly similar timescales. ONR is playing an active part in the development of IAEA and WENRA guidance and we will ensure that new standards nearing finalisation while the SAPs are being updated will be taken into account within our process. International guidance and standards published after the SAPs are re-issued will be taken into account in future ONR guidance in accordance with our commitment to ensuring our guidance to inspectors remains aligned and consistent with wider international safety standards.
- 122 Our review has also looked at our Technical Assessment Guides (TAGs) in light of the Fukushima accident. This aspect of our review has reinforced the need to complete the process of updating the TAGs, many of which are acknowledged to be significantly beyond their formal review dates. A list of TAGs requiring priority update has been identified and improved processes for the re-issue of TAGs are being developed. A programme to update the TAGs, starting with those identified as a priority in this review, will be initiated once resources become available. Recommendation IR5 is ongoing; target for completion June 2013.

## Recommendation IR6 - Long timescale emergency exercises

- 123 The programme of off-site emergency exercises, which is published on the DECC website, has been reviewed to identify opportunities to test aspects of the UK's emergency preparedness and response capability gaps that have been identified through NEPLG. These include:
- extendibility of local authorities' off-site emergency plans;
  - co-ordination of the Central Government national response in the event of a severe accident;
  - security-initiated scenarios;
  - recovery (including handover of control of the local response from the police to the local authority);
  - consistency of approach to emergency exposures;
  - assurance of prolonged sustainability of a capable response;
  - communications;
  - provision/co-ordination of Reassurance Monitoring Units (RMUs) for personnel monitoring.

- 124 To date, a successful exercise testing extendibility has been held since publication of HMCINI's Interim Report (augmenting two previous ones), and a communications exercise (concerning media involvement and provision of information and warnings to the public) planned with the LA for events at Hunterston and an exercise to practise deployment and co-ordination of RMUs has been planned for an event at either Springfields or Heysham. An additional RMU exercise is also planned for February/March 2013 focusing upon the Atomic Weapons Establishment (AWE) sites.
- 125 The future nuclear emergency exercise programme for fixed nuclear installations within the UK has secured opportunities to test the on site and off site response for prolonged periods. Such exercises are intended to test the prolonged delivery and sustainability of the on site, the off site and central government responses. The exercises are also intended to highlight areas for further improvements which will inform reviews of on site and off site emergency plans and feed into future work programmes. The findings will inform reviews of the duration of the future nuclear emergency exercises.
- 126 Government involvement will be exercised more extensively than before in off-site emergency exercises, with ministers playing a role from time to time.
- 127 Automatic decisions to protect the public close to the affected site will continue to be implemented as part of the on-site and off-site emergency plans, in many cases with automatic notification on early countermeasures to members of the public living in the Detailed Emergency Planning Zone (DEPZ). Such automatic decisions may later be modified in accordance with the off-site plan, including possible extendibility beyond the DEPZ. In the unlikely event of a severe accident, wider national countermeasures to protect the public may be invoked under national civil contingency arrangements. All such decisions will be kept under review in the light of the results of environmental monitoring (as discussed in the Government's response to FR7), plume monitoring prediction (as discussed in the nuclear industry's response to FR6) and plant damage control data submitted via secure communications networks.
- 128 For EDF/Magnox reactor sites, secure data on plant damage will be provided by the licensee at their Central Emergency Support Centre (CESC) and transmitted to other control centres via the established computer network "TIIMS" (The Incident Information Management System). For defence sites the data will be provided by the licensee and transmitted to control centres via the established computer network "NERIMS" (Nuclear Emergency Response Information Management System). For other sites the data can be transmitted via the National Resilience Extranet (NRE) to which ONR has recently arranged access (see response to IR7).
- 129 In due course, NEPLG guidance will be reviewed to include exercise success criteria for each of these areas to enable a more quantifiable measure of performance to be concluded. This will further inform the national lessons learnt process on which to build further improvements. Success criteria will also be captured in ONR guidance for the inspection and assessment of off-site emergency exercises to assist ONR's knowledge management. Recommendation IR6 is closed.

## **Recommendation IR7 - Regulatory response to severe accidents**

- 130 Even though ONR's established arrangements were judged to have been effective in responding to the Fukushima accident, and have proven effective in responding to events in the UK and to more severe events tested during exercises, the Fukushima accident identified scope for lessons to be learnt, particularly in ONR's capability to respond to a prolonged emergency. A review has since resulted in a proposal for improved arrangements for ONR's response to initial notifications of all nuclear emergencies, including severe accidents, and for ensuring the prompt deployment of trained staff to remote locations and to ONR's central emergency response centre - the Redgrave Court Incident Suite (RCIS). During deployment a senior nuclear inspector would be available to discuss the developing situation with the affected dutyholder, ONR colleagues, the Government Technical Advisor, Central Government and other agencies.
- 131 ONR has worked with nuclear operators and a range of government agencies to develop arrangements for early plotting of possible radioactive plumes and potential off-site doses using real-time weather (see response to FR6). This work, which has yet to be fully implemented, has so far focused on sites with potential to cause the most severe accidents (namely operating AGR reactor sites, the pressurised water reactor at Sizewell B and the reprocessing plant at Sellafield).

Once these arrangements have been embedded in ONR's emergency response arrangements, work will focus on providing similar capability for other nuclear sites with potential for severe accidents.

- 132 A programme to review and update the site and plant information held in the RCIS for all the licensed sites has already led to significant improvements in this area and will facilitate ONR's response, including the transmission of timely, authoritative data to the IAEA in accordance with international obligations. Such data might relate to plant design, inventory and history of nuclear fuel in reactor cores and storage ponds as advised by the licensee to ONR in advance or in the early stages of a nuclear accident.
- 133 ONR's network connectivity has been assessed in the light of the potential need to transmit licensees' real time plant data relating to the control of criticality, cooling, containment and releases of radioactivity to the environment and other information. For EDF/Magnox reactor sites such data can be transmitted to ONR and other control centres by the licensees from their CESC using the TIIMS network. For defence sites the data can be transmitted by the licensees using the NERIMS system. For other sites ONR has recently secured access to NRE to allow the transmission of restricted information between ONR and the affected site. ONR will also have the capacity to use this system for the exchange of restricted data with relevant government and non-government stakeholders and IAEA (see also responses to Recommendations IR1 and IR6).
- 134 ONR's improved emergency response capability will be supported by existing "command and control" training supplemented by new role-specific training modules. A significant number of individuals will be trained in more than one role (for example, a command role in addition to a technical role) to help provide the flexibility needed in ONR's response to a severe accident or other prolonged emergency. Refresher training will be provided as a matter of course. ONR has worked with a specialist Command and Control Consultancy to develop improved supporting documentation.
- 135 ONR's revised emergency response arrangements will be subject to modular exercises, for training and testing purposes, in addition to the ongoing programme of national emergency exercises (which is itself under review in the light of the need to prepare for prolonged nuclear emergencies - see response to IR6).
- 136 Whilst details of the improved arrangements have yet to be confirmed, ONR is firmly committed to improving the effectiveness and robustness of its current arrangements for emergency preparedness and response so that it is better placed to respond to a prolonged nuclear event in the UK or overseas. Recommendation IR7 is ongoing, and the target for completion is April 2013.

## Recommendation FR10 - Research

- 137 In addition to responding to this recommendation, work to enhance our research capability also takes into account a broader inquiry into the UK's nuclear R&D capabilities by the House of Lords Science and Technology Select Committee and the Government's response to that.<sup>3</sup>

### Improving Strategic Oversight

- 138 In response to the House of Lords Select Committee Inquiry, the Government has established an Independent Nuclear Research Board to advise on the development of a national research and development strategy. As the research board includes representatives from a broad range of interested parties, including HMCINI, it is able to provide high-level strategic review of UK nuclear research activities. To support the research board, and to provide additional oversight of relevant research activities, to identify opportunities for collaboration and to share good practice, the nuclear regulators have established a cross-cutting Research Working Group. The working group includes representatives from the Environment Agency, SEPA, Health and Safety Laboratory, HPA, the Nuclear Decommissioning Authority (NDA) and DECC.

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<sup>3</sup> [www.parliament.uk/business/committees/committees-a-z/lords-select/science-and-technology-committee/inquiries/parliament-2010/nuclear/](http://www.parliament.uk/business/committees/committees-a-z/lords-select/science-and-technology-committee/inquiries/parliament-2010/nuclear/)

- 139 Since the nuclear accident at Fukushima, ONR has undertaken a review of its strategic oversight of nuclear safety and security related research, and its arrangements for commissioning and managing research and specialist technical support. The review is being used to inform the development of an ONR Research & Technical Support Strategy, which will be published shortly. This strategy, which is supported by a detailed implementation plan, sets out the important role research and technical support plays in underpinning our regulatory decisions, the challenges we face going forward and how we plan to overcome these. A Chief Inspector's Independent Technical Advisory Group is to be established, and its role will include advising the Chief Nuclear Inspector on the adequacy and balance of ONR's research strategy and programme.

## Improving Flexibility

- 140 The main vehicle used by ONR to take forward its research priorities is the Nuclear Research Index (NRI), which represents ONR's view of what research is needed to support existing nuclear facilities. This is used by the nuclear site licensees to inform the development of their own research strategies. ONR will commission any research areas not taken forward by the nuclear site licensees and then recover the costs from the licensees via levy. Although the NRI has provided a useful vehicle for taking forward safety-related research it is limited to operating nuclear power stations and therefore lacks flexibility.
- 141 In 2012, ONR will publish a Chemical Plant Nuclear Research Index alongside a revised NRI. This will provide a framework for taking forward research relating to nuclear chemical plants, for example fuel cycle facilities at Sellafield, in addition to operating reactors. The aim then is to publish a single ONR Research Index in 2013 covering all ONR's research requirements. In taking this forward, we are working closely with the Environment Agency, SEPA and NDA in order to identify synergies and maximise opportunities for co-operation.

## Resource Availability and Technical Support

- 142 ONR has a reputation for technical excellence and this is further enhanced through our participation in national and international research projects. In addition, we work closely with the Government to ensure that we have access to the right people with the right skills and experience to regulate the nuclear industry in future.
- 143 In addition to relying on our own technical specialists, there are occasions when we use external technical support, for example to validate risk data provided by industry. Due to the volume of confirmatory analysis needed for our GDA process, we established a framework agreement, including 31 Technical Support Contractors, across a range of 15 technical areas using the Official Journal of the European Union (OJEU) process. The current framework comes to an end in 2013 and we are currently reviewing the changes needed to ensure it can be used effectively across the range of ONR's activities, and in particular to provide any technical support we might need in the event of a nuclear accident overseas. Recommendation FR10 is ongoing; target date for completion is December 2013.

## PROGRESS IN IMPLEMENTING RECOMMENDATIONS RELEVANT TO THE NUCLEAR INDUSTRY

144 The recommendations relevant to the nuclear industry are reproduced in Annex 1. Overall summaries of the progress made by individual licensees, and ONR's views on that progress are given below. In addition to these summaries more detailed information is contained in tables in Annex 4 covering ONR's views on all of the relevant recommendations, stress test findings and considerations for each licensee.

### EDF Energy

145 EDF NGL operates and is the licence holder for eight nuclear power stations in the UK. Seven of the power stations are Advanced Gas Cooled Reactors (AGRs) and the eighth is a Pressurised Water Cooled Reactor (PWR). Each of the AGRs has two reactors per station, the stations being: Hinkley Point B in Somerset; Heysham 1 and Heysham 2 in Lancashire; Dungeness B in Kent; Hartlepool in Teesside; Hunterston B in Ayrshire and Torness in Lothian. The single PWR is Sizewell B located in Suffolk. A description of these facilities is provided in the Chief Inspector's Interim Report (Ref. 35).

146 The initial response of EDF NGL to the events at Fukushima was to use its mandatory evaluation process to confirm that systems essential to fuel cooling in an emergency situation in a within design basis event, including seismic and flooding scenarios, were correctly configured and in a suitable condition. A second mandatory evaluation of beyond design basis capability was also performed.

147 EDF NGL also provided responses (Refs. 36 and 37) to all of the Chief Inspector's Interim Report recommendations in June 2011. ONR concluded that EDF Energy NGL's response to the Interim Report recommendations provided an appropriate commitment to fully address the scope of the recommendations in a reasonable timescale (Ref. 1).

148 Further to HMCINI's recommendations ONR also raised a number of STFs (Ref. 10) following assessment of EDF NGL's stress test reports. In their reports EDF NGL identified a number of studies and potential improvements to be taken forward, referred to as "considerations". ONR's STFs reinforced or extended these considerations or raised points that were additional to those identified by EDF NGL.

149 Subsequently, ONR has reviewed the progress report provided by EDF NGL (Ref. 38) in respect of the HMCINI's Interim and Final Report recommendations, ONR's STFs and EDF NGL's own considerations. In support of this assessment, ONR's inspectors have been actively engaged with EDF NGL to confirm that appropriate lessons are learnt and acted upon. This engagement has taken a number of forms, including: site inspections; technical meetings; observation of workshops and plant "walk downs". In addition, ONR inspectors have held weekly telephone conferences with EDF NGL to ensure good communications and ensure that any issues are progressed in an appropriate and timely manner.

150 It is also noted that EDF NGL has demonstrated a significant commitment to addressing lessons learnt from the accident at Fukushima. Immediately after the accident, EDF NGL created a dedicated team to identify and address lessons learnt and to implement appropriate enhancements to resilience. This dedicated team has included up to 60 people, supported by other staff within EDF NGL as required. As noted above, ONR has interacted extensively with this team, which has demonstrated a clear commitment to addressing the lessons learnt from the accident at Fukushima. ONR is confident that this will continue through to delivery of the various resilience enhancements that have been identified and other ongoing work aimed at identifying further potential enhancements.

- 151 ONR's assessment has been performed against specific technical guidance provided for each of the Chief Inspector's recommendations (Annex 3), which was applicable across all of ONR's programmes.
- 152 A high level summary of the status of each individual recommendation, finding and consideration is presented in Annex 4 of this report. For the recommendations considered in this report EDF NGL has agreed with each recommendation and confirmed that it is applicable to them.
- 153 Similarly, EDF NGL has agreed with all of the relevant stress test findings raised in the UK Nuclear Power Plants National Report (Ref. 10).
- 154 EDF NGL has also reviewed (Ref. 38) all of the stress test findings raised in the UK non-power generating nuclear facilities report (Ref. 11) and confirmed that the relevant findings are already being addressed within their existing workstreams.
- 155 Annex 4 provides a summary of the status of each of the recommendations, stress test findings and EDF NGL's own considerations. In most cases EDF NGL has provided an adequate description of what they are aiming to achieve in addressing the recommendation or finding, although there are some areas where further discussion with EDF NGL will be needed to agree the extent of the work being undertaken to satisfy the full intent of the recommendation or finding.
- 156 EDF NGL considers that nearly all of the recommendations and findings remain open pending completion of ongoing work. Two recommendations are considered to be closed by EDF NGL and on the basis of the information provided this is judged to be reasonable by ONR.
- 157 For around half the recommendations and findings ONR considers that an acceptable programme of work is already underway or that there is good evidence that an appropriate programme of work is being developed. For the remaining recommendations and findings ONR is in the process of agreeing a suitable programme of work with EDF NGL and further discussions are underway so that ONR can be confident that the full intent of all recommendations and findings will be met.
- 158 In most cases good progress is being made against the recommendations and findings; either initial work has been completed to help define a forward programme of work or improvements to processes or equipment have been identified and are already being implemented. There are some areas where progress is less advanced, although this is generally consistent with the two-phase strategy and prioritisation adopted by EDF NGL and outlined below.
- 159 The first phase of EDF NGL's strategy, which has been given priority, is to focus on non-invasive improvements that can be introduced relatively quickly, to strengthen resilience across all of the sites to a wide range of hazards and challenges. Such improvements include the provision of off-site back-up equipment and non-invasive site resilience modifications. ONR considers that EDF NGL is making good progress in respect of this phase of their programme.
- 160 The second phase of the strategy is focused principally on analytical work aimed at identifying and delivering further potential plant improvements through, for example, the analysis of margins against external hazards. As noted above, progress in some of these areas is less advanced, although generally consistent with priority being given to the first phase of work. Nonetheless, ONR notes that EDF NGL is committed to ensuring that all aspects of the recommendations and findings are adequately addressed and now expects the focus to be on closing the scope of phase 2 as well as delivery of the resilience improvements.
- 161 To reflect the above position, the status of EDF NGL's response to the Chief Inspector's recommendations and the stress test findings in a number of key areas is described below.

### *Offsite Back-up Emergency Equipment*

- 162 As part of the response to a number of recommendations and findings (particularly IR8, IR25 and STF15) EDF NGL is in the process of identifying and procuring a range of back-up emergency equipment. This equipment will be stored in the three regional AGR depots that are being established and the new Sizewell B Emergency Response Centre (ERC) that is to be built.



**Figure 6 : Sizewell B - EDF Energy – Planned ERC – Design ideas (courtesy of EDF NGL)**

163 EDF NGL reports that these depots will contain equipment to enhance resilience, including the following:

- off-road vehicles;
- debris moving vehicles (route clearance for example);
- personal protective equipment;
- diesel driven electricity generators;
- diesel driven water pumps – for reactor and fuel cooling;
- reverse osmosis equipment to supply clean water;
- damage repair equipment;
- diesel driven dewatering pumps;
- waste water treatment facilities;
- temporary structures for response coordination and staff welfare;
- mobile communications equipment, including deployable instrumentation facilities;
- inert gas supplies;
- all necessary ancillary equipment required to use these facilities, including fuel stocks.



**Figures 7 and 8: Examples of Back up equipment Movers under consideration (courtesy of EDF NGL)**

- 164 ONR considers that the provision of such equipment and the associated storage locations will provide a significant improvement in EDF NGL's resilience in coping with extreme beyond design basis events. ONR also notes that it is planned that delivery of this equipment and the associated facilities will be complete by September 2013, with capability demonstrations planned for early 2014. As an example, EDF NGL has placed an order for 60 all-terrain haulage lorries and these vehicles are now in production with the first expected to be ready for delivery in October 2012. Additionally EDF NGL has placed an order for high pressure water pumps to support AGR boiler feed. Delivery of the first of these pumps is planned for January 2013.
- 165 Whilst it is intended that the AGR back-up equipment storage locations will be at strategic locations around the UK, the Sizewell B ERC, which is intended to be built by December 2013, will be located within a few kilometres of Sizewell B. This is because the time available to provide protection for a PWR in the event of an extreme beyond design basis event is more limited than that for an AGR. In addition to providing storage for back-up equipment the Sizewell ERC will also include a back-up Emergency Control Centre (ECC).
- 166 Overall, in the context of providing off-site back-up equipment ONR considers that good progress is being made, which once complete will provide EDF NGL with a significant improvement in its ability to provide resilience against extreme beyond design basis events. EDF BGL's overall planned completion date for this work is March 2014.

## *Sizewell B Plant Modifications*

- 167 For Sizewell B an outcome of the stress tests (STF18 and associated considerations) was that EDF NGL should complete feasibility studies into the provision of:
- passive autocatalytic recombiners;
  - filtered containment venting (FCV);
  - containment water injection.
- 168 Good progress is being made with these feasibility studies and an Engineering Review Group was held in February 2012 to consider the feasibility of installing passive autocatalytic recombiners and FCV at Sizewell B. The installation of passive autocatalytic recombiners is being taken forward and is intended to commence during the Sizewell B refuelling outage in 2013. This is an appropriate timescale and reflects EDF NGL's desire to avoid unreasonable delay in achieving this safety enhancement.
- 169 For FCV, the principle has been accepted and EDF NGL is working on the feasibility of implementing this modification and has assembled a team for the delivery of both the technical solution and the safety case strategy. If the modification is determined to be reasonably practicable, installation and commissioning is planned for completion by the end of 2014.
- 170 Overall ONR considers that work in support of STF18 is progressing well and has the potential to deliver substantive safety improvements in reasonable timescales.

## *External Hazards*

- 171 A significant number of the recommendations (IR9, IR10, IR13, IR15, IR16 and FR2) and findings (STF2 to 7, and STF14) are related to external hazards. For the reasons of prioritisation discussed above, progress in addressing some of these has been slower. However, ONR expects that there will now be greater focus and progress on these recommendations and findings and is encouraged by EDF NGL's commitment to ensuring appropriate outcomes.
- 172 Overall, EDF NGL has generally provided an adequate description of what it is trying to achieve and ONR considers that these descriptions generally capture the intent of the external hazard related recommendations and findings. Nevertheless, in respect of ensuring that all external hazards are addressed appropriately (IR16), and the seismic hazards derivation review (STF2), ONR will continue discussions with EDF NGL in order to confirm that the scope of the proposed work will address ONR's expectations.

- 173 Whilst progress is being made, little has been formally reported to ONR to date. For the review of the site flooding safety cases (IR10 and STF7), EDF NGL initiated work soon after the accident at Fukushima, engaging an expert consultant to recalculate the flood hazard at all EDF NGL sites. EDF NGL has advised ONR that significant progress has been made in these areas and this is summarised in their responses. ONR has not yet had full visibility of this work, but will continue to engage with EDF NGL to maintain regulatory oversight of this work.
- 174 For STF2 (review of seismic hazard methodologies) and STF5 (review of margins) ONR notes that, whilst work has commenced, and there is a clear commitment from EDF NGL to address these findings, progress to date is limited. In particular, ONR considers that the establishment of margins within the design basis and identification of potential “cliff edge” effects beyond the design basis, whilst challenging, should be an important element of the Fukushima external hazards work programme. ONR will continue to engage with EDF NGL to ensure that an appropriate scope of work and timeframe is established.
- 175 IR9 and IR15 concern longer term research/international data gathering in relation to further potential lessons to be learnt from Fukushima. The scopes of work proposed by EDF NGL appear reasonable and ONR supports the formation of expert panels and cross-industry working that is planned.
- 176 Within the external hazards area, in general the work programmes are not sufficiently well developed to form a mature view on whether ONR’s expectations will be met. Nevertheless, the high level statements from EDF NGL are encouraging and provide a degree of confidence. ONR has identified some areas where there may be shortfalls and these are being discussed further with EDF NGL. They include: the provision of back-up control room facilities (FR2, discussed further below); the scope of the review of seismic hazard methodology (STF2); the lack of resilience enhancement to CO2 systems that ensure heat removal from the fuel (STF14); and ensuring that all hazards are considered (IR16). The overall intent is that the various assessments will be complete by March 2014, although completion of plant modifications arising from these assessments may go beyond this date.

## *Human Capabilities and Capacities*

- 177 The accident at Fukushima highlighted the importance of human interactions to regain control of the plant following a severe accident. This was reflected in IR24 on Human Capabilities and Capacities and some more specific requirements in STF3, STF15 and STF16. EDF NGL has provided detailed responses for IR24 and the individual stress test findings.
- 178 ONR notes that in addition to work already undertaken, EDF NGL has identified an extensive programme of work that includes:
- a review of operator action claims for seismic and extreme hazard scenarios to ensure the ability of the operators in carrying out necessary actions in the circumstances presented;
  - a review of emergency arrangements including consideration of beyond design basis tasks, back-up equipment deployment and training and longer term emergency exercise arrangements;
  - a review and updating of reactor SBERGs (System Based Emergency Response Guides) and SAGs (Severe Accident Guides), including both their technical appropriateness and usability;
  - the production of new fuel route SBERGs/SAGs;
  - a review of the adequacy of the existing emergency response arrangements;
  - a review and updating of training and exercises for key staff, including incorporation of necessary training and exercise for use of new resilience measures stemming from other recommendations and findings;
  - consideration of the resourcing and welfare support requirements and facilities required for severe accident conditions.

- 179 This work is due to be completed by early 2014 and will be followed by appropriate training for emergency response operators and for enhanced SBERGs and SAGs to be incorporated into the exercise regime. EDF NGL also plans to undertake a large-scale, multi-unit emergency exercise using the on-site resilience modifications as well as off-site back-up equipment, enhanced procedures, training and communications with third party emergency response organisations.
- 180 Although IR24 remains open, ONR considers that EDF NGL has provided an adequate description of what they are doing to address this recommendation and an appropriate forward work programme with reasonable timescales is in place.

### *Emergency Control, Instrumentation and Communication*

- 181 EDF NGL's response to IR22 (on-site emergency control, instrumentation and communications) focuses on the vulnerability of existing communications systems to on- and off-site power loss, resilience enhancements to key buildings, including ECCs, AICs (Alternative Indication Centres) and EICs (Emergency Indication Centres), and plant systems to provide protection against natural hazards.
- 182 As noted above, EDF NGL has made significant progress towards establishing an ERC near to Sizewell B that will include a back-up ECC facility to enhance management of a severe beyond design basis accident and the development of a mobile back-up equipment capability.
- 183 For IR22 further discussions have been held with EDF NGL resulting in agreement on feasibility studies to examine the reasonable practicability of capturing key plant parameters (e.g. reactor temperatures, pressure, boiler pressure and flow) by enhancing existing control and instrumentation (C&I) systems and equipment. These studies will also determine whether there may be alternative means of transmitting this information to plant control rooms and/or severe accident management facilities.
- 184 In addition, EDF NGL is reviewing the capabilities of AGR AICs/EICs, Sizewell ASR and ECCs against relevant good practice in the nuclear industry. EDF NGL recognises that this review will inform what further improvements to resilience can and should be implemented.
- 185 In respect of IR22, ONR notes that the ongoing feasibility studies to identify reasonably practicable improvements to the resilience of existing on-site C&I systems and equipment, and the reviews of the capabilities of the emergency facilities discussed above, should inform the way forward in these areas. However, EDF NGL's proposals will need further development and ONR will continue discussions with EDF NGL to ensure its expectations are addressed.

### *PSA and Severe Accident Analysis*

- 186 FR4 relates to the provision of Level 2 PSA (Probabilistic Safety Assessment) and is closely related to IR25 which involves extending the analysis of accident sequences for long-term severe accidents and STF16 which relates to improvements to the SBERGs and SAGs. For AGRs, whilst EDF NGL's response goes some way to addressing ONR's expectations and provides reasonable initial steps against which it is understood that good progress is being made, it is currently not clear that the full intent of the recommendations will be addressed and uncertainty remains in some areas. In order to provide sufficient confidence in the proposed approach for AGRs, ONR will continue to engage with EDF NGL to ensure the programme of work develops in a way that meets ONR's expectations for these recommendations.
- 187 For Sizewell B a Level 2 PSA that addresses beyond design basis events is already available, hence FR4 is closed for Sizewell B.

## Overall Position

- 188 Overall, ONR considers that EDF NGL's responses to the Final Report recommendations and the findings and considerations in the stress tests report demonstrate an appropriate commitment to implementing lessons from the Fukushima accident. The responses also provide reassurance that good progress is being made for most recommendations and findings. For example, good progress is being made in terms of providing off-site back-up equipment for use in an extreme beyond design basis event, and with potential plant modifications to Sizewell B aimed at mitigating the consequences of a severe accident. In addition to the written responses, this position is also supported by the extensive interaction and ongoing dialogue that has taken place with EDF NGL since the accident at Fukushima.
- 189 In some areas EDF NGL's plans will need further development before ONR can be fully confident that a satisfactory position can be achieved. Such areas include external hazards and Level 2 PSA and severe accident analysis. However, ONR recognises that this reflects the phased approach and prioritisation adopted by EDF NGL and supported by ONR, and does not detract from the positive commitment and progress made by EDF NGL in learning lessons from the accident at Fukushima. ONR expects that the ongoing interactions with EDF NGL will enable a satisfactory position to be reached for all recommendations and findings in due course.
- 190 It is also noted that none of the reviews undertaken by EDF NGL has indicated any fundamental weaknesses in the definition of design basis events or the safety systems to withstand them. This was also a conclusion of HM Chief Inspector's Final Report and the UK national stress test report.
- 191 ONR will continue to monitor all of these workstreams including those areas that need further development as well as delivery of the workplans for areas where there is good alignment.

## NNB GenCo

- 192 NNB GenCo is not currently a nuclear site licensee. It has, however, made an application, which ONR is currently assessing, for a site licence to install and operate a nuclear power plant at Hinkley Point in Somerset. NNB GenCo intends to construct two units of the EPR design on the site, which will become known as Hinkley Point C. The EPR design is currently the subject of an ongoing GDA process submitted jointly to ONR and the Environment Agency by EDF SA and AREVA.
- 193 Whilst ONR currently has no regulatory powers (except to recover assessment costs) over NNB GenCo under the Nuclear Installations Act, NNB GenCo has been working with ONR to demonstrate its capability to hold a licence as part of the licensing process and embrace early learning from the Fukushima accident and provide a safer design, where reasonably practicable.
- 194 NNB GenCo provided an initial response to each of the Interim Report recommendations in June 2011. ONR concluded that NNB GenCo's response provided an appropriate commitment, given its pre-licensing status, to fully address the recommendations at an appropriate time.
- 195 NNB GenCo took part in the UK's extension of the ENSREG stress test process to NNPGFs, concluding that the UK EPR design has been developed utilising good design practice, although assessment of more severe faults was still subject to the ongoing GDA process. ONR raised a specific stress test finding on NNB GenCo concerning electrical supplies (as discussed later).
- 196 ONR has been actively engaged with NNB GenCo since the issue of the recommendations and STFs to clarify the meaning of the issues and ensure that NNB GenCo was responding to the Fukushima event appropriately. ONR has subsequently carried out a systematic review of NNB GenCo's latest progress updates across the range of technical disciplines reflected in the recommendations and findings.
- 197 In the updated responses, NNB GenCo has acknowledged the applicability of all of the HMCINI recommendations and STFs directed at it or to the NPP sector in general. ONR is content that NNB GenCo has provided an adequate description of the objectives for targeted enhancement in addressing these recommendations and findings.

198 In most cases, initial analyses and scoping studies have been performed by NNB GenCo to identify potential enhancements for further consideration as the design develops. NNB GenCo has expended considerable effort in identifying enhanced resilience, enhanced essential supplies and additional back-up equipment. NNB GenCo is also working closely on improvements with both its reactor vendor and architect engineer, which should ensure common learning from improvements identified for other EPR reactors currently being built around the world. NNB GenCo has identified a number of key enhancements for further review as part of the design development, including:

- extension of severe accident battery storage capability from 12 to 24 hours;
- establishment of a communication system suitable for operation under a total loss of electrical power situation;
- qualifying the performance of instrumentation required for monitoring containment integrity and in the spent fuel cooling pool;
- extension of station black-out diesel generator autonomy;
- provision of equipment and means (connection point etc.) to re-supply significant electrical power from three days post-event;
- provision of a high power mobile emergency generator capacity.

199 NNB GenCo has identified a process for the incorporation of any identified enhancements into both the generic and site-specific safety case through the use of a dedicated document to support the site-specific Pre-Construction Safety Report (PCSR) which will consolidate any design changes resulting from Fukushima learning. This is considered an appropriate approach that should ensure effective traceability. It is noted that this document has been presented to NNB GenCo's Nuclear Safety Committee. The current issue of this document has comprehensive coverage of design basis, design extension condition and margins against external hazards as well as cross-referencing to the various NNB GenCo workstreams and the ONR recommendations and findings.

200 There are, however, some areas where ONR considers NNB GenCo should consider its approach further on:

- the robustness of any diverse technologies against natural phenomena (such as solar storms, etc);
- the use of filtered containment venting;
- within the safety case, the potential for activities to impact on other licensees' safety cases and vice versa.

201 In general, the technical scope of the work proposed by NNB GenCo to address the recommendations and STFs is broadly in line with ONR's expectations. However, a number of technical points have been raised during ONR's assessment of NNB GenCo's submissions that will require further discussions and agreement to ensure an appropriate outcome.

### *Overall Position*

202 Overall, ONR considers that the NNB GenCo responses to the Interim and Final Report recommendations, and the findings and considerations in the stress tests report demonstrate an appropriate commitment to implementing lessons from the Fukushima accident. The responses provide satisfactory reassurance that tangible progress is being made on all the recommendations and findings and that a reasonable way forward exists to fully address them and close them out.

203 At this time any enhancements identified by NNB GenCo mean changes to its design and safety case rather than physical modifications. Hence, ONR can only be confident that its expectations related to the HMCINI recommendations and the STFs have been met as the site-specific PCSR and associated reference documents have been formally submitted and assessed.

204 ONR will continue to monitor this work through regular interactions with NNB GenCo.

## Magnox Ltd

- 205 Magnox Ltd, hereafter referred to as “Magnox”, operates and is the licence holder for ten NPPs in the UK. Only one reactor at one site is currently in an operational state; this is at Wylfa in Anglesey, with all other sites being at various stages of decommissioning. Oldbury in south Gloucestershire has only recently shutdown (early 2012), whereas all other non-operational sites have been shut down for at least five years and are currently either defuelling or fully defuelled. The defuelling sites operated by Magnox are at Chapelcross in Dumfries and Galloway, and Sizewell A in Suffolk. The defuelled sites are Dungeness A in Kent, Berkeley in Gloucestershire, Bradwell in Essex, Hinkley Point A in Somerset, Hunterston A in north Ayrshire, and Trawsfynydd in Gwynedd.
- 206 The initial Magnox response, following the events at Fukushima, was to initiate a series of plant “walk downs” and a review of critical systems, processes and procedures at each of their sites. The aim of these being to confirm that systems essential for fuel cooling and reactor integrity in an emergency situation, including seismic and flooding scenarios, continue to meet their design requirements, and that those design requirements remain valid. Additionally, an assessment was undertaken to establish that an adequate degree of resilience was in place to withstand an event beyond the design basis. These reviews were undertaken by “suitably qualified and experienced personnel” with appropriate central specialist support.
- 207 Following these initial reviews, Magnox provided an initial response to the Interim Report recommendations in July 2011 (Ref. 39). ONR concluded that Magnox’s response provided an appropriate commitment to fully addressing the scope of the recommendations on a reasonable timescale.
- 208 Magnox also participated in the European stress tests (Ref. 9), developed by ENSREG, and submitted a report detailing the outcome of the analysis work performed at each of its sites. This work was reviewed by ONR (Refs. 10 and 11) and a number of STFs were identified to further confirm the resilience and safety of Magnox’s sites against severe events. During the targeted reanalysis work performed by Magnox, a number of considerations were raised by the licensee in cases where it had identified that reasonably practicable enhancements could be made. Magnox has now formally responded to the ONR STFs and its own considerations.
- 209 To support the assessment of the licensee’s responses, ONR inspectors have also had a number of engagements with the licensee to understand Magnox’s approach to implementing the learning from the Fukushima accident. These engagements have taken a number of forms, including: site inspections, technical meetings and workshops, and inspection of plant “walk downs”.
- 210 Magnox has acknowledged that all of the HMCINI recommendations are relevant, but notes that not all are applicable to all of their sites because of their different circumstances (e.g. having been defuelled or being no longer dependent on active fuel cooling). Magnox accepts that all of the STFs focused on nuclear power-generating facilities, apart from a finding specific to Sizewell B, apply to it. ONR considers that Magnox has provided an adequate description of what it is seeking to achieve at its sites in addressing these recommendations and findings.
- 211 In general, Magnox is making good progress. In most cases, initial analyses and scoping studies have been performed to identify the forward programmes of work. This has included a number of technical workshops. Due to the limited operational life of the Magnox fleet, ONR has encouraged Magnox to implement reasonably practicable safety improvements to support the remaining life of the stations, with a focus on the higher hazard sites. In order to ensure that prudent measures can be implemented at Magnox’s sites, less focus has been placed on long- term study work, which might not report back within the operational life of the plants in question. As a consequence, a number of prudent improvements have already been implemented at Magnox’s sites, which have tended to be fairly straightforward measures designed to provide an immediate safety benefit. Examples of safety improvements already implemented include:
- Increased CO<sup>2</sup> and diesel fuel stocks on-site, well above the existing operating rule requirements (see Figure 9, courtesy of Magnox Ltd);



**Figure: 9**

- a new diverse pond water emergency filling line at Oldbury (one also planned at Sizewell A);
- provision of backup feedwater/fire pumps on-site to provide further defence-in-depth (see Figures 10 and 11, courtesy of Magnox Ltd);



**Figure : 10**



**Figure : 11**

- development and implementation of improved training in respect of SBERGs and SAGs;
- additional stocks of essential equipment (e.g. basic tools, flash lights etc.) on-site, stored in diverse locations;
- purchase of a water tanker for transport of water from a nearby freshwater source to site (Wylfa) .

212 Magnox has submitted site work lists to ONR, which provide an overview of implemented or planned enhancement work being undertaken at the Magnox sites. The work programmes provided by Magnox in the progress reports are defined at high level. However, they do provide an overview of the key milestones for implementation of safety improvements. In general, the intent is to complete most of the work during 2013, although some work continues through to 2014. In ONR's view, these timescales are appropriate, considering the nature of the solutions been implemented. Therefore, the timescale for the completion of the remaining work is judged to be reasonable and in accord with ONR's expectations.

213 ONR's review of Magnox's submissions has been commensurate with the importance of remote large-scale severe events, as highlighted during the events at Fukushima, and the degree of vulnerability which might exist, particularly beyond the design basis. However, it is recognised that a proportionate interpretation of work scope and duration is needed in relation to the Magnox fleet, due to the limited operational life and subsequent defueling activities planned for the Magnox sites. These aspects have been considered throughout ONR's review of Magnox's submissions.

214 A brief summary of the key workstreams is provided below in order to present a picture of the work being undertaken within Magnox to implement the learning from the Fukushima events.

## *External Hazards*

- 215 Magnox now considers that most of the recommendations and findings associated with external hazards are now closed, on the basis that analysis work is complete and enhancement modifications can best be taken forwards as part of normal business. Where additional clarification is required, ONR will continue to hold discussions with the licensee and to monitor progress. For the longer term review items, cross-industry groups have been established and will report back in due course.

## *Engineered Safety Systems*

- 216 Magnox has reviewed the current state of its plant safety systems and their associated supplies, holding workshops and preparing work scopes for resilience enhancements for the essential safety systems.
- 217 Electrical resilience enhancements have been identified by Magnox. ONR considers that the resulting modifications, when fully incorporated in the electrical infrastructure, should meet its expectations in this respect. However, ONR considers that Magnox's plans need further development and supporting evidence before ONR can be content that they will fully address its expectations.
- 218 Magnox has provided information on the extent of resilience enhancements to C&I systems and equipment associated with plant condition monitoring, and secondary control capabilities in emergency facilities. It is apparent from the information supplied by Magnox that the planned modification to the C&I systems form the basis of a proportionate way forward for work that should satisfy ONR's expectations. ONR will continue to engage with Magnox and monitor progress to ensure satisfactory implementation.
- 219 Magnox is considering immediate implementation of further improvements to increase the resilience of its fuel storage ponds to extreme events. This includes additional lines for pond refilling following a severe event. Magnox has also confirmed that it already has suitable equipment and processes in place, and therefore ONR judges the licensee's work on fuel storage pond resilience to be reasonable and in accord with its expectations.

## *Severe Accident Management and Human Capacity*

- 220 Magnox recognises that the ability of staff to respond to a major incident in a calm and measured way is integral to the successful implementation of an emergency response. Human factors and emergency planning staff within Magnox are reviewing guidance relating to beyond design basis operating instructions, as well as the adequacy of training and exercise arrangements, to see if improvements could be implemented to enhance human performance during extreme conditions.
- 221 Magnox has proposed the provision of a range of containerised back-up equipment to support sites in the management of a beyond design basis accident, or other event. The location and full content of this containerised back-up equipment is still subject to review. It is noted that the containerised back-up equipment is likely to include mobile diesel generators and isolation transformers that can be used to supply existing systems and equipment at sites. A final report that contains recommendations on the range of equipment to be provided is to be made available by the licensee for ONR comment towards the end of 2012, with implementation by the end of March 2013. The licensee recognises that any changes will carry both maintenance and training requirements.
- 222 The ability of a site to communicate with emergency responders, technical experts, local authorities etc. is vital to the successful response to a severe event. Magnox's response, in the context of communications, is considered to broadly satisfy ONR's expectations. It has correctly focused on those issues that should offset the vulnerability of existing conventional telecommunications systems to disruption of their infrastructure by introducing mobile satellite telephones at sites.

## *Accident Analysis and Probabilistic Safety Analysis*

- 223 Magnox is reviewing the transient accident analysis that underpins its severe accident management advice. ONR is not yet confident that those aspects relating to the extension of analysis to long-term severe accidents are being fully addressed. A key element of one of ONR's findings is that the review of the SBERGs/SAGs should take into account improvements to the understanding of severe accident progression and phenomena. ONR considers that this is not fully recognised in Magnox's response.
- 224 Level 2 PSA provides an input for severe accident management measures and associated operator actions. This enables analysts to understand the risk profiles of different plants, and identify any vulnerabilities that might be reduced by implementing improvements. For Magnox's remaining operational reactor, at Wylfa, Magnox accepts ONR's recommendations for the requirement of Level 2 PSA and is progressing this recommendation, although the scope of this work is currently unclear. For the remaining sites that are permanently shut down and are undergoing either decommissioning or defuelling Magnox does not consider ONR's recommendation to be relevant. ONR agrees that the development of Level 2 PSA for these sites would provide little or no safety benefit.

## *Overall Position*

- 225 Overall, ONR considers that Magnox's responses to the recommendations, findings and considerations demonstrate an appropriate commitment to implementing lessons from the Fukushima accident. The responses also provide satisfactory reassurance that real progress is being made for most recommendations and findings, and that reasonable programmes of work to address other areas are either in progress or in the planning stage. ONR will continue to monitor all of these workstreams and will engage in further discussions with Magnox to ensure an appropriate outcome.

## **Horizon Nuclear Power Limited**

- 226 The shareholders of Horizon Nuclear Power Limited (Horizon) took a decision in March 2012 to withdraw from the development of nuclear power in the United Kingdom and, as a consequence, to sell Horizon Nuclear Power Limited.
- 227 In addition, Horizon has not yet determined the reactor design that it intends to adopt for construction in the United Kingdom, with progress in this respect being dependent upon the conclusion of the sale of Horizon.
- 228 Consequently, ONR accepts that Horizon is currently unable to provide meaningful responses to the recommendations and findings set out in ONR's Interim and Final Reports on the implications of the Japanese earthquake and tsunami for the UK nuclear industry, and the ENSREG stress test reports.
- 229 ONR notes and welcomes Horizon's expressed ongoing commitment to addressing the recommendations contained within these reports at an appropriate stage after the sale process for Horizon has been concluded (Ref. 40), and will seek further discussions with Horizon at that stage to satisfy itself that the recommendations and findings are being adequately addressed.

## **NuGeneration Ltd**

- 230 UK nuclear company NuGen is currently developing detailed plans as part of its Moorside project in west Cumbria, on land which is currently owned by NDA but on which NuGen has secured an option to purchase. As part of this development phase NuGen has not made any technology decision regarding the reactor design and is currently working on further detailed phases of the project.
- 231 Therefore, as with Horizon, ONR accepts that NuGen is as yet too early in its development to provide detailed responses to the recommendations and findings set out in ONR's Interim and Final Reports on the implications of the Japanese earthquake and tsunami for the UK nuclear industry, and the ENSREG stress test reports.

232 In addition, again consistent with Horizon, ONR notes and welcomes NuGen's expressed ongoing commitment to addressing the recommendations contained within these reports at an appropriate stage (Ref. 41), and will seek further discussions with NuGen at this stage to satisfy itself that the recommendations and findings are being adequately addressed.

## Generic Design Assessment (GDA)

233 Within the GDA process, a GDA Issue was raised on both Requesting Parties, EDF Group and AREVA for the UK EPR™ and Westinghouse for the AP1000® to provide a Resolution Plan to address the lessons learnt from Fukushima. ONR has considered the adequacy of these Resolution Plans, judged them to be credible and published them. Interim Design Acceptance Confirmations (iDACs) have been issued for both designs. ONR will only issue a DAC when all of the GDA Issues (Ref. 42) have been satisfactorily resolved.

234 In addition EDF and AREVA have written to ONR (Ref. 43) to confirm that:

- both parties remain confident that the deliverables for GDA (in the form of supplementary or updated documentation), scheduled within an agreed Resolution Plan, will satisfactorily address the relevant Fukushima recommendations;
- site-specific aspects will be progressed by any future UK EPR operator.

235 ONR is satisfied with progress made by EDF and AREVA to date, and will continue to monitor progress within the context of closing out the GDA process.

236 Westinghouse has advised ONR that it will not address any of the GDA Issues until it secures a UK customer, at which point it will make suitable funding available. Accordingly, the AP1000® Resolution Plans do not have start dates assigned to them, but they are based simply on estimated overall timescales.

## Sellafield Limited

### *Sellafield Site Operations*

237 The Sellafield site in Cumbria is the location of a number of significant UK nuclear facilities. These include several diverse operational plants and a number of facilities undergoing decommissioning. The site comprises both the Sellafield and Windscale nuclear licensed sites which are operated by Sellafield Ltd (the licensee) and owned by the NDA.

238 Operations on the Sellafield site began in the 1940s, when the site was a Royal Ordnance factory supporting the war effort. Nuclear operations commenced on the site with initial fuel loading of the two Windscale piles in 1950 and construction of the facilities for the separation of fissile material from the spent fuel. The site later became home to the world's first commercial nuclear power station – Calder Hall - which operated four Magnox reactors successfully from 1956 to 2003. A further reactor, the Windscale Advanced Gas-cooled Reactor (WAGR) was constructed and commissioned as a prototype for the UK's second generation of reactors. WAGR ceased operating in 1981. All seven of these reactors are now in differing stages of decommissioning, with WAGR decommissioning now essentially complete. (The four reactors at Calder Hall have been considered within this report, and within the EU stress tests, as NPPs).

239 Operations on site today centre around the nuclear fuel cycle, with two spent fuel reprocessing plants, i.e. the Magnox Reprocessing Plant and Thermal Oxide Reprocessing Plant (THORP). The reprocessing facilities are supported by a number of waste and effluent treatment plants and associated storage facilities. Nuclear fuel manufacturing was carried out until recently on the Sellafield site at the Sellafield Mox Plant (SMP). SMP was built to return reprocessed fissile material in the form of mixed oxide fuel to overseas customers.

- 240 One of the major waste streams from the reprocessing plants is the highly radioactive, heat-generating, fission product liquors which are transferred to water cooled storage tanks for interim storage prior to vitrification (made into solid glass form) and long-term storage in a natural convective air facility. The liquor storage tanks are fitted with a number of water cooling coils and water for the coils can be supplied from a number of different water sources.
- 241 The other waste products from reprocessing are mainly exported to other treatment plants across the site. Much of the waste is cemented within storage drums and moved to a number of drum storage facilities. These drum storage facilities do not require any engineered cooling systems.
- 242 There are also a number of legacy facilities on the Sellafield site which carried out or supported reprocessing activities in the past. Of these, the legacy storage ponds and silos require a number of active and passive systems to control the risks/hazards from the radioactive material they contain, e.g. ventilation/inerting systems to prevent hydrogen accumulations and water cooling systems. The main focus and priority on the Sellafield site is hazard reduction by the removal of the materials from these legacy facilities and the processing of the material into a safer passive waste form. Many of these facilities were designed and built in the 1950s.
- 243 Overall, the Sellafield site houses a large inventory of radioactive material across the site. Some of this material has heat-generating capability and some of the material is stored in a non-passive form in facilities which do not meet modern design requirements. However, the heat-generating capability of the radioactive material on the site is lower than fuel in an operating NPP and thus accident scenarios generally develop over longer timescales than those modelled for NPP. Hence, the nature of the engineered safety and protection systems for the non-NPP facilities on the Sellafield site are significantly different to those for NPP. Nevertheless there are a number of key safety systems in various plants across the site e.g. cooling, ventilation, inerting and containment systems and the availability and reliability of these systems under accident conditions forms the basis of the Sellafield Ltd review.

#### *Sellafield Ltd's Immediate Post Fukushima Initiative*

- 244 Sellafield Ltd established a separate "Resilience" programme to deliver the company's response for the Sellafield, Windscale and Calder Hall sites to the events that occurred at the Fukushima Dai-ichi NPP. As part of this programme, it developed its own RESilience Evaluation Process (RESEP) that scoped the assessment requirements of the stress test approach, which it then applied to key radiological plants across the site, their support systems and relevant utilities. The process identified potential shortfalls and highlighted improvement opportunities to secure availability of essential services, improvements in emergency arrangements and potential means of reducing off-site consequences of a severe event.
- 245 Since the events in Japan, Sellafield Ltd has also been proactive in its relationships with UK nuclear licensees, local/national organisations and overseas nuclear operators in an effort to ensure maximum learning is obtained for future operations on the Sellafield site from the events in Japan. ONR welcomes, and is encouraged by these initiatives.

#### *Sellafield Ltd's Submissions to ONR*

- 246 Sellafield Ltd provided an initial response (Ref. 44) to HMCINI Recommendations which was reviewed by ONR (Ref. 1). It has also produced reports summarising its structured interpretation and application of the ENSREG stress tests covering the Calder Hall NPP (Ref. 45) and NPGNF facilities on the rest of the Sellafield site (Ref. 46). From its reviews of Sellafield Ltd's stress test reports, ONR identified a number of Sellafield Ltd STFs. In addition, Sellafield Ltd, in its application of the ENSREG stress tests, identified 47 considerations, which could potentially lead to further site resilience improvements.
- 247 Sellafield Ltd's report (Ref. 47) presents the requested update on the work it has undertaken to address HMCINI report recommendations, the relevant STFs and considerations, and it provides an update on the applicability other licensee's stress test findings to operations on the Sellafield site. This latter aspect of Sellafield Ltd's work has highlighted seven additional considerations that it is now taking into account and progressing. Within the update report Sellafield Ltd also indicates

that it agrees with, and accepts, all of HMCINI's recommendations and ONR STFs that were raised in relation to Sellafield.

## *ONR Review of Sellafield Ltd's Progress Update Report*

- 248 Each Sellafield Ltd response to a recommendation, STF or consideration has been subject to a review by ONR of how the issue has been, or is being addressed, including a judgement on adequacy of progress. The responses have been reviewed against technical expectations (Annex 3) developed by ONR nuclear topic leads for the relevant technical areas, based on SAPs, (Ref. 48) and internal ONR TAGs (Ref. 47). The individual responses provided by Sellafield Ltd in its update report (Ref. 49) form the principal documentation assessed by ONR. However, in addition to the submitted responses this assessment has also taken account of:
- dialogue with Sellafield Ltd and subsequent assessment of its submission for the Sellafield Ltd stress test reports (Refs. 11 and 50);
  - monthly meetings to discuss progress with existing programmes of work on resilience, severe accident analysis, severe accident management strategies and emergency preparedness;
  - separate discussions with Sellafield Ltd on individual recommendations, STFs or consideration in Ref. 51;
  - formal technical queries asking for additional information and associated responses.
- 249 The ONR review of the Sellafield Ltd update report has indicated that it has provided appropriate update responses to all of the recommendations, STFs and considerations and we are satisfied with the adequacy of Sellafield Ltd's review of the applicability of other UK licensees' STFs and considerations. The summary conclusions from ONR's assessment of the Sellafield Ltd update report, taking into account the other interactions noted above, have been combined and are presented in Annex 4 of this report.
- 250 In a limited number of cases, further information was sought from Sellafield Ltd in respect of individual responses provided for recommendations, considerations and STFs. The supplementary information supplied is acceptable and, in some cases, Sellafield Ltd has provided an enhanced response to ONR.
- 251 Although, Sellafield Ltd has demonstrated progress with all the items considered within this report, the majority remain open on the basis that improvements on the site have yet to be fully implemented. The nature and timescales for these improvements will necessarily be dependent on the outcome of additional studies and optioneering, which are being actively undertaken by the licensee. To date, Sellafield Ltd has identified a significant number of potential resilience improvements that will require continued focus and effort to ensure timely implementation. The improvements range from relatively small, "quick win" items, right up to major projects that, due to their nature, are long term and will take a number of years to deliver in their entirety. Sellafield Ltd is currently pursuing the delivery and implementation of many of the "quick win" improvements, with the more notable achievements to date including:



**Figure 12: New emergency diesel powered lighting tower at Sellafield (courtesy of Sellafield Ltd)**

- Improvements to the Emergency Cooling Water Systems;
- Improvements to the backup electrical power systems;
- Improvements to Access Control Point communication systems.

#### Legacy Ponds and Silos Facilities

- Enhance emergency equipment storage facilities and equipment;
- New fully equipped emergency trailer for Access Control Point;
- New diesel power generator and lighting tower;
- Additional bunding and containment equipment.

#### Infrastructure Facilities

- Improvements to the existing emergency electrical supply systems;
- Facilitated deployment of mobile Diesel alternator sets;
- Improvements to on and off site water supply systems.

#### *Sellafield Ltd Forward Programme*

252 The majority of the improvements fall into those requiring further studies and optioneering. Sellafield Ltd has indicated that the number and complexity of these, combined with a need to clarify funding availability, dictates that a definitive programme will be developed during 2013. Sellafield Ltd has indicated that it is their intention to develop a comprehensive programme, addressing all suitable measures. The expectation is that appropriate progress will be made to deliver this programme and that monitoring of such progress (and any achievements) should be able to move into "normal business" in 2014.



**Figure 13: Example of new emergency equipment store at Sellafield (courtesy of Sellafield Ltd)**

- 253 Sellafield Ltd will continue to implement the required improvements on the site as and when solutions are fully developed. The process leading to the implementation of a number of the more significant improvements e.g. a potential new strategic control centre for the site will be protracted due to wider strategic considerations and emerging issues. Nevertheless, ONR will continue to seek acceleration of the delivery of the programme of improvements.
- 254 Sellafield Ltd's approach to taking forward many of the recommendations, considerations and STFs assessed in this report is embodied through three existing Sellafield Ltd programmes of work (associated with the Resilience programme), i.e. the Severe Accident Analysis programme, the Severe Accident Management Strategy programme and the Sellafield Emergency Management Improvement plan. ONR will continue to monitor all of these workstreams to ensure timely delivery of the programmes and implementation of any reasonably practicable interim measures that can be put in place.

#### *Overall Position*

- 255 Overall, ONR is satisfied that the Sellafield Ltd responses to HMCINI's report recommendations and the findings and considerations in the stress tests report, demonstrate an appropriate level of commitment to implementing lessons from the Fukushima accident.
- 256 ONR recognises that Sellafield Ltd needs to complete the ongoing optioneering and prioritisation review of the identified resilience improvements. However, ONR will continue to press for the acceleration of the delivery of the programme of resilience improvements.
- 257 Although Sellafield Ltd has embarked on work programmes to improve the resilience of the site under severe accident conditions, and to improve general emergency arrangements on site, both Sellafield Ltd and ONR are in agreement that it is of prime importance for Sellafield Ltd to pursue and accelerate, where possible, its existing programmes of work to reduce the hazard potential associated with the radioactive inventory on the Sellafield site.

## Restoration Sites

### Dounreay Site Restoration Ltd

- 258 The ex-UK Atomic Energy Authority (UKAEA) licensed nuclear site at Dounreay on the far north coast of Scotland is operated by Dounreay Site Restoration Ltd (DSRL). The site was originally the centre for Britain's fast reactor research programme and, at its peak, had a total of three nuclear reactors and support facilities. The last reactor was shut down in 1994.
- 259 At present, DSRL is entirely focused on delivery of its NDA site closure contract. All site activities are now directed towards completion of safe and efficient decommissioning, with all reactors on site having been defuelled (aside from a small number of breeder elements and one experimental fuel assembly in the Dounreay Fast Reactor (DFR), none of which are heat generating), their contents placed into passive safe storage, and with many auxiliary facilities having been decommissioned. The site also contains two facilities previously authorised for the disposal of Intermediate Level radioactive Waste (ILW) and Low Level radioactive Waste (LLW).
- 260 Although Dounreay is no longer an operational reactor site, it is recognised that it presents the second largest decommissioning challenge in the UK. Further details of the Dounreay site, facilities and operations can be found in previously published ONR reports (Refs. 1, 10 and 11).
- 261 DSRL provided a response to the HMCINI's Interim Report recommendations which, overall, ONR considered provided an appropriate commitment to fully address the relevant recommendations on a reasonable timescale. ONR requested a further progress update in June 2012.
- 262 DSRL provided a combined response to the ENSREG stress test requirements which considered both the NPP and NPGNF aspects of the Dounreay site (Refs. 10 and 11). ONR identified 18 STFs that are applicable to DSRL. As before, ONR requested a further progress update in June 2012.
- 263 ONR has conducted a systematic review of DSRL's response to these requests across the range of technical disciplines reflected in the recommendations and the summary conclusions are presented in tables in Annex 4 of this report. Analysis of the tables allows an overall picture of the licensee's responses to be developed and this is summarised below.
- 264 DSRL has indicated that it accepts all HMCINI's recommendations and ONR STFs.
- 265 Whilst not all of the recommendations are applicable to DSRL, it has identified those which are, and has made progress on all of the relevant recommendations. In about half of these cases, there is sufficient information and evidence to allow ONR to judge that the recommendation has been fully addressed, mainly on the basis that the licensee has appropriate equipment/processes already in place.
- 266 Of the remaining instances, the majority represent work in progress, and ONR is broadly satisfied with the technical content of the licensee's forward work programme and the proposed timetable for delivery of that work. For instance, in response to IR10, DSRL has reviewed the potential for exposure of the Dounreay site to tsunami activity and possible incursion of sea water, building upon previous work in this area undertaken prior to the Fukushima accident. Whilst these reviews support the overall conclusion that flooding events pose only a very limited threat to nuclear safety, even in extreme events, DSRL has updated its safety assessment handbook to reflect these reviews to ensure that future safety assessments build upon the lessons learnt following Fukushima. Similarly, the licensee is conducting a review of the site's emergency arrangements and organisation against the intent of recommendation IR24 (in coordination with IR22 and IR23, FR11 and also STF15, STF61 and STF74). The review has already resulted in the completion of a number of tasks which are designed to improve the defence-in-depth of the DSRL emergency preparedness and resilience, including refurbishment of the Dounreay Emergency Control Centre and procedural improvements including a review of the personnel retained on-call (availability of skills) and their ability to respond to an emergency situation. The review has also resulted in the creation of a revised DSRL on-call policy. DSRL does not yet consider this recommendation to be closed, and it is continuing to be addressed as part of the wider site response to the "Emergency

Control Centres, Instrumentation and Communications” topic area. For those few instances that do not fall into these categories, the licensee is still developing its programme of work, but ONR is content that there is sufficient evidence to judge that the approach sounds reasonable.

267 As a direct result of the lessons learnt from Fukushima, DSRL has reviewed, revised and re-issued its nuclear safety case external events guidance and methodologies, which include information relating to the assessment of flooding events. The revised guidance is available for use by the safety assessment teams that are currently completing PSRs. DSRL recently reviewed those arrangements as part of the industry-wide “Right First Time Safety Case” programme, which also incorporated lessons learned from the Nimrod accident. DSRL recognises that a ten year periodic review of the facility safety case is not simply a reason to restate the current arrangements, but is an opportunity to critically re-examine the safe operating envelope, to develop understanding of the facility, to recognise available improvements to engineered systems and managerial arrangements, and to implement improvements where practicable to do so. DSRL has reviewed the site arrangements for PSR against ONR TAG T/AST/050 (Ref. 52), which led to:

- enhanced project management oversight for consistency of approach and accountability to the centralised Assurance department;
- enhanced guidance to practitioners involved in the PSR process;
- continuous benchmarking across the wider UK estate of legacy sites.

268 As with the recommendations, DSRL has appropriately identified those STFs which are relevant to it. For the STFs, the dutyholders’ thinking is often less mature as the licensee has had significantly less time to consider how best to deal with the findings. However, for some STFs, an acceptable forward work programme is already underway and the timescales for delivery are judged to be reasonable. In other instances there is good evidence that the licensee is developing an appropriate programme of work.

269 DSRL has taken the proactive step of linking the resolution of many of its STFs to related recommendations from the HMCINI’s report (e.g. STF55 has been linked to the on-going work programme to resolve IR8, IR22 and IR23). This has not precluded DSRL from instigating other actions where appropriate. For example, it has recently completed the installation of an additional back-up diesel generator to ensure robustness of electrical supply to the Dounreay Emergency Control Centre. Whilst work to resolve these STFs is ongoing, ONR is encouraged that the licensee is approaching all of the relevant findings in a positive and appropriate manner.

270 DSRL has identified a number of ongoing workstreams in areas such as “Off-site Infrastructure Resilience” and “Emergency Control Centres, Instrumentation and Communications” for which completion of actions and activities is expected to be made by the end of the current financial year (March 2013). These areas combine a number of related recommendations and STFs into discrete topic groups. The main focus of the DSRL post-Fukushima response has been to develop and secure improvements in their resilience and emergency response arrangements. DSRL expects that any resultant improvements will serve to provide increased defence-in-depth against unlikely but potentially far-reaching external events. Any such improvements are likely to manifest themselves as either enhancements to DSRL’s business continuity plans or emergency arrangements. DSRL has demonstrated an appropriate commitment to implementing resilience improvements to not only specific aspects of the site’s infrastructure but also to the development of additional testing regimes for emergency and on-call personnel.

### *Overall Position*

271 As a site which does not have any severe accident potential (as per the SAPs definition), but does meet the REPPiR criteria for a radiation emergency and therefore requires an off-site emergency plan, DSRL has provided a proportionate and tailored response to HMCINI’s recommendations and ONR STFs. This approach recognises the respective radioactive inventories and hazard profiles of its facilities and the ongoing decommissioning and hazard reduction work.

272 Overall, ONR considers that the DSRL responses to the Final Report recommendations and the findings in the stress tests report demonstrate an appropriate commitment to implementing lessons from the Fukushima accident. The responses also provide satisfactory reassurance that progress is being made for all of the applicable recommendations and findings, and that reasonable programmes of work to address other areas are either in progress or in the planning stage. ONR will continue to monitor all of these workstreams.

## Research Sites Restoration Ltd

273 Research Sites Restoration Ltd (RSRL) is the nuclear site licence holder for the Harwell and Winfrith sites, both formerly managed by UKAEA. RSRL is charged with the safe closure of these sites, on behalf on the NDA.

274 Harwell was established in Oxfordshire in 1946 as the UK's atomic energy research establishment. UKAEA assumed responsibility for the site in 1954. During its operational lifetime the site housed a number of research reactors, the last of which were shut down in 1990.

275 Current site activities, in addition to the decommissioning of the remaining two defuelled test reactors, include waste storage, processing and handling. Fuel from the former low energy GLEEP reactor at Harwell and the DRAGON reactor at Winfrith (neither of which is heat-generating) is stored on the Harwell site pending completion of movement elsewhere as part of the fuel consolidation project.

276 Winfrith, located in Dorset, was a centre for UK civil reactor research and development from the 1950s to the 1990s. The site operated a number of reactor types, the biggest of which (in terms of power) was the Steam Generating Heavy Water Reactor (SGHWR), which was shut down in 1995. Eight reactor types were operated in all.

277 All reactors have been defueled and decommissioned with the exception of SGHWR and DRAGON (a high temperature gas-cooled reactor). SGHWR and DRAGON have been defuelled and are currently in a state of care and maintenance pending further decommissioning. Current site activities, in addition to decommissioning, include waste storage and handling. No fuel is stored on the Winfrith site.

278 Further details of the RSRL site, facilities and operations can be found in previously published ONR reports (Refs. 1 and 11).

279 RSRL has provided previous updates on its response to the Fukushima accident. In particular, RSRL provided a response to HMCINI's Interim Report recommendations which ONR considered provided an appropriate commitment to fully address them on a reasonable timescale. ONR requested a further progress update in June 2012.

280 RSRL also provided a response to the ENSREG stress test requirements which is reported in the ONR NPGNF report (Ref. 11). The licensee did not identify any "Considerations" for further review, with ONR identifying one stress test finding applicable to RSRL. ONR requested a further progress update in June 2012.

281 For this implementation report, ONR has conducted a general review of the approach taken to dealing with each recommendation, and progress made, in conjunction with a review against technical expectations developed by ONR nuclear topic leads for the relevant technical areas based on the SAPs, (Ref. 48) and internal ONR TAGs (Ref. 49). These reviews also took account of knowledge that ONR has acquired through routine interventions and clarification from the licensee as necessary.

282 The summary conclusions from each assessment report have been combined and are presented in tables in Annex 4 of this report. Analysis of the tables allows an overall picture of the licensee's responses to be developed as summarised below.

283 RSRL has indicated that it accepts all of HMCINI's recommendations and ONR STFs.

- 284 RSRL has reviewed HMCINI's recommendations and has identified those which apply to its facilities and operations in an appropriate manner. RSRL has made progress on the majority of the recommendations relevant to it, and in the majority of these cases has provided sufficient information and evidence for ONR to judge that the recommendation has been adequately addressed. For the most part this is because the licensee has appropriate procedures/equipment already in place.
- 285 There are, however, a few cases where RSRL is reviewing its next steps or has identified a forward work programme. For all of these forward work programmes or those being developed, ONR is broadly satisfied with the technical content and the proposed timescales for delivery of that work. The main focus of the licensee's ongoing work in response to the Fukushima accident continues to be in the area of emergency planning and response arrangements. This is mainly driven by IR16, but includes aspects of IR24 and FR2 and FR3.
- 286 The licensee has reviewed the adequacy of its sites utilities and infrastructures under extreme conditions, the relevance of safety cases to beyond design basis analysis events, and the adequacy of its emergency response capability. The review concluded that the existing commitment to review emergency planning arrangements adequately bounds all foreseeable extreme events. In response to IR16, RSRL has undertaken a project to implement improvements to the emergency planning arrangements, which is nearing completion. RSRL has already implemented a number of other improvements, for example, purchasing additional standby batteries for communication equipment which are retained in a charged and ready state in the site emergency control centre.
- 287 There are relatively few examples in which the licensee's responses to HMCINI's recommendations do not yet completely satisfy ONR. In summary, these relate to:
- IR8 – This recommendation is linked to STF93, hence ONR judges that IR8 cannot be adequately resolved while STF93 remains ongoing.
  - IR12 – In its response, RSRL does not consider this recommendation to be applicable and hence does not consider fuel strategies, as per the intent of this recommendation. ONR do not agree. However, ONR remains content that this is a “presentational” issue with the RSRL response, and that the licensee does indeed have adequate arrangements in place regarding fuel strategies in the context of IR12. ONR understands that RSRL has since updated its progress report for this aspect, but too late for ONR to review and incorporate into this report.
  - FR1 – RSRL presented a minimal response to FR1 that did not, in ONR's opinion, adequately demonstrate how it gives appropriate and consistent priority to completing PSRs. In response, ONR has secured a commitment from RSRL's managing director by letter (Ref. 53) to provide, by the end of September 2012, a more comprehensive review of its LC15 arrangements that takes cognisance of learning from Fukushima and any challenges to timely delivery of future PSRs, recognising the likely acceleration of decommissioning in the near future. ONR is content with this updated response.
- 288 STF93 relates to the build-up of combustible hydrogen to hazardous levels in the Waste Encapsulation Plant (WEP) at Harwell. Whilst ONR agrees that this is not a current hazard as the plant is not operational, and will be subject to a regulatory hold-point before active operations are permitted, RSRL needs to explicitly consider the capability to sustain hydrogen concentration at WEP at a safe level beyond the exhaustion of the three-day supply of diesel. In addition, RSRL should also review whether the five and a half-day hydrogen generation window presents a best-estimate basis against which to design on-site emergency plans. Although we have yet to reach agreement, ONR is encouraged that the licensee is approaching this finding in a positive manner, and will continue to ensure improvements and monitor progress in this area.

## Overall Position

- 289 RSRL has provided a concise update of its response to the Fukushima accident and HMCINI's recommendations and ONR STFs. As a site which does not have any severe accident potential (as per the SAPs definition), RSRL has provided a proportionate response which recognises the relatively low hazard nature of their decommissioning operations. There were several areas where ONR found it necessary to seek additional clarification and information from the licensee, but RSRL responded adequately to these. RSRL continues to work in areas related to emergency planning and expects to complete this work within the current calendar year.
- 290 Overall, ONR considers that the RSRL's response to the Final Report recommendations and the findings in the stress test report demonstrates an appropriate commitment to implementing lessons from the Fukushima accident. The responses also provide a degree of reassurance that progress is being made for the majority of the applicable recommendations and findings, and that reasonable programmes of work to address other areas are either in progress or in the planning stage. There are one or two areas where ONR considers that further work is needed before it can be confident that a satisfactory position can be achieved. ONR will continue to monitor all of these workstreams paying particular attention to those areas that need further development.

## Commercial Sites

### Sellafield Capenhurst Ltd

- 291 The Sellafield Capenhurst licensed site is expected to be relicensed during 2012 to become part of the wider Urenco UK Ltd (UUK) nuclear site. As such ONR has included consideration of the Sellafield Capenhurst site in the UUK section that follows.

### Urenco UK Ltd

- 292 Currently there are two separate licensees within the Capenhurst site boundary (Urenco UK Ltd and Sellafield Ltd), with both licensees currently maintaining close association for a number of services, including accident management. The two extant licensed sites at Capenhurst are expected to undergo relicensing towards the end of 2012 to form a single licensed site.
- 293 The gaseous diffusion plant on the Sellafield Ltd Capenhurst site ceased operations in the early 1980s and the site has since been focused on decommissioning and the safe storage of uranium hexafluoride, LLW, depleted and low level uranic material. ONR considers Sellafield Capenhurst to be a lower hazard facility and, as such, considers that the assessment report here for UUK will bound the potential hazards for the combined site, should the relicensing proceed.
- 294 The UUK Ltd site itself contains a number of units or plants which comprise three main groups, all of which are involved in the processing, handling or storage of uranium hexafluoride (UF<sub>6</sub>) with an enrichment of 6% at maximum, namely: three centrifuge enrichment plants; UF<sub>6</sub> cylinder storage rafts and buildings; and a number of support facilities (such as workshops, uranium residues store, chemical laboratories and the site emergency control centre). Further details of the UUK site, facilities and operations can be found in previously published ONR reports (Refs. 1 and 11).
- 295 UUK provided a response to the HMCINI's interim report recommendations that ONR considered provided an appropriate commitment to adequately address the scope of relevant recommendations, and on a reasonable timescale. ONR requested a further progress update in June 2012.
- 296 UUK also provided a response to the ENSREG stress test requirements which is reported in the ONR NPGNF report (Ref. 11). UUK identified a total of nine considerations to take forward (mainly related to emergency arrangements and aspects related to long-term PSRs), with ONR identifying a further two stress test findings. ONR requested a further progress update in June 2012.

- 297 ONR has conducted a systematic review of UUK's response to these across the range of technical disciplines reflected in the recommendations and findings. These reviews also took account of knowledge that ONR has acquired through routine interventions and any clarification from the licensee as necessary.
- 298 The summary conclusions from ONR's assessment have been combined and are presented in tables in Annex 4 of this report. Analysis of the tables allows an overall picture of the licensee's responses to be developed and this is summarised below.
- 299 UUK has indicated that it accepts all of HMCINI's recommendations and ONR STFs.
- 300 Although not all of the recommendations are applicable to UUK, it has identified those which are in an appropriate manner. The licensee's responses indicate that it has made progress on all of the recommendations relevant to it and, in the majority of these cases, has provided sufficient information and evidence for ONR to make the judgement that the item has been adequately addressed, either on the basis that the licensee has appropriate equipment/processes already in place, or the licensee has committed to address the intent of the action under a wider programme of ongoing work.
- 301 For those cases where there is an identified forward work programme, ONR is broadly satisfied with the technical content and the proposed timetable for delivery of that work. For instance, in response to IR8, UUK has reviewed the dependency of the site on off-site supplies, showing that although loss of these facilities may have potential commercial impacts, it does not impact on nuclear safety. UUK has committed to consider the wider dependency on off-site infrastructure in extreme conditions as part of its response to IR22 and IR24, which represents one of the major ongoing workstreams for UUK.
- 302 To date, UUK has completed a review of its emergency arrangements, which will help in making informed decisions on the options for improving emergency procedures, plans, roles (including training, behavioural and cultural arrangements), competencies, emergency management (including communications) and facilities on the UUK Ltd site. The licensee's review has already identified further options for enhancing arrangements.
- 303 This review will shortly be submitted to the site leadership team for review and acceptance, and will result in a set of improvement options. Any associated improvement projects are planned to begin in Q4 2012.
- 304 There was only one isolated response where ONR has identified the need to encourage improvements in the licensee's approach, relating to FR1. In this case, ONR is now content that UUK has recognised the potential for delayed PSR submissions in the future, and has proposed consolidation of safety cases and re-setting of PSR ten-year cycles. This consolidation, which is already underway, allied to a positive response to the "Right First Time Safety Case" initiative, enables ONR to conclude that the licensee has an appropriate forward work programme to manage the intent of this recommendation.
- 305 For the STFs, the picture is often less mature as the licensee has had significantly less time to consider how best to deal with the findings. However, for both of the STFs, there is good evidence that the licensee is either developing an appropriate programme of work or that an appropriate programme of work is already underway. In both cases, the timescales for delivery appear reasonable. UUK has taken the proactive step of linking resolution of its STFs to the related recommendations and ongoing workstreams already in progress. Hence both STF34 and 84 have been combined with the larger workstream to review the UUK emergency response arrangements. Whilst work to resolve these STFs is ongoing, ONR is encouraged that the licensee is approaching all of the relevant findings in a positive and appropriate manner.
- 306 UUK has provided an update on its progress with its identified considerations and, in each case, has provided an adequate description of what it is trying to achieve, with good evidence to suggest it is developing an appropriate forward work programme which accords with ONR expectations.

- 307 UUK has combined a number of related recommendations and STFs into discrete topic groups and workstreams:
- Emergency response arrangements – This addresses IR8, IR13, IR22 and IR24 and FR2 and FR3 but also includes some elements of IR18, IR23 and IR25. UUK has also included STF34 and STF84 in this topic, along with UUK1, 5 and 9. UUK anticipates that this work stream will report on any identified forward action in Q3 2012, with implementation beginning in Q4 2012. Completion dates will depend on the scope of actions identified;
  - Existing Long-term Periodic Review (LTPR) plans – UUK has included UUK2, 3, 4, 6, 7 and 8 within the scope of their existing LTPR plans. Timescales for delivery to ONR vary, with the latest date being Q3 2015 for the UUK6 review.
- 308 ONR is content that this represents a sensible and proportional approach to addressing the actions resulting from the Fukushima accident. Incorporation of items into normal UUK business is encouraged by ONR.

## Overall Position

- 309 As a site which does not have any severe accident potential (as per the SAPs definition), but does meet the REPIIR criteria for a radiation emergency and hence need for an off-site emergency plan, UUK has provided a proportionate and tailored response to the HMCINI's recommendations and ONR STFs. This approach recognises the respective radioactive inventories and hazard profiles of its facilities.
- 310 Overall, ONR considers that the UUK Ltd response to the Final Report recommendations and the findings in the stress tests report demonstrates an appropriate commitment to implementing lessons from the Fukushima accident. The responses also provide satisfactory reassurance that progress is being made for all of the applicable recommendations and findings, and that reasonable programmes of work to address other areas are either in progress or in the planning stage. ONR will continue to monitor all of these workstreams.

## Springfields Fuels Ltd

- 311 The Springfields Fuels Ltd (SFL) site is located approximately 7km to the north-west of Preston. The site was originally developed in the mid-1940s and provided nuclear fuel fabrication services to the UK Magnox reactor programme.
- 312 The site's current activities include manufacture of oxide fuels for AGRs and LWRs in the UK, Europe, USA and Japan, manufacture of uranium hexafluoride and its conversion, processing of residues, decommissioning and demolition of redundant plants and buildings.
- 313 Uranium feedstocks and products have a low radiation hazard, but some of the chemicals used in the manufacturing process have a high chemotoxic hazard. Principal processes undertaken on site include manufacture of natural uranium hexafluoride ( $UF^6$ ) from uranium trioxide ( $UO^3$ ), conversion of enriched uranium hexafluoride to uranium dioxide ( $UO^2$ ) powder and processing of residues arising from both historic and current manufacture of uranium hexafluoride in both natural and enriched forms. Further details of the SFL site, facilities and operations can be found in previously published ONR reports (Refs. 1 and 11).
- 314 SFL has provided previous updates on its response to the Fukushima accident, in particular SFL provided a response to HMCINI's Interim Report recommendations, which ONR considered to be an appropriate commitment. ONR requested a further progress update in June 2012
- 315 SFL also provided a response to the ENSREG stress test requirements which is reported in the ONR NPGNF report (Ref. 11). The licensee identified no considerations and ONR identified three stress test findings that are applicable to SFL. ONR requested a further progress update in June 2012.

- 316 For this current report on implementation, ONR has carried out a general review of how each recommendation has been, or is being dealt with and the progress being made, together with a review against technical expectations (Annex 3) developed by ONR nuclear topic leads for the relevant technical areas based on the SAPs, (Ref. 48) and internal ONR TAGs (Ref. 49). These reviews also took account of knowledge that ONR has acquired through routine interventions and any clarification from the licensee as necessary.
- 317 The summary conclusions from each assessment report have been combined and are presented in tables in Annex 4 of this report. Analysis of the tables allows an overall picture of the licensee's responses to be developed and this is summarised below.
- 318 SFL has indicated that it accepts all of HMCINI's recommendations and ONR STFs.
- 319 Overall, SFL has reviewed HMCINI's recommendations and has identified those which apply to their facilities and operations in an appropriate manner. SFL has made progress on all of the recommendations relevant to them, and in the majority of these cases it has provided sufficient information and evidence for ONR to judge that they have been adequately addressed. For the majority of recommendations this is due to SFL having adequate procedures/equipment already in place.
- 320 For the remaining recommendations, the licensee has identified forward work programmes which have either started or are being developed. For those cases where there is an identified forward work programme in progress or being developed, ONR is broadly satisfied with the technical content and the proposed timescales for delivery of that work. For IR8, SFL concludes that the site has sufficient on-site power supply contingencies. Furthermore, Springfields' plants and processes are designed to fail safe in the event of power failure so there is no dependency on continuing electricity supply for nuclear safety. The major ongoing area of work for SFL is related to the site ECC. A back-up ECC has been identified which should be available by March 2013.
- 321 For the STFs, SFL has made reasonable progress in addressing these findings considering the limited time it has to consider how best to deal with them. In one instance, STF88, the licensee now considers the response "closed" on the basis of additional calculations. On the basis of the evidence presented, ONR considers this to be reasonable. For the remaining two STFs, SFL has identified the need for further work. ONR is encouraged that the licensee is approaching all of the relevant findings in a positive and appropriate manner and will continue to monitor progress in these areas.

## *Overall Position*

- 322 SFL has provided a considered and proportionate response to the HMCINI's recommendations and ONR STFs. Although the site does not have any severe accident potential (as per the SAPs definition), it does meet the REPIIR criteria for a radiation emergency and need for an off-site emergency plan and is a top tier COMAH site.
- 323 Overall, ONR considers that the SFL response to the Final Report recommendations and the findings in the stress tests report demonstrates an appropriate commitment to implementing lessons from the Fukushima accident. The responses also provide satisfactory reassurance that progress is being made for all of the applicable recommendations and findings, and that reasonable programmes of work to address other areas are either in progress or in the planning stage. ONR will continue to monitor all of these workstreams.

## **GE Healthcare Ltd**

- 324 GE Healthcare (GEHC) is the licensee for two sites in the UK - at Amersham in Buckinghamshire, and at a facility near Cardiff. In April 2012, GEHC formally exited from what was a third licensed site at Harwell. Both remaining sites are undergoing decommissioning. What remaining operational work there is relates to the manufacture of radiopharmaceutical products and the management of operational wastes. GEHC is considered to be a low hazard licensee by ONR on the basis that:

- The inventory at the GEHC sites is such that there are no accident sequences with potential to lead to significant off-site consequences or severe accidents;
- There are no nuclear reactors (power, research or other) or processing of spent nuclear fuel at the sites, hence no handling of reactor fuel (either spent or new) or requirements for cooling ponds. The inventory and type of radioisotope is such that there is no requirement to provide a heat sink capability;
- There are no materials on GEHC sites that require criticality control, and no processes involving control of reactivity;
- There are no processes in routine or accident conditions involving temperature or pressure excursions sufficient to drive materials off site. Scenarios which lead to the creation or accumulation of hydrogen or other combustible gas are not relevant for GEHC operations;
- Systems for the control of off-site safety or environmental impact are passive and availability of those systems is not time-critical.

325 Further details of the GEHC sites, facilities and operations can be found in previously published ONR reports (Refs. 1 and 11).

326 GEHC has provided previous updates on its response to the Fukushima accident. In particular, it provided a response to the HMCINI's Interim Report recommendations. ONR acknowledged GEHC's proposal to review multiple concurrent events between facilities on its sites to confirm arrangements for response to extreme events are adequate. ONR was satisfied with the proposed timescale to address the relevant recommendations and requested a further progress update in June 2012.

327 GEHC also provided a response to the ENSREG stress test requirements which is reported in the ONR NPGNF report (Ref. 11). On the basis of our review of these responses, ONR did not identify any stress test finding applicable to GEHC. The licensee identified no considerations for further review. ONR requested a further progress update in June 2012.

328 For this current report on implementation, ONR has conducted a general review of how the recommendation has been, or is being dealt with and the progress being made, together with a review against technical expectations (Annex 3) developed by ONR nuclear topic leads for the relevant technical areas based on the SAPs, (Ref. 48) and internal ONR TAGs (Ref. 49). These reviews also took account of knowledge that ONR has acquired through routine interventions and any clarification from the licensees as necessary.

329 The summary conclusions from this assessment have been combined and are presented in tables in Annex 4 of this report. Analysis of the tables allows an overall picture of the licensee's responses to be developed and this is summarised below.

330 GEHC accepts all of HMCINI's recommendations.

331 GEHC has considered the HMCINI's recommendations and has identified those which apply to their facilities and operations in an appropriate manner. GEHC's report indicates that it has made progress on all of the recommendations relevant to it, and in all of these cases GEHC has provided sufficient information and evidence for ONR to judge that the recommendation has been adequately addressed.

332 In most cases, progress is considered to be adequate on the basis that the licensee has appropriate procedures/equipment already in place, given the low hazard nature of their facilities and operations.

333 The licensee has identified only a single ongoing activity (which is only partly in response to the Fukushima accident) related to PSR's and FR1.

334 In its response GEHC has confirmed that the accident at Fukushima has strengthened its focus on assessment of the Nuclear Fire Safety case during the periodic review process. However, to put this into context, it is important to understand that even an unmitigated fire would not result in

a severe accident, and the consequences would be less than the REPPIR criterion for an off-site emergency plan. ONR is content with the technical content and the proposed timescales for delivery of that work, and will continue to monitor progress as part of ongoing interventions with the licensee.

- 335 Whilst the licensee also considers its responses to IR9 and IR15 closed, it has committed to review any additional learning as it becomes available, in co-ordination with relevant industry groups such as the SDF. ONR welcomes this approach for continued learning and benchmarking.

## *Overall Position*

- 336 GEHC has provided a proportionate and sensible response to its reviews in reaction to the HMCINI's recommendations in relation to the Fukushima accident. Neither of the GEHC sites has any severe accident potential (as per the SAPs definition) nor meets the REPPIR criteria to require an off-site emergency plan. This is a reflection of the low hazard nature of operations and the very limited radiological inventory on site, plus the ongoing decommissioning activities.
- 337 Overall, ONR considers that the GEHC Ltd responses to the Final Report recommendations demonstrate an appropriate commitment to implementing lessons from the Fukushima accident. The responses provide satisfactory reassurance that adequate progress has been made for all of the relevant recommendations. ONR will continue to monitor those ongoing workstreams.

## **Studsvik UK Limited**

- 338 The Metal Recycling Facility (MRF) operated by the licence holder, Studsvik UK Ltd, is a small low-hazard facility located at Lillyhall near Workington in Cumbria. The MRF receives metallic waste items contaminated with low levels of radiological contamination from clients within the UK nuclear industry. These items are processed on a batch basis that includes size reduction (if required) using conventional hot and cold cutting techniques, with subsequent decontamination using industrial grit blasting equipment.
- 339 The site itself consists of a number of standard industrial units which house the facilities. The limited amount of contaminated material held on site at any one time means that the site does not trigger the requirement for off-site emergency planning under REPPIR.
- 340 Further details of the Studsvik UK site, facilities and operations can be found in previously published ONR reports (Refs. 1 and 11).
- 341 Studsvik UK has provided previous updates on its response to the Fukushima accident. In particular, it provided a response to the HMCINI's Interim Report recommendations, stating that the majority of the Interim Report recommendations do not apply to their site. ONR agreed with this position but requested a further progress update in June 2012.
- 342 Studsvik UK also provided a response to the ENSREG stress test requirements, which is reported in the ONR NPGNF report (Ref. 11). ONR identified no STFs applicable to Studsvik UK, and the licensee identified no considerations for further review.
- 343 For this current report on implementation, ONR has conducted a general review of how each recommendation has been, or is being, dealt with and the progress being made, together with a review against technical expectations (Annex 3) developed by ONR nuclear topic leads for the relevant technical areas based on SAPs, (Ref. 48) and internal ONR TAGs (Ref. 49). These reviews also took account of knowledge that ONR has acquired through routine interventions and any clarification from the licensees as necessary.
- 344 The summary conclusions from each assessment report have been combined and are presented in tables in Annex 4 of this report. Analysis of the tables allows an overall picture of the licensee's responses to be developed and this is summarised below.
- 345 Studsvik UK has indicated that it accepts all of HMCINI's recommendations.

- 346 Overall, Studsvik UK has reviewed HMCINI's recommendations and has identified those which apply to its facilities and operations in an appropriate manner. The progress reported by Studsvik UK indicates that it has made progress on all of the recommendations relevant to it, and in all of these cases it has provided sufficient information and evidence that ONR can make the judgement that the recommendation has been adequately addressed. Most of these are considered adequate because the licensee has appropriate procedures/equipment already in place taking into account the low hazard nature of their facilities and operations.
- 347 The licensee has identified only a single on-going activity, which is only partly in response to the Fukushima accident, related to PSRs and FR1. Recognising that Studsvik UK Ltd's site is still in an active phase of commissioning, ONR is content that the licensee has a suitable programme of work to develop the maturity of its Licence Condition 15 (covering periodic reviews) arrangements for producing PSRs. ONR is content with the technical content and the proposed timescales for delivery of that work and will continue to monitor progress as part of ongoing interventions with the licensee. ONR acknowledges the licensee's commitment to continue to engage with the wider industry (via SDF, Nuclear Industry Association (NIA) etc.) in regard to the specific recommendations IR9 and IR15, where relevant and proportionate to do so. ONR welcomes this approach for continued learning and benchmarking.

### *Overall Position*

- 348 For a site which has no severe accident potential (as per the SAPs definition) and is below the REPPiR criteria that would require an off-site emergency plan, Studsvik UK has provided a comprehensive and thorough update on their Fukushima response
- 349 Overall, ONR considers that the Studsvik Ltd responses to the Final report recommendations demonstrate an appropriate commitment to implementing lessons from the Fukushima accident. The response provides satisfactory reassurance that adequate progress has been made for all of the relevant recommendations. ONR will continue to monitor those ongoing workstreams.

### **Low Level Waste Repository Limited**

- 350 The Low Level Waste Repository (LLWR) site is situated near the coast of west Cumbria about 0.5km from the village of Drigg and about 6km to the south of the Sellafield nuclear licensed site. LLWR became operational as a LLW disposal route in 1959. The purpose of LLWR is the receipt, grouting, storage and disposal of LLW. LLW is grouted in its transport container following receipt at the site and then placed in a storage vault. The site also stores historical LLW in trenches that are now full and have high quality covers fitted. ONR consider LLWR to be a low hazard site on the basis that:
- The low-hazard nature of the inventory at LLWR means that no accident at the site, initiated through internal or external events, can result in an off-site consequence that exceeds 1mSv; hence the site does not trigger the requirement for off-site emergency planning under REPPiR;
  - As a storage facility for LLW the processes involved do not require electricity, water, cooling or other services to maintain safety. There is no reliance on complex control systems or instrumentation. The site has no nuclear reactors (power, research or other) nor any handling of reactor fuel (either spent or new) or requirements for cooling ponds. Similarly this means there is no requirement to provide a heat sink capability. There are no materials on site requiring criticality control and no processes involving control of reactivity.
- 351 Further details of the LLWR site, facilities and operations can be found in previously published ONR reports (Refs. 1 and 11).
- 352 LLWR has provided previous updates on their response to the Fukushima accident. In particular, it has provided a response to HMCINI's Interim Report recommendations, which ONR considered provided an appropriate commitment to fully address the scope of relevant recommendations. ONR requested a further progress update in June 2012.

- 353 LLWR also provided a response to the ENSREG stress test requirements which is reported in the ONR NPGNF report (Ref. 11). ONR did not identify any STFs but the licensee identified three considerations for further review. ONR requested a further progress update in June 2012.
- 354 For this current report on implementation, ONR has carried out a general review of how each recommendation has, or is being dealt with and the progress being made, together with a review against technical expectations (Annex 3) developed by ONR nuclear topic leads for the relevant technical areas based on the SAPs, (Ref. 48) and internal ONR TAGs (Ref. 49). These reviews also took account of knowledge that ONR has acquired through routine interventions and any clarification from the licensees as necessary.
- 355 The summary conclusions from each Assessment Report have been combined and are presented in tables in Annex 4 of this report. Analysis of the tables allows an overall picture of the licensee's responses to be developed and this is summarised below.
- 356 LLWR has indicated that it accepts all of HMCINI's recommendations.
- 357 Overall, LLWR has reviewed HMCINI's recommendations and has identified those which apply to its facilities and operations in an appropriate manner. The progress reported by LLWR indicates that it has made progress on all of the recommendations relevant to it, and in all of these cases has provided sufficient information and evidence that ONR can make the judgement that the item has been adequately addressed, generally on the basis that appropriate procedures/equipment are already in place, given the low hazard nature of their facilities and operations.
- 358 The licensee considers most of its responses to HMCINI's recommendations to be closed. For example, in response to IR8, the licensee has considered its own resilience and concluded that current arrangements are adequate. The licensee has identified only a single ongoing activity, which is only partly in response to the Fukushima accident, related to PSRs and FR1. ONR will continue to monitor progress as part of ongoing interventions with the licensee. ONR acknowledges the licensee's commitment to continue to engage with the wider industry in regard to the specific recommendations IR9 and IR15 where relevant and proportionate to do so. LLWR has diligently engaged with the Sellafield Ltd "Resilience" programme in recognition that a major event which affects LLWR is more likely to be attributable to an accident on that site.
- 359 LLWR has provided an update on its progress with its identified considerations. For all of the licensee's considerations, LLWR has provided an adequate description of what it is trying to achieve, and has provided good evidence to suggest it is taking these forward appropriately.

## *Overall Position*

- 360 LLWR is a site with no severe accident potential (as per the SAPs definition) and no requirement for an off-site emergency plan under REPPiR. LLWR has provided a proportionate and adequate response given the low hazard nature of operations and the very limited radiological inventory on site.
- 361 Overall, ONR considers that the LLWR response to the Final Report recommendations demonstrates an appropriate commitment to implementing lessons from the Fukushima accident. The response provides satisfactory reassurance that adequate progress has been made for all of the relevant recommendations. The licensee has demonstrated adequate progress is being made in relation to its own considerations from the stress tests process. ONR will continue to monitor those ongoing workstreams.

## **Imperial College of Science, Technology and Medicine**

- 362 Imperial College of Science, Technology and Medicine (IC) is the licensee for the CONSORT II Research Reactor, which is located on a secure nuclear licensed site within the Imperial College Silwood Park campus near Ascot in Berkshire.
- 363 CONSORT is a low power (100kW thermal) research reactor, and first achieved criticality in 1965. CONSORT uses light water as its moderator, reflector and coolant. At maximum power, the water temperature differential for water passing through the core is very low (circa 10°C). Core reactivity is controlled by stainless steel clad cadmium rods, which enter the core under gravity.

Materials test reactor type fuel elements remain in the reactor vessel at all times, with there being no other fuel storage facilities or elements present on the licensed site. Reactor operations continue intermittently, but the reactor is taken critical infrequently (primarily for maintenance of water chemistry and training) and will no longer achieve criticality following final shutdown at the end of 2012.

364 Imperial College reports that decommissioning plans are in an advanced state, and that defueling of all fuel elements and de-licensing of the site will be completed to an agreed timescale. IC is considered as a low hazard licensee by ONR on the basis of the nature of the reactor as described above, its current operational status, plus:

- The inventory at the IC site is such that there are no accident sequences with potential to lead to significant off-site consequences or severe accidents;
- The CONSORT reactor design is very simple and low power, requiring no emergency cooling systems. This means that extreme events such as a complete loss of all cooling water or all electrical supplies lead to acceptable consequences. There are no auxiliary facilities for handling the reactor fuel outside of the reactor vessel itself.

365 Further details of the IC site, facilities and operations can be found in previously published ONR reports (Refs. 1 and 11).

366 IC has provided previous updates on their response to the Fukushima accident. In particular, IC provided a response to HMCINI's Interim Report. ONR noted that IC did not intend to undertake any further review on flooding due to the site's location and geography, and acknowledges the licensee's proposal to review safety-related on- and off-site supplies. ONR was satisfied with the proposed timescale to address relevant recommendations and requested a further progress update in June 2012.

367 IC provided a response to the ENSREG stress test requirements which is reported in the ONR NPGNF report (Ref. 11). The licensee identified no considerations for further review and, similarly ONR identified no STFs applicable to IC.

368 For this current report on implementation, ONR has carried out a general review of how each recommendation has been, or is being dealt, with and the progress being made, together with a review against technical expectations (Annex 3) developed by ONR nuclear topic leads for the relevant technical areas based on the SAPs, (Ref. 48) and internal ONR TAGs (Ref. 49). These reviews also took account of knowledge that ONR has acquired through routine interventions and any clarification from the licensees as necessary.

369 The summary conclusions from each assessment report have been combined and are presented in tables in Annex 4 of this report. Analysis of the tables allows an overall picture of the licensee's responses to be developed and this is summarised below.

370 IC has indicated that it accepts all of HMCINI's recommendations.

371 Overall, IC has reviewed HMCINI's recommendations and has identified those which apply to its facilities and operations in an appropriate manner. IC has made progress on all of the recommendations relevant to it, and has provided sufficient information and evidence that ONR can make the judgement that the recommendations have been adequately addressed, on grounds that the licensee has appropriate procedures/equipment already in place, taking into account the relatively low hazard nature of the licensee's operations and facilities.

372 For example, in response to IR13 (and other related recommendations), IC has reviewed the extant safety case and facility PSA to confirm that adequate consideration is given to extreme external events ONR accepts the outcome of IC's review.

373 IC has only identified IR9, IR15 and FR1 as requiring further work. For the related IR9 and IR15, the licensee has committed to review any further relevant information that arises from investigation into the Fukushima accident. For FR1 the licensee indicates that its latest PSR was submitted to ONR in March 2012, and ONR will continue to monitor progress against the forward action plan resulting from this PSR as part of normal business.

## Overall Position

- 374 Given the low hazard nature of the Imperial College site, IC has provided a proportionate response to HMCINI's recommendations. The IC site does not have any severe accident potential (as per the SAPs definition) and is below the REPPIR criteria for an off-site emergency plan. The site is in the early stages of a decommissioning programme.
- 375 Overall, ONR considers that the IC responses to the Final Report recommendations demonstrate an appropriate commitment to implementing lessons from the Fukushima accident. The responses also provide satisfactory reassurance that real progress has been made for all recommendations, to a level proportionate with the hazards posed by the low-power CONSORT reactor. ONR will continue to monitor those few remaining identified workstreams.

## Defence Sites

### Atomic Weapons Establishment (AWE) (Aldermaston & Burghfield)

- 376 AWE manufactures, maintains and disassembles the warheads for the UK's nuclear deterrent. The work covers the entire life-cycle of the nuclear warhead from design, component manufacture and assembly, in-service support, decommissioning and disposal. AWE occupies two licensed sites, Aldermaston and Burghfield, both located more than 50km inland in Berkshire. The AWE sites do not have a nuclear power plant or stored nuclear fuel requiring decay heat removal, nor are they situated over any major geological faults or close to large bodies of water. However, radioactive materials are used by AWE, including plutonium, uranium and tritium. Further detail of the operations and facilities at AWE sites can be found in Ref. 11.
- 377 AWE provided initial responses, covering both of its sites, to the recommendations in the HMCINI's Interim report. AWE acknowledged that improvements had been identified within the PRS process and that ONR was monitoring AWE's progress in their implementation. Overall ONR considered that the AWE response represented an appropriate commitment to address the recommendations and requested a further update to be made in June 2012.
- 378 AWE also participated in the stress test reviews, and their report identified five high-level considerations linked to its emergency arrangements for dealing with severe accidents. ONR's assessment identified nine technical STFs specific to AWE, mainly related to the robustness of safety systems and emergency arrangements, following a range of extreme external events.
- 379 ONR had a number of early engagement meetings with AWE to discuss intended responses to ONR's request for an update on progress towards implementing the recommendations and stress test outcomes. In addition, AWE has been actively participating in a special Fukushima sub-group of the UK nuclear industry's SDF, which has informed its responses. Further engagement with AWE has led to a clarification and modification of some of the initial June 2012 responses. ONR has assessed the response to each Recommendation and STF, and the outcomes are combined and presented in summary form in Annex 4 of this report. Analysis of the tables allows an overall picture of the licensee's responses to be developed and this is summarised below.
- 380 ONR's assessment has taken into account that AWE has had considerably less time to respond to the STFs than the recommendations, due to the relatively recent publication of the NPGNF stress test report.
- 381 AWE agrees with most of the items. For the limited number where this agreement has not yet been reached, namely three STFs for which AWE has either provided an acceptable explanation of why it does not agree with the STF, discussions are underway to resolve the issue.
- 382 For STF41, which concerns the need to consider reassessing the site flood model to determine the potential erosion of safety margins resulting from the loss of drainage networks, AWE has conducted analysis of the flood model showing that the effect is minimal. ONR considers that the evidence provided is adequate, and accepts that the item is closed. For STF43 AWE has argued that extreme flooding events, beyond those already analysed in the design basis, cannot occur, but has not yet provided sufficient evidence to support this view. ONR will continue to engage with AWE to clarify expectations and agree a forward programme of work if necessary.

- 383 ONR agrees with AWE that IR11, IR12, IR14, IR19 and IR20, don't apply to AWE sites.
- 384 For most items that AWE agrees with and accepts are relevant to its sites, it has provided an adequate description of what is needed to address them. For the relatively few remaining items, it is not yet clear to ONR that AWE is addressing them in the most appropriate manner and discussions are therefore ongoing.
- 385 For the accepted items, there has been a range of responses on progress. In the majority of cases, AWE has carried out work or analysis, and is reviewing the outcome to decide what needs to be done. For a limited number of items, AWE either has appropriate equipment or processes already in place, or has identified specific equipment to be installed, or processes to be implemented. For the remaining items, AWE has identified an appropriate forward work programme.
- 386 There has been no tangible progress to date on Recommendation FR4 which calls for Level 2 PSA for all nuclear facilities that could have significant off-site dose consequences. AWE considers that its existing PSA methodology and analysis is adequate. Nevertheless, following discussions with ONR, AWE has decided to commission a targeted, independent review by recognised national experts that should complete early in 2013. This work will also provide essential input to AWE's parallel review of IR25 on severe accident management arrangements. Overall, ONR is content that AWE is developing a suitable programme of work for FR4 and IR25, but considers that these recommendations need to remain open pending the outcome of the independent reviews and closure of any improvements identified.
- 387 An example of a recommendation for which AWE has identified specific equipment to be installed is IR22, which relates to the continuing functionality of emergency C&I and communications in the potential on-site environments that may arise following a severe accident. AWE's solution is to provide several, segregated, diverse communication methods which do not rely on fixed infrastructure to operate. This strategy has been developed via a PRS enhancement project, which has specified additional communications equipment. This is currently being procured.
- 388 Of the items that remain open, in most cases ONR is content that AWE is developing an appropriate programme of work. For the relatively few remaining cases, ONR is still in the process of agreeing a suitable work programme with AWE.
- 389 For the STFs, the picture is sometimes less mature than for the recommendations as AWE has had significantly less time to consider how best to respond to the findings. Nevertheless, we are encouraged that the licensee is approaching the relevant findings in a positive and appropriate manner.

## *Overall Position*

- 390 Overall, ONR considers that AWE's responses to the Final Report recommendations and the findings and considerations in the stress tests report demonstrate an appropriate commitment to implementing lessons from the Fukushima accident. For those items that AWE accepts apply to its sites, the responses also provide a degree of reassurance that progress is being made for some of the recommendations and findings. For the remainder, reasonable programmes of work are being planned, or are being developed into programmes that will meet ONR expectations.
- 391 ONR will continue to monitor AWE's progress in implementing work programmes against each of the applicable recommendations and STFs that ONR considers remain open to ensure that expectations are met. The timescales for satisfactory resolution remain to be determined.

## **Nuclear Fuel Production Plant and Neptune Reactor, Derby**

- 392 Rolls Royce Marine Power Operations Limited (RRMPOL) operates two nuclear licensed sites on the same industrial site, in support of the Ministry of Defence (MoD) Naval Nuclear Propulsion Programme. It operates the Neptune zero power test reactor used in the research and design of naval reactor fuels and, under a separate nuclear site licence, manufactures the nuclear fuel that powers the Royal Navy's submarines.

- 393 RRMPOl provided a response to HMCINI's Interim report recommendations which ONR considered to be an appropriate commitment to progress work activities to address the recommendations. ONR requested a further progress update to be made in June 2012.
- 394 RRMPOl also provided a response to the stress test requirements indicating that it had identified 16 of its own considerations to take forward, split equally between the two licensed sites. ONR undertook its own assessment (Ref. 11) and identified a further 13 STFs which apply to RRMPOl, two of which were generic and administrative. As part of the stress tests process ONR requested a further progress update in June 2012.
- 395 ONR engaged with RRMPOl in an effort to ensure that ONR expectations were clear with respect to the nature and scope of the progress update that was required by June 2012. In addition to direct discussions with ONR, RRMPOl also took part in the SDF where they were able to discuss with other UK licensees the broad requirements of the HMCINI's recommendations and, to a lesser extent, the STFs.
- 396 RRMPOl's progress update has been assessed by ONR in a consistent and proportional manner. The output of the individual assessments has been amalgamated and summarised here in order to describe RRMPOl's overall progress in addressing the lessons learnt from the Fukushima accident.
- 397 The summary conclusions from ONR's assessment have been combined and are presented in Annex 4 of this report.
- 398 The licensee agrees that most of the recommendations and all of the STFs apply to them. There are eight recommendations that RRMPOl do not believe are applicable to them (being IR8, IR11, IR12, IR14, IR17, IR18, IR19 and IR20). Of these, ONR accepts RRMPOl's arguments for five, but requires further information before it is able to accept the non-applicability of the remaining three. For example, IR17 and IR18 refer to security of electrical supplies, with RRMPOl indicating that this does not apply to them. However, it is yet to provide adequate justification for this position. Similarly further information is needed in relation to IR8.
- 399 ONR will require further information from the licensee before it can reach a conclusion with respect to the applicability or otherwise of these recommendations.
- 400 The licensee has provided an adequate description of what it intends to do for most of the recommendations and has identified acceptable work programmes for about half of them.
- 401 In some cases, partially acceptable work programmes have been identified, e.g. in the case of recommendation IR21 (which relates to accumulation of combustible gas). Whilst RRMPOl has provided evidence on the impact on the Neptune reactor, ONR believes that RRMPOl's manufacturing site should also be considered and, therefore, that the licensee needs to provide an enhanced description of what it is seeking to deliver.
- 402 For a limited number of recommendations, the licensee has identified or specified equipment to be installed. Examples of this relate to IR22 and IR23, where the licensee has identified that a new bronze command (emergency control facility) will be built that will be able to withstand beyond design basis events for flooding and seismic activity.
- 403 None of the recommendations that apply to the RRMPOl site are considered closed by ONR at this stage.
- 404 Nonetheless, ONR is satisfied that work is underway or progress has been made on developing forward work programmes for the majority of recommendations although, for some, ONR is still in the process of agreeing a suitable work programme. For example, in the case of IR10 (which relates to flood risk assessments), RRMPOl has initiated a revised flood assessment to support its facility and site safety cases as part of the PRS process. A flood protection report for the NFPP site is currently in preparation, with completion of the first draft due in December 2012. As a consequence, ONR is of the opinion that an acceptable forward work programme is underway.
- 405 Another example relates to FR1, with RRMPOl being in the process of implementing improvements on site, including an updated NFPP site and facilities safety case. Consequently, ONR is of the opinion that an acceptable forward work programme is underway.

- 406 As is the case for the other defence licensees, progress with STFs is sometimes less mature than for recommendations, due to the shorter period of time available to the licensee to consider how best to address them.
- 407 In the majority of cases, ONR notes that RRMPO's plans need further development before ONR can be content that they adequately address in line with its expectations.
- 408 There were also 16 considerations identified in RRMPO's stress test submission. For the majority of these, RRMPO has identified an appropriate forward work programme and work is underway. There are some areas where further development is needed before ONR will be satisfied that its expectations are being addressed.

## *Overall Position*

- 409 Overall, ONR considers that the RRMPO's responses to the Final Report recommendations, and the findings and considerations in the stress test report, demonstrate an appropriate commitment to implementing lessons from the Fukushima accident. The responses also provide some reassurance that progress is being made for a limited number of recommendations and findings. In the remaining areas, reasonable programmes of work to address the majority of other areas are either in progress or in the planning stage. However, there are a number of areas where the licensee's plans/proposals need further development before ONR can be fully confident that a satisfactory position can be achieved. ONR will continue to engage with the licensee to monitor all of these workstreams, paying particular attention to those areas that need further development. The timescales for satisfactory resolution remain to be determined.

## **Devonshire Dock Complex, Barrow in Furness**

- 410 The Devonshire Dock Complex at Barrow in Furness is a shipbuilding facility operated by BAESM as the site licence company. The complex includes the Devonshire Dock Hall, a large indoor facility that was used to construct the Vanguard Class submarines and where, currently, the Astute Class submarines are being constructed. Within the complex, a ship lift facility is utilised to lower vessels into the water. As well as construction, the commissioning and testing of submarines takes place within the complex, but only during this commissioning stage are nuclear safety-critical operations undertaken. New fuel for the reactor is stored on site before it is loaded into the reactor pressure vessel prior to testing.
- 411 BAESM provided a response to HMCINI's report recommendations by the required date. At this time it was recognised that BAESM would be entering into a period of increased workload in order to complete the preparations prior to the power range testing (PRT) of HMS Ambush. Discussions were held with BAESM, who assured ONR that the progress update required by FR12 would be completed, recognising that the effort available to address Fukushima learning would increase significantly once the PRT of HMS Ambush was completed. ONR accepted this position as being reasonable given the limited hazard associated with licensable activities, and that no spent fuel was stored or processed on site.
- 412 BAESM also provided a response to the stress test requirements and following ONR assessment (Ref. 11) 11 STFs applied to BAESM, two of which were generic and administrative. BAESM identified 32 of its own considerations to take forward. ONR requested a further progress update in June 2012.
- 413 ONR engaged with BAESM in an effort to ensure that ONR's expectations were clear with respect to the nature and scope of the progress update required by June 2012. In addition to direct discussions with ONR, BAESM also took part in the SDF Fukushima sub-group, in which it was able to discuss with other UK licensees the broad requirements of the HMCINI's recommendations and, to a lesser extent, the STFs.
- 414 Detailed reviews and assessments by BAESM have now commenced. However, ONR notes that its June 2012 progress statements (Ref. 54), which were received on time, reflected little progress due to PRT of HMS Ambush, a position already accepted by ONR.

- 415 Nevertheless, the June 2012 progress statements were assessed by ONR and the summary conclusions from each assessment report have been combined and are presented in Annex 4 of this report. The output of the individual assessments is amalgamated and summarised here in order to describe BAESM's approach and progress in addressing the lessons learnt from the Fukushima accident.
- 416 As is the case with the other defence licensees, progress with STFs is sometimes less mature than for recommendations. ONR consider this to be reasonable given that the licensee has had a little more than a month to consider how best to deal with the findings. However, BAESM agrees with most of the STFs, the exceptions being STF30, STF35 and STF44. ONR will need further discussion with the Defence Nuclear Safety Regulator (DNSR) before satisfactory closure can be confirmed.
- 417 For the recommendations, BAESM has agreed that most are applicable to its site, but that there are four recommendations that it does not believe are applicable. ONR has assessed the evidence submitted and concluded that BAESM has provided an acceptable justification that these recommendations are not applicable. A simple example of this relates to IR11, on multiple reactors, which clearly is not applicable.
- 418 BAESM has provided an adequate response to about half of the remaining recommendations, but, for the reasons noted above, has made little tangible progress yet on any of them.
- 419 The current progress of BAESM in addressing the recommendations, STFs and considerations is judged to be acceptable due to the intent to incorporate actions into its PRS process (required under Licence Condition 15) which, following PRT of HMS Ambush, has now commenced. BAESM has undertaken to ensure that Fukushima-related work is carried out to an acceptable timescale, and ONR remains in discussion with BAESM on this related and developing programme of work.
- 420 There were also 32 considerations raised by BAESM in its stress test submission. One of these (BAE2), BAESM now no longer considers relevant. However, ONR is seeking further information to understand the rationale for this. BAESM also considers that two of their considerations are closed (BAE11 and BAE18), which relate to accident scenarios that could arise following loss of water from Barrow dock system, which could leave a submarine grounded and without external cooling water supply. Again, only limited information has been provided to ONR to support the closure of these two considerations, and with further information being sought by ONR before concurrence can be reached. ONR will seek assurance from DNSR, where appropriate, on the closure of BAE11 and BAE18.

## *Overall Position*

- 421 Overall, ONR considers that the BAESM responses to the Final Report recommendations and the findings and considerations in the stress tests report demonstrate commitment to implementing lessons from the Fukushima accident. The responses also provide some indication that progress is being made, but as yet for only relatively few recommendations and findings. There are also a number of areas where the licensee's plans/proposals need further development before ONR can be confident that a satisfactory position can be achieved. ONR is, however, encouraged, by the further commitment received in July 2012 stating that work to address the recommendations, findings and considerations associated with Fukushima has now commenced in earnest following the PRT of HMS Ambush. ONR will continue to engage with the licensee to monitor progress, paying particular attention to those areas that need further development. The timescales for satisfactory resolution remain to be determined.

## **Devonport Royal Dockyard, Plymouth**

- 422 The Devonport site consists of two parts, the Naval Base and Devonport Royal Dockyard. The MoD manages the Naval Base, which is under the control of the Naval Base Commander and is currently the base port for a number of Trafalgar Class submarines. Devonport Royal Dockyard is that part of the overall Devonport site owned and operated by the Marine and Technology Division of Babcock International, which includes the site licence company DRDL, which operates the

nuclear-related facilities. DRDL is contracted by MoD to refit and maintain the Royal Navy's nuclear-powered submarines. A number of redundant submarines are stored afloat outside of the licensed site awaiting development of a new facility to remove their spent fuel. Further details of the Devonport site can be found in previously published ONR reports (Refs. 1 and 11).

- 423 DRDL provided a response to HMCINI's report recommendations that ONR considered demonstrates an appropriate commitment to address the recommendations. ONR requested a further progress update in June 2012.
- 424 DRDL also provided a response to the stress test requirements and, following ONR's assessment (Ref. 11), nine STFs applied to DRDL, two of which were generic and administrative. As part of the stress test process, DRDL identified 39 of their own considerations to take forward. ONR requested a further progress update in June 2012.
- 425 ONR engaged with DRDL, including face-to-face discussions, in an effort to ensure that ONR expectations were clear with respect to the nature and scope of the progress update that was to be provided by June 2012. In addition to direct discussions with ONR, DRDL also took part in the SDF Fukushima sub-group, where it was able to discuss with other UK licensees the broad requirements of the HMCINI's recommendations and to a lesser extent the STFs.
- 426 DRDL's progress update has been assessed by ONR in a consistent and proportional manner. The output of the individual assessments has been amalgamated and summarised here in order to describe DRDL's overall progress in addressing the lessons learnt from the Fukushima accident.
- 427 The summary conclusions from each assessment report have been combined and are presented in full in Annex 4 of this report.
- 428 The licensee agrees that all of the recommendations and STFs apply to them. The licensee responses indicate that it has made real progress on some of the recommendations, and in a few of these cases it has provided sufficient information (recommendations IR12, IR14, FR11 and STF91) for ONR to judge that these have been fully addressed. ONR requires further information before it can form a view on the closure of recommendation IR20. Of the remaining recommendations and findings, the majority represent either work in progress or the development of a work plan to deal with the recommendations. Where DRDL has identified work plans, ONR is broadly satisfied with the technical content of these and the proposed timetable for delivery of that work, for example in relation to IR10 (flooding studies) and FR1 (periodic safety review).
- 429 There are some areas where, although ONR is satisfied with the technical content of the licensee's proposals, it has yet to reach full agreement on an appropriate timescale for delivery.
- 430 An example is the response to recommendation IR25, review and possible extension of the analysis of severe accidents. DRDL states that progress requires the extension of the severe accident analysis for the submarine reactor plant, which is a matter for the MoD. For this reason DRDL did not provide any technical or programme information, and did not report any tangible progress at this time. ONR acknowledges that the provision of severe accident information for the submarine reactor plant is a MoD activity, but it is not clear to ONR that progress with IR25 is entirely dependent upon further work by the MoD.
- 431 There are also some instances in which ONR remains to be fully satisfied that the licensee's proposals are adequate. These relate to recommendations IR17, IR18, IR21, IR22, IR23, IR24 and IR25; and STFs STF32, STF75 and STF82. For example, in the case of recommendation IR21, ventilation and venting routes for combustible gases, DRDL has restricted the scope to the Primary Circuit Decontamination (PCD) building. ONR considers that this may be appropriate, but that this would need to be substantiated with further information, if necessary, via the agreed regulators' protocol with the DNSR which provides ONR assurance of NRP safety.
- 432 There are some instances where there is no tangible progress at this stage. An example of this relates to recommendation IR17, potential unavailability of off-site electrical supplies under severe hazard conditions. DRDL is collaborating with other licensees in performing a review of the grid robustness and its reliability under severe hazard conditions. The output of this review will be shared with the nuclear community and used by DRDL in identifying any reasonable

improvements necessary to ensure grid supplies. DRDL will engage with this through the SDF and the associated sub-groups.

433 As is the case for the other defence licensees, progress with STFs is sometimes less mature than for recommendations. ONR consider this to be reasonable given that the licensee has had only a month to consider how best to deal with the findings, or in a number of instances, whether the findings are actually applicable to them.

434 An initial response has been provided by DRDL which states how each consideration will be addressed. The vast majority of the considerations will either be addressed as part of the general external hazards assessment Review or that they will be “considered and sentenced” through the PRS process.

## *Overall Position*

435 Overall, ONR considers that the DRDL responses to the Final Report recommendations and the findings and its own considerations in the stress test report demonstrate an appropriate commitment to implementing lessons from the Fukushima accident. The responses also provide some reassurance that real progress is being made for some recommendations and findings. In the remaining areas, reasonable programmes of work to address most of the other areas are either in progress or in the planning stage. However, at this stage, it is fair to say that there are a number of areas where the licensee’s proposals need further development before ONR can be fully confident that a satisfactory position can be achieved. ONR will continue to engage with the licensee to monitor all of these workstreams, paying particular attention to those areas that need further development. The timescales for satisfactory resolution remain to be determined.

## **Rosyth Royal Dockyard**

436 The Rosyth nuclear licensed site is operated by Rosyth Royal Dockyard Limited (RRDL), a wholly-owned subsidiary of Babcock International Group plc. Rosyth Royal Dockyard was used to support the refitting and maintenance of nuclear-powered submarines until such work was transferred to Devonport. The nuclear licensed site is a relatively small part of the overall dockyard and most of the nuclear-related facilities have now been decommissioned and the hazard removed. The site is a low hazard nuclear site.

437 There are no longer any facilities containing nuclear fuel on the licensed site. However, the site does store relatively small quantities of radioactive waste, for which disposal options are currently being explored. Decay heat removal and prevention of criticality provisions are not relevant to the site. Further details of the Rosyth site can be found in previously published ONR reports (Refs. 1 and 11).

438 RRDL provided a response to HMCINI’s report recommendations which ONR considered to represent an appropriate commitment to address the recommendations. ONR requested a further progress update in June 2012.

439 RRDL also provided a response to the stress test requirements and following ONR assessment (Ref. 11) three STFs applied to RRDL, two of which were generic and administrative. As part of the stress test process, RRDL did not identify any further considerations over and above its existing emergency arrangements. ONR requested a further progress update in June 2012.

440 ONR engaged with RRDL, including face-to-face discussions, in an effort to ensure that ONR expectations were clear with respect to the nature and scope of the progress update that was to be provided by June 2012. In addition to direct discussions with ONR, RRDL also took part in the SDF Fukushima sub-group where they were able to discuss with other UK licensees the broad requirements of the HMCINI’s recommendations and to a lesser extent the STFs.

441 RRDL’s progress update has been assessed by ONR in a consistent and proportional manner. The output of the individual assessments has been amalgamated and summarised here in order to describe RRDL’s overall progress in addressing the lessons learnt from the Fukushima accident.

- 442 The summary conclusions of ONR's assessment have been combined and are presented in full in Annex 4 of this report.
- 443 RRDL considers the majority of recommendations or STFs do not apply to it, and has provided an acceptable justification to ONR for this. For instance, RRDL does not handle spent fuel or have the need for decay heat removal provision - consequently, ONR agrees that IR12, IR14, IR19 and IR20 are not relevant to this site. RRDL has demonstrated the robustness of the radioactive materials store against external hazards, and shown that the low hazard potential of the radioactive material it contains is such that it would have a very small effect off site even if released. ONR considers that RRDL has appropriate equipment and arrangements already in place to safeguard the site against severe events.
- 444 The majority of recommendations and findings are either closed as a result of the information provided to ONR, or have been shown to be non-applicable.
- 445 RRDL accepts that a limited number of recommendations remain open. For instance, in the case of IR9 (for which the full comparison assessment of the responses between the two Fukushima sites is not yet available), the relevant information will be reviewed by RRDL when it becomes available.
- 446 Some recommendations remain open (e.g. IR10, IR13, IR16, FR1, FR2 and FR3), and ONR will engage with RRDL to ensure acceptable measures for closure are defined and delivered. Given the low hazard nature of this site, ONR considers this will be a straightforward exercise, and we are encouraged that RRDL is continuing to approach all of the relevant findings in a positive and appropriate manner.
- 447 Overall, ONR considers that the RRDL responses to the Final Report recommendations and the findings and considerations in the stress test report demonstrate an appropriate commitment to implementing lessons from the Fukushima accident. ONR accepts that the majority of recommendations or STFs do not apply to the site.
- 448 ONR will continue to engage with the licensee to ensure the remaining open recommendations are progressed to acceptable closure. The timescales for satisfactory resolution remain to be determined.

## DISCUSSION AND CONCLUSIONS

### Introduction

- 449 HMCINI's Final Report on the implications for the UK nuclear industry of the Japanese earthquake and tsunami made a number of recommendations relating to various stakeholders, including a requirement that the stakeholders should provide ONR with an update on their progress in implementing the recommendations relevant to them. All stakeholders have responded positively and we have received and assessed those updates.
- 450 In addition to the Final Report, ONR also produced two national reports on the European stress tests focusing on licensees; the first covering all civil NNP; and then second, on the instructions of the Chief Inspector, covering all of the remaining UK nuclear installations. In both of these reports there were areas for potential improvement identified by licensees, known as "considerations", augmented by STFs identified by ONR. As with the Final Report, we requested an update on progress, recognising that in many cases progress on the outcomes of the stress tests would be less mature, given the more limited time the nuclear industry has had to develop their proposals, especially for the non-power generating nuclear licensees. All licensees have provided responses to the outcomes of the UK stress test reports.
- 451 In this section, we summarise the responses we have received from all of the stakeholders and, where appropriate, ONR's views on these responses. In general, we have followed the order of the recommendations in HMCINI's Final Report although, where we discuss the responses from the nuclear industry, we have included the stress test outcomes. ONR recognises that this report deals with progress as of June 2012, nine months or so after publication of the Final Report, and that in many cases we are at an intermediate stage during which work is still underway to confirm, after detailed analysis, where potential new plant and equipment, or new procedures and processes need to be effected. Consequently, in this report, we also discuss the way in which we envisage the work continuing, and ONR's monitoring and open reporting of that work. Finally, we reflect on the significance of international co-operation and ONR's part in these activities.
- 452 We will continue to monitor the situation in Japan and the steps taken to consolidate future safety at the Fukushima Dai-ichi site and the further investigations to the condition of the plant damaged in the accident. There will undoubtedly be more to learn in detail, particularly from the significant effort the Japanese are making to stabilise and decontaminate the site and from the remediation efforts off site. ONR will continue to review and act upon any such information that emerges from scientific analysis or subsequent research.
- 453 Uncertainty over technical details related to the accident has not prevented us drawing conclusions and seeking to ensure that early significant lessons were recognised and measures put in place. This report provides an update on the progress made in the UK. The Final Report recommendations and conclusions remain valid.

### General Recommendations

- 454 The general recommendations of the Final Report were principally aimed at the UK's response to civil nuclear emergencies, looking at international (IR1) and national issues (IR2, IR3, FR6 and FR7). Also included in this section were; support for global safety standards (FR9), the adequacy of planning controls for developments near nuclear licensed sites (FR5) and openness and transparency (IR4 and FR8).

#### *Response to Nuclear Emergencies*

- 455 The UK Government has confirmed that it continues to work with its partners internationally to push forward work on enhancing nuclear safety standards and working towards improving the dissemination of information under the convention on Early Notification of a nuclear accident. In addition, the UK has become a member of IAEA's global Response and Assistance Network (RANET).

- 456 In terms of the national situation, the NEPLG has re-evaluated the UK's radiation monitoring capability and clarified requirements for delivery of data and information in the event of a prolonged incident in the UK. NEPLG has also assessed the central government arrangements for response, in particular the provision of scientific and technical advice in the event of a nuclear emergency in the UK or overseas. ONR is also working towards an even more robust testing regime for emergency exercises, including testing the extendibility arrangements. More detailed work on potential source terms associated with nuclear accidents is well underway and aims to provide rapid assessment of the potential impact on the UK or its citizens, and information to support possible countermeasures.
- 457 There is more to do in this area, particularly in relation to national communications in the event of a significant UK incident, and greater extendibility of off-site arrangements.

## *Global Nuclear Safety*

- 458 In relation to international safety standards (FR9) ONR actively cooperates with other nuclear regulators worldwide, including under the auspices of IAEA, OECD's Nuclear Energy Agency, ENSREG and WENRA. Furthermore, licensees have also re-affirmed their support for international organisations such as IAEA, and their intentions to use their interactions with such bodies to further enhance the safety of their plants. The UK also welcomes international peer review of its regulatory approach and has already agreed dates for the next IRRS missions.

## *Provision of Environmental Dose Data and Predictions in Severe Accidents*

- 459 This has yet to be addressed fully, especially in respect to demonstrating that adequate off-site monitoring capability can be maintained following severe external hazards.

## *Planning Controls*

- 460 ONR has included the specific recommendation on examining the adequacy of planning controls in its response to the Government's consultation exercise for its proposed National Planning Policy Framework for England. As planning is a devolved matter the Government has confirmed that it will pursue the issue with the UK's devolved administrations. There is more to be done here to ensure this matter is adequately addressed.

## *Openness and Transparency*

- 461 The final part of the general recommendations concerned ways in which open and more transparent communications with the public and other stakeholders could be achieved (IR4 and FR8). Both ONR and the Government recognise the importance of an open and transparent regulator and industry. In particular, the creation of ONR as a statutory body outside of the civil service, the establishment of ONR's Board, and endowment of ONR with statutory powers, functions and duties for nuclear regulation in its own right (not currently the case), will lead to greater transparency. Also, there will be greater transparency of independent technically-based nuclear regulation, particularly by establishing the post of the Chief Nuclear Regulator in statute for the first time, with the expectation that the ONR regulatory function and regulatory decisions will be delegated to the post holder, with he/she being the authoritative head of the regulatory body with direct access to ministers. This will ensure and provide evidence of the independence of nuclear regulation from any government or other body associated with the promotion or development of nuclear energy, or related activities. For ONR, openness and transparency mean adopting a presumption of disclosure, and a specific workstream is in place to ensure that as much of our work as possible is made publicly available, such as the publication of project assessment reports PARs which explain the rationale for regulatory decisions on nuclear safety issues.

## Recommendations on ONR

- 462 The recommendations placed on ONR fall into three groups: review of safety assessment principles (SAPs) (IR5), consideration of emergency response arrangements (IR6 and IR7) and oversight of nuclear safety research (FR10).

### *Safety Assessment Principles*

- 463 To date, ONR's review has confirmed that there are no significant gaps in the SAPs, though a small number of technical areas have been identified where amplification and clarification of the principles would be beneficial, mainly related to coverage of severe accidents. The majority of the changes to be made to the SAPs are to bring them up to date based on the six years of operating experience we have gained working with the current version and to reflect changes to the industry and ONR over this period.
- 464 IAEA and WENRA have also embarked on processes to update their guidance in light of Fukushima. IAEA's updating process is expected to be on a longer timescale than ONR's, although WENRA's process is expected to run to broadly similar timescales. ONR is playing an active part in the development of updated IAEA and WENRA guidance and we will ensure that new standards nearing finalisation while the SAPs are being updated will be taken into account within our revision process. ONR remains committed to ensuring that our guidance to inspectors is aligned and consistent with wider good practice and international safety standards. A programme to update the detailed Technical Assessment Guides (TAGs) will be initiated following our SAPs work.

### *Emergency Response Arrangements*

- 465 The programme of off-site emergency exercises has been reviewed for opportunities to test aspects of the UK's "emergency preparedness and response" capability gaps that have been identified through NEPLG. These include: extendibility of LAs' off-site emergency plans; assurance of prolonged sustainability of a capable response; communications and provision/co-ordination of Reassurance Monitoring Units (RMUs) for personnel monitoring. A further successful exercise testing extendibility has been already been held, and a communications exercise (concerning media involvement and provision of information and warnings to the public) is planned. The future nuclear emergency exercise programme for fixed nuclear installations within the UK will test the prolonged delivery and sustainability of the on site, the off site and central government responses. The exercises are also intended to highlight areas for further improvements which will inform reviews of on site and off site emergency plans and feed into future work programmes.
- 466 Even though ONR's established arrangements were shown to have been effective in responding to the Fukushima accident, and have proven effective in responding to minor events in the UK and design basis emergency exercises, the Fukushima accident identified scope for enhancement, particularly in ONR's capability to provide a sustained response to a prolonged emergency. A review has since resulted in a proposal for improved arrangements for ONR's response to initial notifications of all nuclear emergencies including severe accidents, and for ensuring the prompt deployment of trained staff to remote locations and to ONR's central emergency response centre - RCIS. Examples of improvements include; developing arrangements for early plotting of possible radioactive plumes and potential off-site doses (ongoing work) and improved site and plant information held in the RCIS for all the licensed sites, and real time up-to-date data during an event.
- 467 ONR remains firmly committed to improving the effectiveness and robustness of its current arrangements for emergency preparedness and response, as part of its continuous improvement process, so that it is better placed to respond to a prolonged nuclear event in the UK or overseas.

## Research

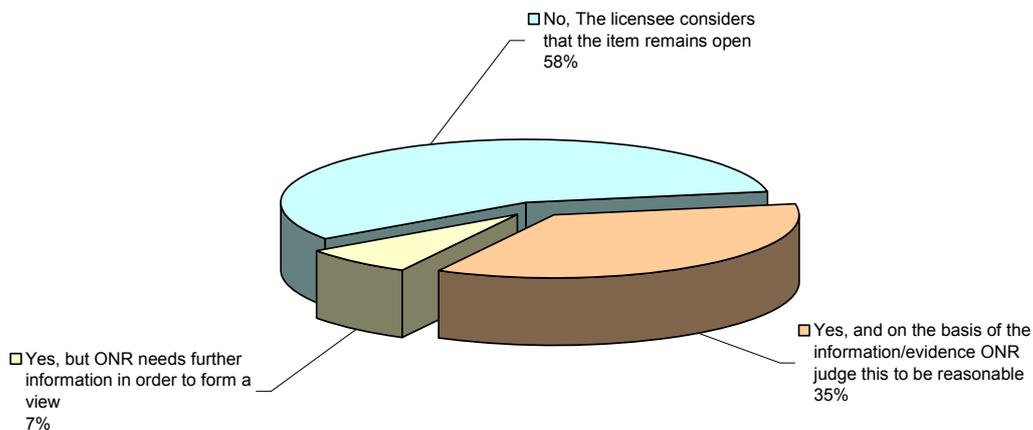
- 468 Since the nuclear accident at Fukushima, ONR has undertaken a review of its strategic oversight of nuclear safety and security-related research, and its arrangements for commissioning and managing research and specialist technical support. The review is being used to inform the development of an ONR Research & Technical Support Strategy, which will be published shortly. This strategy, which is supported by a detailed implementation plan, sets out the important role research and technical support plays in underpinning our regulatory decisions, the challenges we face going forward, and how we plan to overcome these. ONR is establishing a Chief Inspector's Independent Advisory Group, whose role will include advising the Chief Nuclear Inspector on the adequacy and balance of ONR's research strategy and programme.
- 469 The main vehicle used by ONR to take forward its research priorities is the Nuclear Research Index (NRI), which represents ONR's view of what research is needed to support existing nuclear power facilities. This is used by the nuclear site licensees to inform the development of their own research strategies. ONR will commission any research areas not taken forward by the nuclear site licensees and then recover the costs from the licensees via levy. ONR will also publish a Chemical Plant Nuclear Research Index alongside a revised NRI. This will provide a framework for taking forward research relating to Sellafield and other nuclear facilities, in addition to operating reactors. The aim then is to publish a single ONR Research Index in 2013 covering all ONR's research requirements.

## Progress by the Nuclear Industry – Recommendations and Stress Test Outcomes

- 470 There were a significant number of recommendations and stress test findings placed on the nuclear industry as well the industry's own considerations developed during the stress tests. Although this report contains some details of ONR's extensive assessment of these, for all licensees, they are too numerous to feature individually in this discussion. Instead, we have tried to summarise the overall position and present it in a simple form. In addition, because of its importance, we have included discussion on the PSR recommendation (FR1).
- 471 ONR's views on the licensees' responses have then been grouped into broad categories defined to represent situations or outcomes. As an example, for the question: "is the recommendation, stress test finding or consideration considered closed by the licensee?", ONR's judgements on the licensee's response, have been grouped as follows:
- The licensee considers it closed and on the basis of the evidence ONR judges this to be reasonable;
  - The licensee considers it closed but ONR needs further information to form a view;
  - The licensee considers it to be still open.
- 472 These categories give a broad, quantitative idea of the progress that has been made.
- 473 In terms of the technical work done, or the proposals made, ONR's judgements have been grouped as follows:
- The licensee's work/proposals/plans are in accord with ONR expectations;
  - The licensee's work/proposals/plans are broadly in line with ONR expectations but we are discussing potential improvements to the work/proposals/plans;
  - The licensee's work/proposals/plans need further development or provision of evidence/information before ONR can be content that they adequately address expectations.

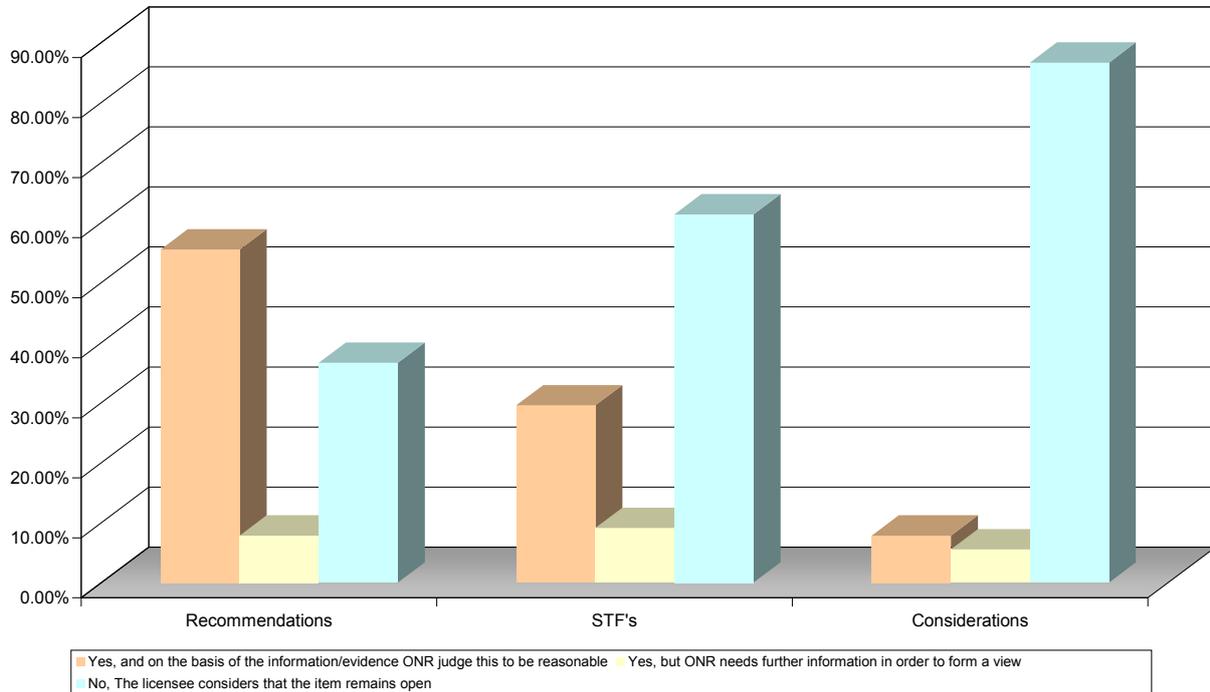
- 474 These categories give a qualitative insight not only for those recommendations or findings that are considered closed, but on the plans and proposals that are still being worked on.
- 475 This response grouping process therefore provides a high-level picture of the overall position on the nuclear site licensees' progress in implementing the lessons from Fukushima. The individual outcomes for each licensee are summarised elsewhere in this report (Section 6) and the tables in Annex 4.
- 476 It is important to note that ONR's judgements have been made at a specific point in time and take account of the information available and work plans and intentions as of 30 June 2012.
- 477 The first chart illustrates the proportion of recommendations, findings and considerations that are considered closed by the licensee and ONR's view of those claims:

**Overall Totals - "Is the recommendation, finding or consideration considered closed by the Licensee?"**



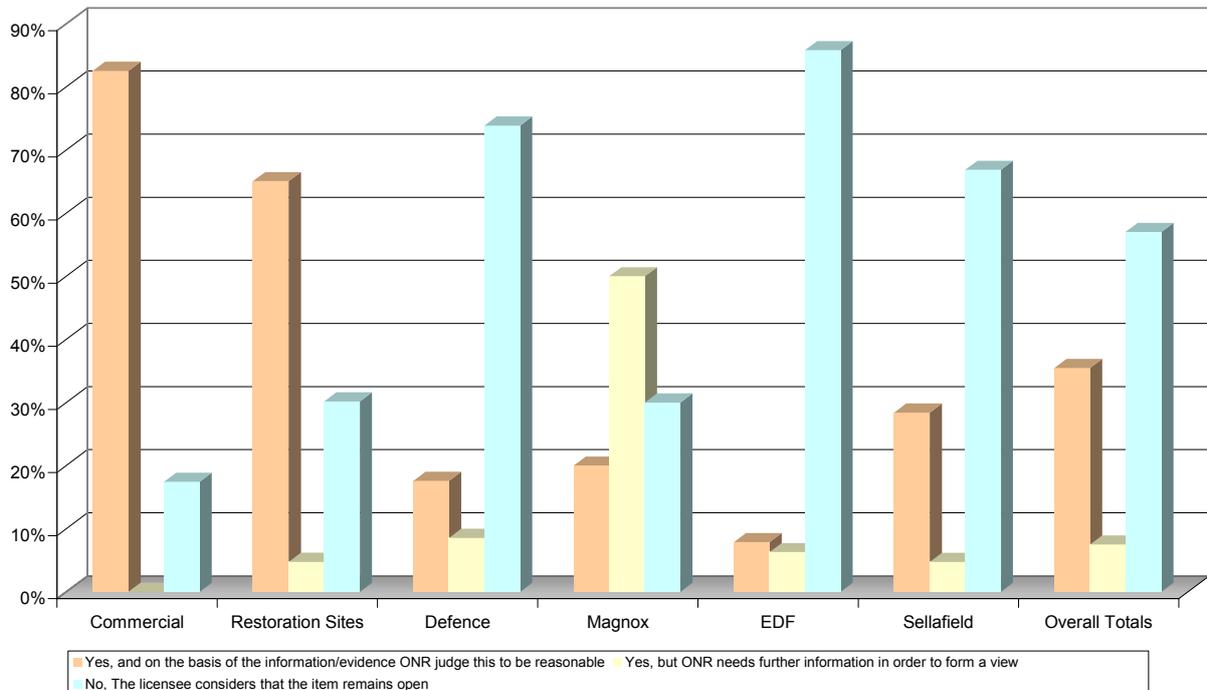
- 478 In 35% of cases the licensee has provided sufficient information to allow ONR to judge that sufficient has been done for that recommendation or finding by the particular licensee to be closed out. In the majority of cases, 58%, the licensee acknowledges that more needs to be done or that further work needs to be undertaken before the issue can be considered to have been closed. There is only a small proportion, 7%, where the licensee believes that the issue can be closed, but ONR has not yet seen sufficient information or evidence. The following diagrams show the overall position in respect of recommendations, stress test findings and considerations.

**Overall Totals - "Is the recommendation, finding or consideration considered closed by the Licensee?"**



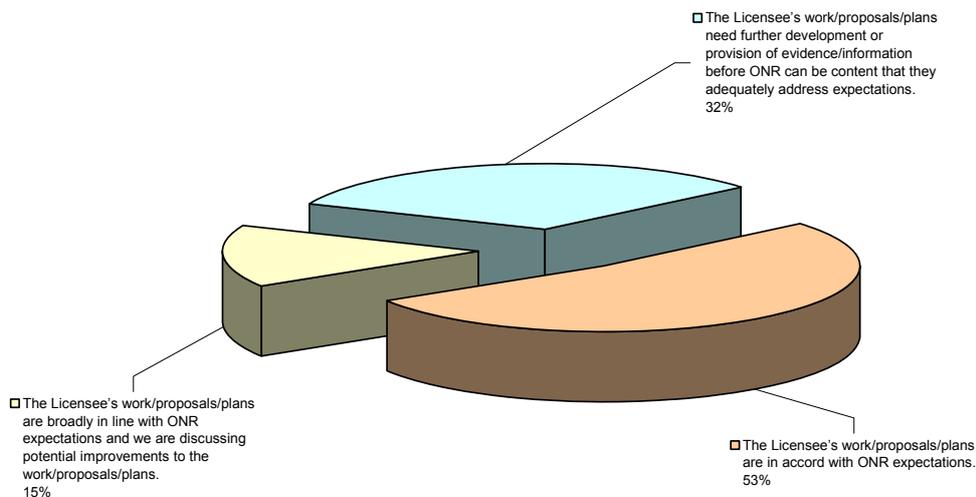
The following diagram illustrates the position with respect to UK nuclear installations in different categories.

**Overall Totals - "Is the recommendation, finding or consideration considered closed by the Licensee?"**



- 479 In looking at the diagram, it is important to note that items remaining open are not typically indicative of a shortfall or lack of progress, rather, they are an indication of complex or lengthy activities that remain, and would be expected to remain, ongoing. It is also worth noting that, in some categories (for example in the case of “commercial sites”), the nature of activities undertaken and the radioactive materials on the site mean that about a quarter of the recommendations placed on the industry as a whole are not applicable, with the licensees having justified to ONR that such recommendations can be closed without having to implement changes. For the same reason, many of these sites were subject to relatively few stress test findings.
- 480 The same is not true for more complex plant, such as operating nuclear power reactors or Sellafield, where all of the recommendations were considered applicable and there were many more stress test findings and considerations to be addressed. In addition, some of the enhancements arising from these are complex and/or require longer term implementation.
- 481 Hence, whilst the diagram represents a factual summary of progress in closing out Fukushima learning, it should not be interpreted as a meaningful indicator of commitment or effort applied.
- 482 The next chart shows the status of responses or proposals judged on the basis of a comparison with ONR’s technical expectations. There is some overlap with the first chart; however, this second chart also provides an insight, not only for those recommendations or findings that are considered closed, but on the content of plans and proposals that are still being worked on:

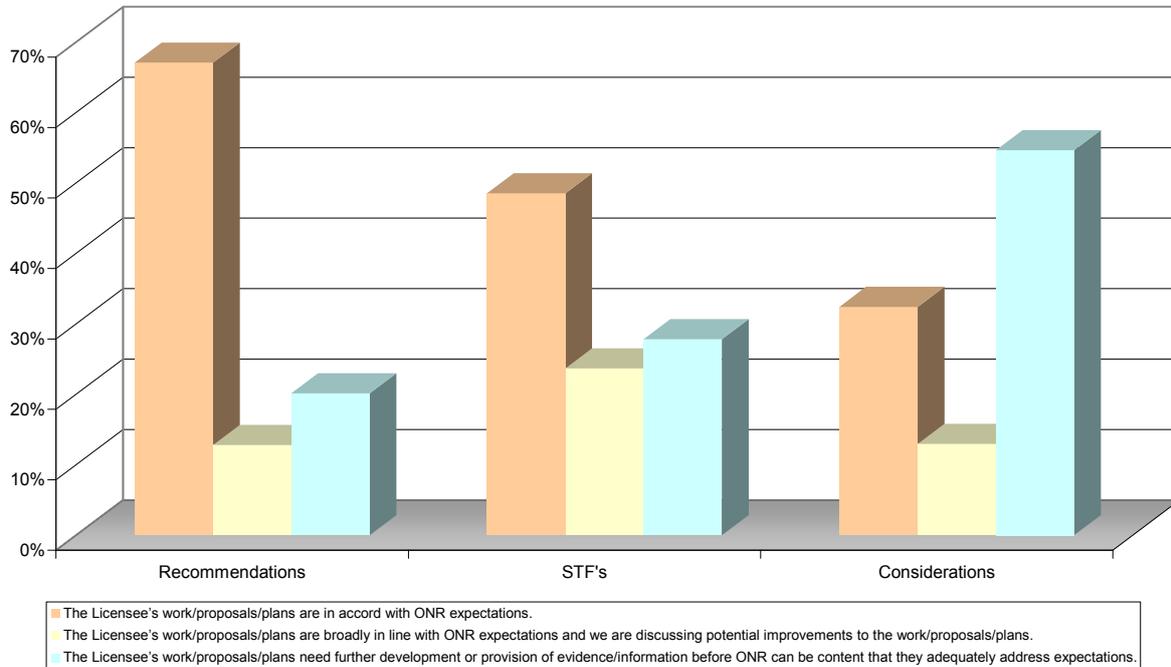
**Overall Totals - "Is there a reasonable match with ONR technical expectations?"**



- 483 The figure in this chart show that in about 70% of the cases the licensee’s proposals are either in line with or broadly in line with ONR expectations. For the remaining 30% or so, further discussions are needed between ONR and licensees. This should not come as a surprise as ONR is a goal-setting and largely non-prescriptive regulator. This means that we expect the licensees to make proposals on how they intend to meet the required safety outcomes, and to justify why their proposal represents the safest reasonably practicable option for improvement. ONR will then challenge the basis for these proposals, and the associated timescales, to see if any more can be done that is reasonably practicable to reduce risks further. In many cases this process requires significant interaction as licensees strive to convince ONR that their proposals are adequate. If we are not satisfied, ONR will require licensees to revisit the issue and undertake further work as appropriate, and to provide further evidence to justify their proposals. Ultimately, if we remain

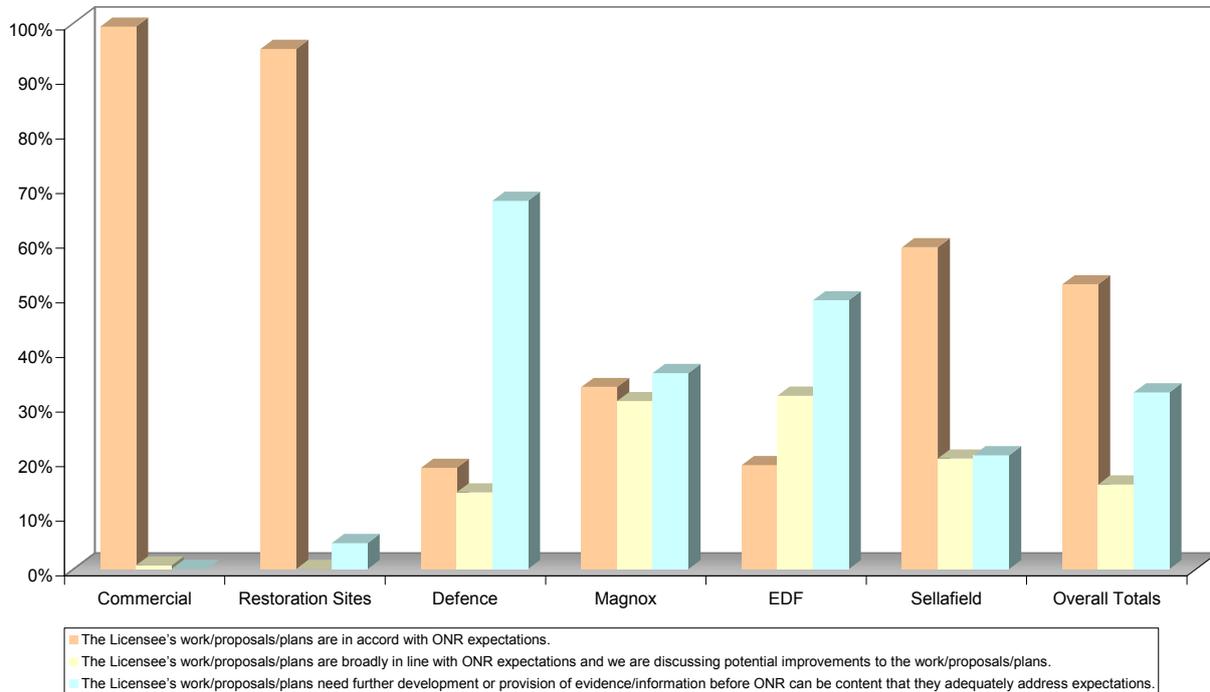
unsatisfied, ONR will take appropriate enforcement action. The chart above reflects that this process is in progress for 30%, of the issues. We are confident that this approach is suitably robust and that it will deliver the appropriate safety outcomes. Ultimately, if we remain unsatisfied, ONR will take appropriate enforcement action. The following diagrams show the overall position in respect of recommendations, stress test findings and considerations.

**Overall Totals - Recommendations, STF's, Considerations - "Is there a reasonable match with ONR technical expectations?"**



The position with respect to UK nuclear installations in different categories is shown in the next diagram.

**Overall Totals - "Is there a reasonable match with ONR technical expectations?"**



484 As noted earlier, the percentage figures for those issues where further discussion is needed reflect the way in which ONR engages with licensees rather than any fundamental dissatisfaction with the situation. For example, the EDF figures show a relatively high percentage in the “further development or provision of evidence” category; however, ONR’s assessment of the relevant submissions concludes that: “EDF NGL’s responses to the Final Report recommendations and the findings and considerations in the stress test report demonstrate an appropriate commitment to implementing lessons from the Fukushima accident.” The assessment conclusions also note that, although further work is needed, “ONR recognises that this reflects the phased approach and prioritisation adopted by EDF NGL and supported by ONR, and the complexity of some of the activities, and does not detract from the positive commitment and progress made by EDF NGL in learning lessons from the accident at Fukushima.”

### Periodic Safety Review

485 The Chief Inspector’s report (Ref. 1) noted that we had not identified any significant defects in the UK’s approach to nuclear regulation and highlighted that one of the key parts of that approach is that of PSRs. We also reflected on the situation in Japan where the PSRs had been carried out by licensees on a largely voluntary basis with little or no review by the regulator. Consequently, to reinforce the importance of PSRs the Chief Inspector made a further recommendation (FR1) for licensees to prioritise completing PSRs to the required standards and timescale and to implement any reasonably practicable improvements identified in the PSR.

486 The licensees’ responses adequately depict their current positions on PSR, and ONR is satisfied with the responses provided. The licensees are at different positions with their arrangements and programmes for PSR. This ranges from having revised arrangements in place for the next phase of PSR to further development of the basis, scope and plans for undertaking PSR. Therefore, there are different positions on whether or not the recommendation is closed. Regardless of the licensee’s position, ONR will continue to have interactions on current and future PSR programmes combined with LC15 compliance inspections, as part of the normal regulatory process.

- 487 Looking forward, ONR is seeking continual improvement across the UK nuclear industry in the manner in which PSRs are undertaken and utilised. ONR expects a PSR to be of value to a licensee as an integral part of the company's approach to risk management. ONR will be encouraging more emphasis on continual or interim reviews of safety. More regular reviews can identify safety issues and improvements earlier and the results can contribute to the ten-yearly PSR. Also, reviews need to encompass more focus on leadership and culture which can have a profound effect on safety, as evidenced in the lessons from major events internationally in the nuclear and other sectors.
- 488 ONR guidance is being updated to better reflect these expectations. ONR will seek to influence by engaging with the UK nuclear industry at a strategic level and through interactions with individual licensees on PSR programmes and LC15 interventions to achieve continual improvement in the manner in which PSRs are undertaken and utilised.

## Physical and other improvements across the nuclear industry

- 489 Although it is clear that much work is still to be done to implement the lessons from Fukushima, there are a number of examples of physical improvements to sites that are in place or have been committed to.
- 490 For instance, EDF NGL has committed to providing a range of back-up emergency equipment. This equipment will be stored in regional AGR depots that are being established, and the new Sizewell B Emergency Response Centre (ERC) that is to be built by the end of 2013. These depots will contain:
- off-road vehicles;
  - debris moving vehicles (route clearance for example);
  - personal protective equipment;
  - electricity generators;
  - water pumps – for reactor and fuel cooling;
  - reverse osmosis equipment to supply clean water;
  - damage repair equipment;
  - dewatering pumps;
  - Waste water treatment facilities
  - temporary structures for response coordination and staff welfare;
  - mobile communications equipment, including deployable instrumentation facilities;
  - inert gas supplies;
  - all necessary ancillary equipment required to use these facilities, including fuel stocks.
- 491 Furthermore, for Sizewell B, passive autocatalytic recombiners, which safely remove hydrogen produced in the event of a severe accident, are planned to be installed in 2013. Work to deliver a filtered containment ventilation system is underway.
- 492 For Magnox Ltd, examples of safety improvements already implemented include:
- increased CO<sup>2</sup> and fuel stocks on sites, well above the existing operating rule requirements;
  - a new diverse pondwater emergency filling line at Oldbury (one also planned at Sizewell A);
  - provision of back-up feedwater/fire pumps on site to provide further defence-in-depth;
  - development and implementation of improved training in respect of the SBERGs and SAGs;
  - additional stocks of essential equipment (e.g. basic tools, flash lights etc.) on sites stored in diverse locations;

- purchase of water tanker for transport of water from a nearby freshwater source to site (Wylfa).

493 At the Sellafield site there have also been improvements implemented on site, with more yet to be delivered. These improvements include:

- Improvements to the Emergency Cooling Water Systems;
- Improvements to the backup electrical power systems;
- Improvements to Access Control Point communication systems.

#### Legacy Ponds and Silos Facilities

- Enhance emergency equipment storage facilities and equipment;
- New fully equipped emergency trailer for Access Control Point;
- New diesel power generator and lighting tower;
- Additional bunding and containment equipment.

#### Infrastructure Facilities

- Improvements to the existing emergency electrical supply systems;
- Facilitated deployment of mobile Diesel alternator sets;
- Improvements to on and off site water supply systems.

494 The implementation of identified resilience improvements at Sellafield awaits the completion of ongoing analysis and option selection. This aspect of the work will extend into 2013.

495 A number of the recommendations from HMCINI's reports and the stress tests called for reviews or additional analyses, and these are in progress; but things will not stop as a result of these reviews, the expectation being that they will identify further measures to enhance safety at nuclear sites.

### Way Forward

496 This report contains a summary of ONR's assessment of the progress made by the UK nuclear industry in responding to the lessons learnt from the Fukushima event of 11 March 2011. However, and as anticipated, there are a range of longer term improvements or ongoing activities that will need to be delivered over timeframes extending beyond those for the production of this report.

497 Whilst ONR acknowledges that an appropriate level of commitment has been shown by all relevant stakeholders, and that there is clear evidence of progress being made, we note that the main focus of licensees in the first year following the Fukushima event has been on:

- implementing any necessary short-term improvements arising from the learning from Fukushima;
- undertaking reviews to determine how best to address medium and longer term actions;
- developing plans to deliver these longer term actions.

- 498 We recognise that different operators have made differing rates of progress depending on their specific circumstances due to a range of factors, which include:
- the relative size and complexity of the site(s) in question;
  - the relative safety significance of each Fukushima learning point to the particular site in question (taking into account its hazard potential);
  - in the case of the nuclear new build prospective licensees, that they are simply unable to implement some of the Fukushima learning at such an early stage in their programmes (which, themselves, are yet to be fully defined);
  - that, in some cases, further dialogue between ONR and the stakeholder is needed in order to reach a full agreement on the adequacy of the approach being proposed;
  - that some licensees (i.e. those that operate MoD and NDA sites) are required to secure funding for work, which does not carry an immediate safety imperative through their respective and separate funding authorities, prior to committing to undertake the work.
- 499 We acknowledge that the licensees that operate, defuel, or decommission nuclear reactors (i.e. EDF NGL and Magnox Ltd) have declared their commitment to closing out the most significant improvements arising from learning from Fukushima by or before the end of 2014. However, it remains clear that there are still improvement measures yet to be fully scoped and scheduled.
- 500 It is clearly important that all stakeholders sustain their efforts to ensure that all recommendations, considerations and findings are closed out, and that the intended safety benefits are realised.
- 501 Consequently, ONR will continue to monitor and assess the adequacy of progress made by the industry over the longer term, until it is satisfied that the significant lessons learnt from the Fukushima event have been adequately discharged. To ensure that this happens, ONR will:
- press for the industry to complete the more significant<sup>4</sup> improvements arising from learning from the Fukushima event by the end of 2014 (taking into account, particularly in relation to Sellafield, other priority safety activities and the availability of funding);
  - deliver proportionate and effective oversight of this by monitoring ongoing “Fukushima learning” activities through its operational regulatory programmes (e.g. which relate to civil nuclear reactors, Sellafield, decommissioning and waste management, and relevant UK defence sites).
- 502 This combined approach offers a number of distinct benefits in that it:
- ensures that, in the overall interests of nuclear safety, such improvements are delivered taking into account the particular circumstances and impact on the site;
  - accords with ONRs well-established process for regulating improvements following a periodic review of safety (undertaken every ten years for major sites)
  - ensures that necessary improvements are delivered and regulated under the wide spectrum of available site licence conditions;
  - is both effective and efficient in its use of regulatory resources;
  - secures sustained consistent regulation on an integrated basis for improvements on each site;

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<sup>4</sup> In challenging licensees over potential improvements, ONR seeks justification not only regarding the nature of a specific improvement but on the timing of its implementation. Licensees will need to meet the 2014 target date or justify that meeting such a date is either not reasonably practicable (i.e. that it is grossly disproportionate) or is simply not physically possible to implement on such a timescale. Consideration of what is reasonably practicable must be done in context and should take account of all relevant factors, including prioritisation of safety related work as a whole.

- ensures that clarity of regulatory roles and responsibilities within ONR is maintained, especially in the minds of dutyholders;
- reflects good practice in terms of setting projects up for particular tasks and then disbanding them once the project has been delivered.

503 Whilst, as noted above, dutyholders have shown an appropriate level of commitment to deliver these improvements, ONR will, if it proves necessary, invoke its regulatory powers to ensure that reasonably practicable improvements are implemented.

<b>Conclusions:</b>	<p><b>ONR concludes that:</b></p> <ol style="list-style-type: none"> <li><b>(1) all relevant stakeholders have shown an appropriate level of commitment to address the Chief Inspector’s recommendations and the relevant findings of the Stress Test reports,</b></li> <li><b>(2) there is clear evidence that adequate progress is being made, and improvements are either in place or planned,</b></li> <li><b>(3) however, more needs to be done and it is important that all involved sustain their efforts to ensure that all recommendations, considerations and findings are closed out and that the intended safety benefits are realised.</b></li> </ol> <p><b>To ensure that this happens ONR will:</b></p> <ol style="list-style-type: none"> <li><b>(4) press for the industry to complete the more significant improvements arising from learning from the Fukushima event by the end of 2014 (taking into account, particularly in relation to Sellafield, other priority safety activities and the availability of funding),</b></li> <li><b>(5) deliver proportionate and effective oversight of this by monitoring ongoing “Fukushima learning” activities through its operational regulatory programmes (e.g. which relate to civil nuclear reactors, Sellafield, decommissioning and waste management, and relevant UK defence sites).</b></li> </ol>
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## Future Reporting

504 Whilst ONR does not intend to produce further discrete Fukushima Implementations reports, it is committed to continuing to monitor progress, assess proposals, inspect and report on implementation, and to taking any such enforcement actions as may be necessary. Whilst 'day to day' oversight will be exercised through ONR’s operational regulatory programmes, this will, in turn, be subject to oversight by ONR’s Regulatory Standards/Special Projects Directorate (which is independent of the Operational Programmes). With regards to reporting, Operational Programmes will report regularly on Fukushima related matters and it is anticipated that ONR site inspectors will include appropriate updates on this topic in their routine quarterly reports to the respective Site Liaison Committees. Additionally, ONR will include reports on Fukushima progress (along with other improvements) in its routine reports to DECC ministers and in periodic reports to a Chief Inspectors Technical Advisory Panel (which will have a membership made up of technical experts nominated by a wide range of stakeholders, including DECC).

<b>Conclusions:</b>	<b>(6) ONR will continue to report the progress of government, ONR and licensees in addressing the recommendations, findings and considerations in appropriate routine reports via its website.</b>
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## International

505 The importance of international co-operation and shared learning has been clearly demonstrated in the aftermath of the Fukushima accident. ONR continues to take a full and active role internationally. We are fully engaged with the IAEA, and the Fukushima-related activities under the Convention on Nuclear Safety. ONR has also engaged with ENSREG in the development, conduct and peer review of the European stress tests and is currently assisting ENSREG in the development for a specification national action plans that all European countries with NPPs will be producing at the end of 2012. We anticipate that these plans will, amongst other things, provide updates on:

1. the national regulators' stress test report;
2. ENSREG main and country peer review report;
3. any additional recommendations from the extraordinary CNS meeting;
4. additional activities derived from national reviews.

506 This current "implementation" report covers bullets 1, 2 and 4 above and will provide much of the information necessary to inform the UK National Action Plan for ENSREG, and indeed into the ONR's report for the sixth IAEA CNS meeting to be held in 2013. As part of the outcome of the European Peer review of the stress tests, ENSREG identified a number of technical work areas (see Table 2 of Annex 5) which are being co-ordinated through WENRA's Reactor Harmonisation Working Group and ONR is actively involved in all of these work areas.

507 ONR is committed to international collaboration and cooperation and will not only meet the commitments to report on progress (for example, the ENSREG action plan) but will support and encourage this process to be carried out openly with the reports being made publicly available.

<b>Conclusions:</b>	<b>(7) International co-operation and shared learning will continue to be a significant ONR activity to ensure that the UK nuclear industry maximises the learning from others and share their own experiences to the benefit of others.</b>
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## GLOSSARY AND ABBREVIATIONS

AC	Alternating Current
AGR	Advanced Gas-Cooled Reactor
AIC	Alternative Indication Centre
ASN	Autorité de Sûreté Nucléaire (France)
AWE	Atomic Weapons Establishment
BAESM	BAE Systems Marine Limited
Bq	Becquerel (an SI unit of quantity of radioactive material)
C&I	Control and Instrumentation
CESC	Central Emergency Support Centre
CNS	Convention on Nuclear Safety
COBR	Cabinet Office Briefing Room
COMAH	Control of Major Hazards Regulations 1999
CP	Contracting Party (to Convention on Nuclear Safety)
(i)DAC	(interim) Design Acceptance Confirmation
DECC	Department of Energy and Climate Change
DEPZ	Detailed Emergency Planning Zone
DNSR	Defence Nuclear Safety Regulator
DRDL	Devonport Royal Dockyard Limited
DSRL	Dounreay Site Restoration Limited
EC	European Commission
ECC	Emergency Control Centre
EDF NGL	Electricité de France Nuclear Generation Limited
EDF NNB Genco	Electricité de France Nuclear New Build Generation Company
EDG	Emergency Diesel Generator
EIC	Emergency Indication Centre

EM	Extraordinary Meeting (of the Convention on Nuclear Safety)
ENSREG	European Nuclear Safety Regulators Group
ERC	Emergency Response Centre
EU	European Union
FCO	Foreign and Commonwealth Office
FCV	Filtered Containment Venting
FR	Final Recommendation
GDA	Generic Design Assessment
GEHC	GE Healthcare
GO Science	Government Office for Science
HALES	Highly Active Liquor Evaporation and Storage
HMCINI	Her Majesty's Chief Inspector of Nuclear Installations
HPA	Health Protection Agency
HPC PCSR	Hinkley Point C Pre-Construction Safety Report
IAEA	International Atomic Energy Agency
IC	Imperial College of Science, Technology and Medicine
ILW	Intermediate Level Waste
INES	International Nuclear and Radiological Event Scale
INPO	Institute of Nuclear Power Operations
IR	Interim Recommendation
IRRS	Integrated Regulatory Review Service
IRSN	Institut de Radioprotection et de Sûreté Nucléaire (France)
JAEA	Japan Atomic Energy Agency
LA	Local Authority
LLW	Low Level Waste
LLWR	Low Level Waste Repository Limited
LWR	Light Water Reactor
MDA	Mobile Diesel Alternator

METI	Ministry of Economy, Trade and Industry (Japan)
MO/ Met Office	Meteorological Office
MoD	Ministry of Defence
MRF	Metal Recycling Facility
NDA	Nuclear Decommissioning Authority
NEA	Nuclear Energy Agency
NEBR	Nuclear Emergency Briefing Room
NERIMS	Nuclear Emergency Response Information Management System
NEPLG	Nuclear Emergency Planning Liaison Group
NFPP	Nuclear Fuel Production Plant
NGO	Non-Governmental Organisation
NIA	Nuclear Industry Association
NIEA	Northern Ireland Environment Agency
NISA	Nuclear and Industrial Safety Agency (Japan)
NITF	Nuclear Industry Training Framework
NPGNF	Non Power Generating Nuclear Facility
NPP	Nuclear Power Plant
NPPF	National Planning Policy Framework
NRA	Nuclear Regulatory Authority (Japan)
NRE	National Resilience Extranet
NRI	Nuclear Research Index
NSAN	National Skills Academy for Nuclear
NuGen	NuGeneration Limited
OECD	Organisation for Economic Co-operation and Development
OJEU	Official Journal of the European Union
ONR	Office for Nuclear Regulation
PAR	(ONR) Project Assessment Report
PCD	Primary Circuit Decontamination

PCV	Primary Containment Vessel
PRS	Periodic Review of Safety
PRT	Power Range Testing
PSA	Probabilistic Safety Assessment
PSR	Periodic Safety Review
PWR	Pressurised Water Cooled Reactor
RANET	Response and Assistance Network
RCIS	(ONR) Redgrave Court Incident Suite
REPIIR	Radiation (Emergency Preparedness and Public Information) Regulations 1993
RESEP	Resilience Evaluation Process
RIMNET	Radioactive Incident Monitoring Network
R&D	Research and Development
RMU	Re-assurance Monitoring Unit
RPV	Reactor Pressure Vessel
RRDL	Rosyth Royal Dockyard Limited
RSRL	Research Sites Restoration Limited
RRMPOL	Rolls Royce Martine Power Operations Limited
SAG	Severe Accident Guides
SAGE	Scientific Advisory Group for Emergencies
SAMP	Severe Accident Management Guidelines
SAP	(ONR) Safety Assessment Principles
SBERG	System Based Emergency Response Guide
SBO	Station Black Out
SDF	Safety Directors Forum
SFL	Springfields Fuels Limited
SEPA	Scottish Environment Protection Agency
SGHWR	Steam Generating Heavy Water Reactor

SMP	Sellafield Mox Plant
SRP	Site Resilience Programme
STF	Stress Test Finding
Sv	Sievert (a unit of radiation dose)
TAG	(ONR) Technical Assessment Guide
TAP	Technical Advisory Panel
TEPCO	Tokyo Electric Power Company
THORP	Thermal Oxide Reprocessing Plant
TIIMS	The Incident Information Management System
TSol	Treasury Solicitors
UKAEA	United Kingdom Atomic Energy Authority
UNSCEAR	United Nations Committee on the Effects of Atomic Radiation
UUK	Urenco UK Ltd
WAGR	Windscale Advanced Gas-Cooled Reactor
WANO	World Association of Nuclear Operators
WHO	World Health Organisation

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## Annex 1: Recommendations from the chief inspectors final report (ref)

General	
International Arrangements for Response	<p><b>Recommendation IR-1:</b> The Government should approach IAEA, in co-operation with others, to ensure that improved arrangements are in place for the dissemination of timely authoritative information relevant to a nuclear event anywhere in the world.</p> <p><i>This information should include:</i></p> <p>a) <i>basic data about the reactor design including reactor type, containment, thermal power, protection systems, operating history and condition of any nuclear materials such as spent fuel stored on the site should be held permanently in a central library maintained on behalf of the international community; and</i></p> <p>b) <i>data on accident progression and the prognosis for future accident development. The operator would provide such information as is available to its national authorities. International mechanisms for communicating this information between national governments should be strengthened. To ensure that priority is given to relevant information, international agreement should be sought on the type of information that needs to be provided.</i></p>
Global Nuclear Safety	<p><b>Recommendation FR-9:</b> The UK Government, nuclear industry and ONR should support international efforts to improve the process of review and implementation of IAEA and other relevant nuclear safety standards and initiatives in the light of the Fukushima-1 (Fukushima Dai-ichi) accident.</p>
National Emergency Response Arrangements	<p><b>Recommendation IR-2:</b> The Government should consider carrying out a review of the Japanese response to the emergency to identify any lessons for UK public contingency planning for widespread emergencies, taking account of any social, cultural and organisational differences.</p> <p><b>Recommendation IR-3:</b> The Nuclear Emergency Planning Liaison Group should instigate a review of the UK's national nuclear emergency arrangements in light of the experience of dealing with the prolonged Japanese event.</p> <p><i>This information should include the practicability and effectiveness of the arrangements for extending countermeasures beyond the Detailed Emergency Planning Zone (DEPZ) in the event of more serious accidents.</i></p> <p><b>Recommendation FR-6:</b> The nuclear industry with others should review available techniques for estimating radioactive source terms and undertake research to test the practicability of providing real-time information on the basic characteristics of radioactive releases to the environment to the responsible off-site authorities, taking account of the range of conditions that may exist on and off the site.</p> <p><b>Recommendation FR-7:</b> The Government should review the adequacy of arrangements for environmental dose measurements and for predicting dispersion and public doses and environmental impacts, and to ensure that adequate up to date information is available to support decisions on emergency countermeasures.</p>

Planning Controls	<b>Recommendation FR-5:</b> The relevant Government departments in England, Wales and Scotland should examine the adequacy of the existing system of planning controls for commercial and residential developments off the nuclear licensed site.
Openness and Transparency	<p><b>Recommendation IR-4:</b> Both the UK nuclear industry and ONR should consider ways of enhancing the drive to ensure more open, transparent and trusted communications, and relationships, with the public and other stakeholders.</p> <p><b>Recommendation FR-8:</b> The Government should consider ensuring that the legislation for the new statutory body requires ONR to be open and transparent about its decision-making, so that it may clearly demonstrate to stakeholders its effective independence from bodies or organisations concerned with the promotion or utilisation of nuclear energy.</p>

<b>Relevant to the Regulator</b>	
Safety Assessment Approach	<p><b>Recommendation IR-5:</b> Once further detailed information is available and studies are completed, ONR should undertake a formal review of the Safety Assessment Principles to determine whether any additional guidance is necessary in the light of the Fukushima accident, particularly for “cliff-edge” effects.</p> <p><i>The review of ONR’s Safety Assessment Principles (SAP should also cover ONR’s Technical Assessment Guides (TAG), including external hazards.</i></p>
Emergency Response Arrangements and Exercises	<p><b>Recommendation IR-6:</b> ONR should consider to what extent long-term severe accidents can and should be covered by the programme of emergency exercises overseen by the regulator.</p> <p><i>This should include:</i></p> <ul style="list-style-type: none"> <li>a) <i>evaluation of how changes to exercise scenarios supported by longer exercise duration will permit exercising in real time such matters as hand-over arrangements, etc.;</i></li> <li>b) <i>how automatic decisions taken to protect the public can be confirmed and supported by plant damage control data; and</i></li> <li>c) <i>recommendations on what should be included in an appropriate UK exercise programme for testing nuclear emergency plans, with relevant guidance provided to Radiation (Emergency Preparedness and Public Information) Regulations 2001 (REPPPIR) duty holders.</i></li> </ul> <p><b>Recommendation IR-7:</b> ONR should review the arrangements for regulatory response to potential severe accidents in the UK to see whether more should be done to prepare for such very remote events.</p> <p><i>This should include:</i></p> <ul style="list-style-type: none"> <li>a) <i>enhancing access during an accident to relevant, current plant data on the status of critical safety functions, i.e. the control of criticality, cooling and containment, and releases of radioactivity to the environment, as it would greatly improve ONR’s capability to provide independent advice to the authorities in the event of a severe accident; and</i></li> <li>b) <i>review of the basic plant data needed by ONR – this has much in common with what we suggest should be held by an international organisation under Recommendation IR-1.</i></li> </ul>

Relevant to the Regulator	
Research	<p><b>Recommendation FR-10:</b> ONR should expand its oversight of nuclear safety-related research to provide a strategic oversight of its availability in the UK as well as the availability of national expertise, in particular that needed to take forward lessons from Fukushima. Part of this will be to ensure that ONR has access to sufficient relevant expertise to fulfil its duties in relation to a major incident anywhere in the world.</p>

Relevant to the Nuclear Industry	
Off-site Infrastructure Resilience	<p><b>Recommendation IR-8:</b> The UK nuclear industry should review the dependency of nuclear safety on off-site infrastructure in extreme conditions, and consider whether enhancements are necessary to sites' self sufficiency given for the reliability of the grid under such extreme circumstances.</p> <p><i>This should include:</i></p> <p>a) <i>essential supplies such as food, water, conventional fuels, compressed gases and staff, as well as the safe off-site storage of any equipment that may be needed to support the site response to an accident; and</i></p> <p>b) <i>timescales required to transfer supplies or equipment to site.</i></p> <p><b>Recommendation IR-9:</b> Once further relevant information becomes available, the UK nuclear industry should review what lessons can be learnt from the comparison of the events at the Fukushima-1 (Fukushima Dai-ichi) and Fukushima-2 (Fukushima Dai-ni) sites.</p>
Impact of Natural Hazards	<p><b>Recommendation IR-10:</b> The UK nuclear industry should initiate a review of flooding studies, including from tsunamis, in light of the Japanese experience, to confirm the design basis and margins for flooding at UK nuclear sites, and whether there is a need to improve further site-specific flood risk assessments as part of the periodic safety review programme, and for any new reactors. This should include sea-level protection.</p>
Multi-reactor Sites	<p><b>Recommendation IR-11:</b> The UK nuclear industry should ensure that safety cases for new sites for multiple reactors adequately demonstrate the capability for dealing with multiple serious concurrent events induced by extreme off-site hazards.</p>
Spent Fuel Strategies	<p><b>Recommendation IR-12:</b> The UK nuclear industry should ensure the adequacy of any new spent fuel strategies compared with the expectations in the Safety Assessment Principles of passive safety and good engineering practice.</p> <p><i>Existing licensees are expected to review their current spent fuel strategies as part of their periodic review processes and make any reasonably practicable improvements, noting that any intended changes need to take account of wider strategic factors including the implications for the nuclear fuel cycle.</i></p>
Site and Plant Layout	<p><b>Recommendation IR-13:</b> The UK nuclear industry should review the plant and site layouts of existing plants and any proposed new designs to ensure that safety systems and their essential supplies and controls have adequate robustness against severe flooding and other extreme external events.</p> <p><i>This recommendation is related to Recommendation IR-25 and should be considered along with the provisions put in place under that recommendation. It should include, for example, the operator's capability to undertake repairs and the availability of spare parts and components.</i></p>

Relevant to the Nuclear Industry	
Fuel Pond Design	<b>Recommendation IR-14:</b> The UK nuclear industry should ensure that the design of new spent fuel ponds close to reactors minimises the need for bottom penetrations and lines that are prone to siphoning faults. Any that are necessary should be as robust to faults as are the ponds themselves.
Seismic Resilience	<b>Recommendation IR-15:</b> Once detailed information becomes available on the performance of concrete, other structures and equipment, the UK nuclear industry should consider any implications for improved understanding of the relevant design and analyses.  <i>The industry focus on this recommendation should be on future studies regarding the continuing validation of methodologies for analysing the seismic performance of structures, systems and components important to safety. This should include concrete structures and those fabricated from other materials.</i>
Extreme External Events	<b>Recommendation IR-16:</b> When considering the recommendations in this report the UK nuclear industry should consider them in the light of all extreme hazards, particularly for plant layout and design of safety-related plant.  <b>Recommendation FR-2:</b> The UK nuclear industry should ensure that structures, systems and components needed for managing and controlling actions in response to an accident, including plant control rooms, on-site emergency control centres and off-site emergency centres, are adequately protected against hazards that could affect several simultaneously.  <b>Recommendation FR-3:</b> Structures, systems and components needed for managing and controlling actions in response to an accident, including plant control rooms, on-site emergency control centres and off-site emergency centres, should be capable of operating adequately in the conditions, and for the duration, for which they could be needed, including possible severe accident conditions.
Off-site Electricity Supplies	<b>Recommendation IR-17:</b> The UK nuclear industry should undertake further work with the National Grid to establish the robustness and potential unavailability of off-site electrical supplies under severe hazard conditions.
On-site Electricity Supplies	<b>Recommendation IR-18:</b> The UK nuclear industry should review any need for the provision of additional, diverse means of providing robust sufficiently long-term independent electrical supplies on sites, reflecting the loss of availability of off-site electrical supplies under severe conditions.  <i>This should be considered along with Recommendation IR-8 within the wider context of "on-site resilience".</i>
Cooling Supplies	<b>Recommendation IR-19:</b> The UK nuclear industry should review the need for, and if required, the ability to provide longer term coolant supplies to nuclear sites in the UK in the event of a severe off-site disruption, considering whether further on-site supplies or greater off-site capability is needed. This relates to both carbon dioxide and fresh water supplies, and for existing and proposed new plants.  <b>Recommendation IR-20:</b> The UK nuclear industry should review the site contingency plans for pond water make up under severe accident conditions to see whether they can and should be enhanced given the experience at Fukushima.
Combustible Gases	<b>Recommendation IR-21:</b> The UK nuclear industry should review the ventilation and venting routes for nuclear facilities where significant concentrations of combustible gases may be flowing or accumulating to determine whether more should be done to protect them.

Relevant to the Nuclear Industry	
Emergency Control Centres, Instrumentation and Communications	<p><b>Recommendation IR-22:</b> The UK nuclear industry should review the provision on-site of emergency control, instrumentation and communications in light of the circumstances of the Fukushima accident including long timescales, wide spread on and off-site disruption, and the environment on-site associated with a severe accident.</p> <p><i>In particular, the review should consider that the Fukushima-1 site was equipped with a seismically robust building housing the site emergency response centre which had: adequate provisions to ensure its habitability in the event of a radiological release; and communication facilities with on-site plant control rooms and external agencies, such as TEPCO headquarters in Tokyo.</i></p> <p><b>Recommendation IR-23:</b> The UK nuclear industry, in conjunction with other organisations as necessary, should review the robustness of necessary off-site communications for severe accidents involving widespread disruption.</p> <p><i>In addition to impacting communications, it is possible that external events could also affect off-site centres used to support at site in an emergency. Alternative locations should be available and they should be capable of being commissioned in an appropriate timescale.</i></p>
Human Capabilities and Capacities	<p><b>Recommendation IR-24:</b> The UK nuclear industry should review existing severe accident contingency arrangements and training, giving particular consideration to the physical, organisational, behavioural, emotional and cultural aspects for workers having to take actions on-site, especially over long periods. This should take account of the impact of using contractors for some aspects on-site such as maintenance and their possible response.</p> <p><i>This is a wide ranging recommendation and there are a number of aspects that need to be included:</i></p> <ul style="list-style-type: none"> <li>a) <i>the reviews need to acknowledge design differences between individual nuclear facilities and consider whether corporate Severe Accident Guidelines need to be customised;</i></li> <li>b) <i>adequacy of trained personnel numbers for long-term emergencies, particularly for multi-unit sites, and taking into account the potential impact of infrastructure damage and societal issues on the ability to mobilise large numbers of personnel;</i></li> <li>c) <i>the time windows for availability of off-site support may be challenged hence the role of on-site personnel may change, which has implications for procedures and training;</i></li> <li>d) <i>the review of Severe Accident Management Guidelines (SAMG) should consider not only critical safety functions prioritisation, but also whether and how SAMGs support any dynamic reprioritisation based on emerging information;</i></li> <li>e) <i>consideration should also be given to operator support requirements relating to tactical and strategic decision making; and</i></li> <li>f) <i>in addition to the acute phase of a severe accident, consideration also needs to be given to stabilisation, recovery and clean- up, and the personnel involved from the many organisations involved.</i></li> </ul> <p><b>Recommendation FR-11:</b> The UK nuclear industry should continue to promote sustained high levels of safety culture amongst all its employees, making use of the National Skills Academy for Nuclear and other schemes that promote “nuclear professionalism”.</p>
Safety Case	<p><b>Recommendation IR-25:</b> The UK nuclear industry should review, and if necessary extend, analysis of accident sequences for long-term severe accidents. This should identify appropriate repair and recovery strategies to the point at which a stable state is achieved, identifying any enhanced requirements for central stocks of equipment and logistical support.</p>

## Relevant to the Nuclear Industry

*Recommendation IR-25 is linked with Recommendation IR-13. Combining these two recommendations means that we would expect industry to:*

- a) identify potential strategies and contingency measures for dealing with situations in which the main lines of defence are lost. Considerations might include, for example, the operator's capability to undertake repairs and the availability of spares (capability includes the availability of personnel trained in the use of emergency equipment along with necessary supporting resources);*
- b) consider the optimum location for emergency equipment, so as to limit the likelihood of it being damaged by any external event or the effects of a severe nuclear accident;*
- c) consider the impact of potential initiating events on the utilisation of such equipment;*
- d) consider the need for remotely controlled equipment including valves; and*
- e) consider in the layout of the site effective segregation and bunding of areas where radioactive liquors from accident management may accumulate.*

*Regarding other aspects of Recommendation IR-25, the industry needs to:*

- f) ensure it has the capability to analyse severe accidents to properly inform and support on-site severe accident management actions and off-site emergency planning. Further research and modelling development may be required;*
- g) ensure that sufficient severe accident analysis has been performed for all facilities with the potential for accidents with significant off-site consequences, in order to identify severe accident management and contingency measures. Such measures must be implemented where reasonably practicable and staff trained in their use; and*
- h) examine how the continued availability of sufficient on-site personnel can be ensured in severe accident situations, as well as considering how account can be taken of acute and chronic stress at both an individual and team level (this is linked to Recommendation IR-24).*

**Recommendation FR-1:** All nuclear site licensees should give appropriate and consistent priority to completing Periodic Safety Reviews (PSR) to the required standards and timescales, and to implementing identified reasonably practicable plant improvements.

**Recommendation FR-4:** The nuclear industry should ensure that adequate Level 2 Probabilistic Safety Analyses (PSA) are provided for all nuclear facilities that could have accidents with significant off-site consequences and use the results to inform further consideration of severe accident management measures. The PSAs should consider a full range of external events including "beyond design basis" events and extended mission times.

## Annex 2: Outcomes of the UK Stress Tests

**Table 1: ONR's Stress Test Findings (Nuclear Power Plant)**

Finding No.	ONR's Stress Tests Findings
STF-1	Licensees should provide ONR with the decision-making process to be applied to their <i>Considerations</i> along with a report which describes the sentencing of all their <i>Considerations</i> . The report will need to demonstrate to ONR that the conclusions reached are appropriate.
STF-2	The nuclear industry should establish a research programme to review the Seismic Hazard Working Party (SHWP) methodology against the latest approaches. This should include a gap analysis comparing the SHWP methodology with more recent approaches such as those developed by the Senior Seismic Hazard Analysis Committee (SSHAC).
STF-3	Licensees should undertake a further review of the totality of the required actions from operators when they are claimed in mitigation within external hazards safety cases. This should also extend into beyond design basis events as appropriate.
STF-4	Licensees should undertake a further systematic review of the potential for seismically-induced fire which may disrupt the availability of safety-significant structures, systems and components (SSC) in the seismic safety case and access to plant areas.
STF-5	Licensees should further review the margins for all safety-significant structures, systems and components (SSC), including cooling ponds, in a structured systematic and comprehensive manner to understand the beyond design basis sequence of failure and any cliff-edges that apply for all external hazards.
STF-6	Licensees should review further the margin to failure of the containment boundary and the point at which containment pressure boundary integrity is lost should be clearly established for the advanced gas-cooled reactors (AGR) and Magnox stations.
STF-7	Licensees should undertake a more structured and systematic study of the potential for floodwater entry to buildings containing safety-significant structures, systems and components (SSC) from extreme rainfall and / or overtopping of sea defences.
STF-8	Licensees should further investigate the provision of suitable event-qualified connection points to facilitate the reconnection of supplies to essential equipment for beyond design basis events.
STF-9	Licensees should further investigate the enhancement of stocks of essential supplies (cooling water, fuel, carbon dioxide, etc.) and extending the autonomy time of support systems (e.g. battery systems) that either provide essential safety functions or support emergency arrangements.
STF-10	Licensees should identify safety-significant prime mover-driven generators and pumps that use shared support systems (including batteries, fuel, water and oil) and should consider modifying those prime movers systems to ensure they are capable of being self-sufficient.
STF-11	Licensees should further consider resilience improvements to equipment associated with the connection of the transmission system to the essential electrical systems (EES) for severe events.
STF-12	Magnox Ltd should assess the progressive loss of electrical systems on all aspects of the fuel route and address any implications.
STF-13	Magnox Ltd should demonstrate that all reasonably practical means have been taken to ensure integrity of the fuel within the dry fuel stores in the extremely unlikely event of the natural draft air ducting becoming blocked.
STF-14	Licensees should confirm the extent to which resilience enhancements are to be made to existing equipment and systems that are currently installed at nuclear power plants. Information should be provided on the equipment and systems that may be affected and the nature of the resilience enhancements, including interconnectivity with mobile back-up equipment.

Finding No.	ONR's Stress Tests Findings
STF-15	Licensees should complete the various reviews that they have highlighted so that ONR can assess their proposals and associated timescales. These reviews should look in detail at on-site emergency facilities and arrangements, off-site facilities, facilities for remote indication of plant status, communication systems, contents and location of beyond design basis containers and the adequacy of any arrangements necessary to get people and equipment on to and around site under severe accident conditions. Any changes to arrangements and equipment will require appropriate training and exercising.
STF-16	Licensees should review the symptom-based emergency response guidelines (SBERG) and severe accident guidelines (SAG) taking into account improvements to the understanding of severe accident progression, phenomena and the equipment available to mitigate severe accident. This review should also take into account the fuel route. Once completed, appropriate training and exercising should be arranged.
STF-17	Licensees should further review the systems required to support long-term claims on the pre-stressed concrete pressure vessel containment capability in severe accident conditions.
STF-18	EDF Energy Nuclear Generation Ltd should complete its feasibility study into the installation of filtered containment venting, installation of passive autocatalytic hydrogen recombiners and flexible means of injecting water into the Sizewell B containment.
STF-19	Reports on the progress made in addressing the conclusions of the licensees <i>Considerations</i> and the ONR findings should be made available to ONR on the same timescale as that for HM Chief Inspector's recommendations (June 2012). These should include the status of plans and details of improvements that have been implemented.

**Table 2: EDF NGL Stress Test Considerations**

ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Sites	All AGRs
CSA001	Chapter 2: Earthquake	Consider the need for a review of the totality of the required actions, and the way these might be influenced by the Emergency Arrangements (e.g. the need for a site muster, and the setting up of the Access Control Points), taking due account of the human factors issues.	DNB 2.1	HNB 2.1	HPB 2.1	HRA 2.1	HYA 2.1	HYB 2.1		TOR 2.1		✓
CSA002	Chapter 2: Earthquake	Consider investigating whether the single long small bore pipe providing the make up to the decay store could be vulnerable to interaction hazards.	DNB 2.2									
CSA003	Chapter 2: Earthquake	EDF Energy will consider reviewing the probability of consequential fire as a result of an earthquake.	DNB 2.4	HNB 2.2	HPB 2.2	HRA 2.2	HYA 2.2	HYB 2.2		TOR 2.2		✓
CSA004	Chapter 2: Earthquake	Consideration should be given to the feasibility of enhancing the seismic capability of appropriate unqualified fire systems.	DNB 2.5	HNB 2.4	HPB 2.4	HRA 2.4	HYA 2.4	HYB 2.4	SZB 2.1	TOR 2.4	✓	✓
CSA005	Chapter 2: Earthquake	Consideration should be given to enhancing the robustness of pond cooling systems within the AGR fleet.	DNB 2.6	HNB 2.5	HPB 2.5	HRA 2.5	HYA 2.5	HYB 2.5		TOR 2.5		✓
CSA006	Chapter 2: Earthquake	EDF Energy will consider conducting a review of the efficiency of the process for maintaining ongoing seismic qualification and consider whether improvements should be implemented.		HNB 2.3	HPB 2.3	HRA 2.3	HYA 2.3	HYB 2.3		TOR 2.3		
CSA007	Chapter 2: Earthquake	The demands upon personnel to respond to beyond design basis events should be included within the review of the emergency response capabilities (considered further in chapter 6).							SZB 2.2			
CSA008	Chapter 3: Flooding	Consider updating the safety case to reflect the latest assessment of the risk of flooding due to tsunamis at Dungeness B.	DNB 3.1									
CSA009	Chapter 3: Flooding	In line with Recommendation 10 of the ONR report, flooding studies have been initiated for all eight stations. These studies re-evaluate the design basis flooding scenarios using the most recent data and taking account of climate change, they cover the period until 2035.	DNB 3.2	HNB 3.1	HPB 3.1	HRA 3.1	HYA 3.1	HYB 3.1		TOR 3.1		✓
CSA010	Chapter 3: Flooding	In line with Recommendation 10 of the ONR Interim Report on the Japanese Earthquake and Tsunami Implications for the UK Nuclear Industry, flooding studies have been initiated for all eight stations. These studies re-evaluate the design basis flooding scenarios using the most recent data and taking account of climate change, they cover the period until 2035.							SZB 3.1			
CSA011	Chapter 3:	Consider reviewing whether the operators could complete all the tasks required	DNB									

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ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Sites	All AGRs
	Flooding	prior to an extreme sea state or extreme rainfall if insufficient warning was given.	3.3									
CSA012	Chapter 3: Flooding	Consider reviewing the exact water level at which essential plant located within buildings will fail due to flooding.	DNB 3.5									
CSA013	Chapter 3: Flooding	Drainage of the site should be examined and the existing rainfall calculation revisited to highlight any margins. It should be ascertained whether the drainage would be compromised by a high sea state.	DNB 3.6									
CSA014	Chapter 3: Flooding	Consideration should be given to the feasibility of additional temporary or permanent flood protection for essential safety functions where margins to flood levels are low.	DNB 3.7									
CSA015	Chapter 3: Flooding	Consideration should be given to enhancing the robustness of dewatering capability, in particular focussing on independence from other systems.	DNB 3.8	HNB 3.3	HPB 3.5	HRA 3.3	HYA 3.3	HYB 3.5		TOR 3.5		✓
CSA016	Chapter 3: Flooding	Consideration should be given to the feasibility of additional temporary or permanent flood protection for essential safety functions, for example the CW pumphouse.		HNB 3.2	HPB 3.4	HRA 3.2	HYA 3.2	HYB 3.4		TOR 3.4		
CSA017	Chapter 3: Flooding	Station should consider reviewing the output of this report and determine if any other local actions are required.			HPB 3.2							
CSA018	Chapter 3: Flooding	Drainage for the site should be examined to explore the capability of beyond design basis events.			HPB 3.3							
CSA019	Chapter 3: Flooding	The need for a formal reseal / repressurise case is currently being considered in a revision of the shutdown cooling safety case.						HYB 3.2		TOR 3.2		
CSA020	Chapter 3: Flooding	The need to increase feed stocks to ensure they are sufficient for a 24 hour period is under review.						HYB 3.3		TOR 3.3		
CSA021	Chapter 3: Flooding	Further mitigation against beyond design basis floods should be provided by for example, improvements to flood protection around the RUHS and electrical back-up supplies.							SZB 3.2			
CSA022	Chapter 4: Extreme Weather	Consideration should be given to reassessing the tornado hazard in light of recent studies which suggest the magnitude of the hazard may have been underestimated.	DNB 4.1	HNB 4.1	HPB 4.1	HRA 4.1	HYA 4.1	HYB 4.1		TOR 4.1		✓
CSA023	Chapter 4: Extreme Weather	Consideration should be given to whether a snow loading hazard case is required and whether all aspects of the snow hazard such snow drifting have been considered..	DNB 4.2	HNB 4.4	HPB 4.2	HRA 4.2	HYA 4.3	HYB 4.2		TOR 4.3		✓

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ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Sites	All AGRs
CSA024	Chapter 4: Extreme Weather	Consider whether all credible combinations of hazards have been assessed.	DNB 4.3	HNB 4.5	HPB 4.3	HRA 4.3	HYA 4.4	HYB 4.3	SZB 4.2	TOR 4.4	✓	✓
CSA025	Chapter 4: Extreme Weather	Consideration should be given to evaluating the methodologies used to calculate the infrequent extreme ambient temperature and extreme wind event conditions and whether a fleet wide methodology should be adopted.	DNB 4.4	HNB 4.6	HPB 4.4	HRA 4.4	HYA 4.5	HYB 4.4	SZB 4.1	TOR 4.5	✓	✓
CSA026	Chapter 4: Extreme Weather	Consideration should be given to defining the safety margin to equipment failure due to extreme wind, either directly or as a result of buildings failing.	DNB 4.5	HNB 4.7	HPB 4.5	HRA 4.5	HYA 4.6	HYB 4.5		TOR 4.6		✓
CSA027	Chapter 4: Extreme Weather	Consideration should be given to defining the safety margin to equipment failure against extreme ambient temperature. This should include consideration of the consequences of loss of grid for an extended period and the ability to prevent freezing. Furthermore, consider the effects of extremely low ambient temperatures on building temperatures when both reactors are shutdown.	DNB 4.7	HNB 4.8	HPB 4.6	HRA 4.6	HYA 4.7	HYB 4.6		TOR 4.8		✓
CSA028	Chapter 4: Extreme Weather	Consider reviewing whether comprehensive human factors assessments are required for operator actions undertaken during extreme weather conditions.	DNB 4.8	HNB 4.10	HPB 4.8	HRA 4.8	HYA 4.9	HYB 4.8		TOR 4.9		✓
CSA029	Chapter 4: Extreme Weather	Consider reviewing the seasonal preparedness measures currently undertaken to identify areas to increase robustness.	DNB 4.9	HNB 4.11	HPB 4.9	HRA 4.9	HYA 4.10	HYB 4.9	SZB 4.3	TOR 4.10	✓	✓
CSA030	Chapter 4: Extreme Weather	Consideration should be given to all stations receiving site specific weather forecasts.	DNB 4.10	HNB 4.12	HPB 4.10	HRA 4.10		HYB 4.10	SZB 4.4	TOR 4.11		
CSA031	Chapter 4: Extreme Weather	Consideration should be given to connecting the trace and tank heating systems to secure electrical systems.	DNB 4.11									
CSA032	Chapter 4: Extreme Weather	Consideration should be given to the provision of additional station based robust means of personnel transport for extreme weather conditions.	DNB 4.12	HN B 4.1 3	HP B 4.1 1	HR A 4.1 1	HY A 4.1 1	HY B 4.1 1	SZ B 4.5	TO R 4.1 2	✓	✓
CSA033	Chapter 4: Extreme Weather	A review of the programme of work in place to respond to the extreme wind hazard design basis methodology should be incorporated in to the next Periodic Safety Review. Any significant nuclear safety issues arising from the programme of work should be addressed as appropriate.		HNB 4.2								
CSA034	Chapter 4: Extreme Weather	Monitor and review the extreme ambient temperatures following the publication of the climate change adaptation report and consider these as part of plant life extension for all AGR stations.		HNB 4.3			HYA 4.2			TOR 4.2		

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ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Sites	All AGRs
CSA035	Chapter 4: Extreme Weather	Consideration should be given to the prioritisation of the ongoing production of the lightning and drought safety cases.		HNB 4.9	HPB 4.7	HRA 4.7	HYA 4.7	HYB 4.7				
CSA036	Chapter 4: Extreme Weather	Consideration should be given to defining the safety margins to equipment failure against extreme ambient temperature.								TOR 4.7		
CSA037a	Chapter 5: Loss of Power and Heat Sink	Consideration should be given to the practicability of extending the availability of essential stocks for electrical supplies, by either providing additional on-site storage facilities or additional means to replenish stocks to allow an extended operating period.	DNB 5.1		HPB 5.1	HRA 5.1	HYA 5.1	HYB 5.1	SZB 5.1	TOR 5.1	✓	✓
CSA037b	Chapter 5: Loss of Power and Heat Sink	Consideration will be given to the practicability of extending safety case mission times by either providing additional on-site storage facilities or additional diverse means to replenish stocks.		HNB 5.1								
CSA038	Chapter 5: Loss of Power and Heat Sink	Consider making the re-seal and re-pressurisation equipment available independent of installed on-site or off-site AC power supplies.	DNB 5.2									
CSA039	Chapter 5: Loss of Power and Heat Sink	Consideration should be given to reviewing the status of the arrangements to cover the event of SBO for [Station Name].	DNB 5.3			HRA 5.4	HYA 5.4	HYB 5.3		TOR 5.3		
CSA040	Chapter 5: Loss of Power and Heat Sink	Consider providing resilient supplies for essential control and instrumentation and lighting functions.	DNB 5.4			HRA 5.5						
CSA041	Chapter 5: Loss of Power and Heat Sink	Consideration should be given to provision of training, planning or pre-engineering in order to improve mitigation measures.	DNB 5.5		HPB 5.3		HYA 5.5	HYB 5.6	SZB 5.3	TOR 5.6		
CSA042	Chapter 5: Loss of Power and Heat Sink	Consider providing transient analysis using the latest route covering the scenario with no available power or cooling to determine the timescales for prevention of fuel and structural damage.	DNB 5.6	HNB 5.2	HPB 5.4	HRA 5.7	HYA 5.6	HYB 5.7		TOR 5.7		✓
CSA043	Chapter 5: Loss of Power and Heat Sink	Consideration should be given to the practicability of extending the availability of essential stocks of cooling water, by either providing additional on-site storage facilities or additional means to replenish stocks to allow an extended operating period.	DNB 5.7		HPB 5.5	HRA 5.9 HRA 5.12	HYA 5.8 HYA 5.12	HYB 5.8		TOR 5.10		
CSA044	Chapter 5: Loss of Power and Heat Sink	Consideration should be given to increasing the provision of off-site back-up equipment including: equipment to enable boiler feed; a supply of suitable inert gas for primary circuit cooling; electrical supplies for lighting, control and instrumentation.	DNB 5.8	HNB 5.4	HPB 5.6	HRA 5.13	HYA 5.13	HYB 5.9	SZB 5.5	TOR 5.14	✓	✓

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ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Sites	All AGRs
CSA045	Chapter 5: Loss of Power and Heat Sink	To improve resilience of decay store cooling against loss of electrical power, consider possible enhancement options in respect to guidance to operators, fault recovery techniques, and improved understanding of credible consequences.	DNB 5.9	HNB 5.5	HPB 5.7	HRA 5.14	HYA 5.14	HYB 5.10		TOR 5.15		✓
CSA046	Chapter 5: Loss of Power and Heat Sink	To improve resilience of pond cooling and make up against loss of electrical power, consider possible enhancement options in respect to guidance to operators, replenishment of lost pond water, and standalone pond cooling facilities having no dependence on any other station supplies or systems.	DNB 5.10 DNB 5.12	HNB 5.6 HNB 5.8	HPB 5.8 HPB 5.10	HRA 5.15 HRA 5.17	HYA 5.15 HYA 5.17	HYB 5.11 HYB 5.13	SZB 5.7	TOR 5.16 TOR 5.18	✓	✓
CSA047	Chapter 5: Loss of Power and Heat Sink	To improve resilience of decay store cooling against the loss of the ultimate heat sink, consider possible enhancement options in respect to guidance to operators, fault recovery techniques, and improved understanding of credible consequences.	DNB 5.11	HNB 5.7	HPB 5.9	HRA 5.16	HYA 5.16	HYB 5.12		TOR 5.17		✓
CSA048	Chapter 5: Loss of Power and Heat Sink	Consideration will be given to the practicability of extending safety case mission times by either providing additional on-site storage facilities or additional diverse means to replenish stocks.		HNB 5.1								
CSA049	Chapter 5: Loss of Power and Heat Sink	Consider providing resilient supplies for essential control and instrumentation and lighting functions.			HPB 5.2							
CSA050	Chapter 5: Loss of Power and Heat Sink	Consideration will be given to using diesel generators to power the emergency seawater pumps				HRA 5.2	HYA 5.2					
CSA051	Chapter 5: Loss of Power and Heat Sink	Consideration will be given to carrying out a compatibility check to assess whether or not GT fuel can be used for BUCS pumps.				HRA 5.3	HYA 5.3					
CSA052	Chapter 5: Loss of Power and Heat Sink	Consideration should be given to providing Emergency Plug-in Points for portable diesel generators and mobile air compressors.				HRA 5.6						
CSA053	Chapter 5: Loss of Power and Heat Sink	Consider whether the on-site installation of additional, diverse, permanently installed AC power generators would be appropriate to ensure provision of power to essential systems for an extended mission time, for example 72 hours.				HRA 5.8	HYA 5.7			TOR 5.8		
CSA054	Chapter 5: Loss of Power and Heat Sink	Any relevant operational experience from the recent Torness jellyfish drum screen blockage should be considered at [Station Name] once it becomes available.				HRA 5.10	HYA 5.9			TOR 5.11		
CSA055	Chapter 5: Loss of Power and Heat Sink	Consider establishing the amount of additional water stocks that would be required to be held to allow an extended operating period of 72 hours to be claimed for the EBFS, and establish whether realistic options for storage of such stocks are available.				HRA 5.11	HYA 5.10			TOR 5.12		
CSA056	Chapter 5: Loss of Power and	The disused Trimpell tanks could be completely removed and replaced with more modern and larger water storage tanks to provide extra town-water reserves to					HYA					

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ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Sites	All AGRs
	Heat Sink	both Heysham 1 and 2.					5.11					
CSA057	Chapter 5: Loss of Power and Heat Sink	The potential for improving redundancy, reliability and ease of installation of the BUEFS should be considered.						HYB 5.2				
CSA058	Chapter 5: Loss of Power and Heat Sink	The potential for improving redundancy, reliability and ease of connection of the BUEFS should be considered, including means for simplify and improve certainty of the connection / establishment of the BUEFS.								TOR 5.2		
CSA059	Chapter 5: Loss of Power and Heat Sink	Consider whether additional means could usefully be installed in order to extend the formally claimed battery mission time by some margin.						HYB 5.4		TOR 5.4		
CSA060	Chapter 5: Loss of Power and Heat Sink	Consider providing resilient supplies for essential control and instrumentation and lighting functions (fixed and portable) for all relevant areas of plant on site.						HYB 5.5		TOR 5.5		
CSA061	Chapter 5: Loss of Power and Heat Sink	Consider whether additional means could usefully be installed to extend current battery capacity and supply.							SZB 5.2			
CSA062	Chapter 5: Loss of Power and Heat Sink	For beyond design basis faults related to SBO, several specific potential enhancements have been identified and their practicability should be assessed.							SZB 5.4			
CSA063	Chapter 5: Loss of Power and Heat Sink	For beyond design basis faults relating to the provision of water, several specific potential enhancements have been identified and their practicability should be assessed.							SZB 5.6			
CSA064	Chapter 5: Loss of Power and Heat Sink	Consider providing a seismically qualified fire hydrant main.								TOR 5.9		
CSA065	Chapter 5: Loss of Power and Heat Sink	The current robustness and maintenance of the plant is compliant with its design basis for loss of the ultimate heat sink. However, steps to improve the resilience of the plant following a beyond design basis event should be considered.								TOR 5.13		
CSA066	Chapter 6: Severe Accident Management	Alignment of Dungeness B with generic role profile for responding ACP teams would enhance their resilience due to an increase in skills available.	DNB 6.1									

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ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Sites	All AGRs
CSA067	Chapter 6: Severe Accident Management	EDF Energy will consider how lessons identified from Japan and credible beyond design basis events can be reflected in our facilities, procedures, training and exercise programmes. Utilising experience from other emergency response organisations and the military, EDF will consider enhancement of its staff welfare, human factors and emotional aspects associated with emergency response.	DNB 6.2	HNB 6.1	HPB 6.2	HRA 6.1	HYA 6.1	HYB 6.1	SZB 6.1	TOR 6.1	✓	✓
CSA068	Chapter 6: Severe Accident Management	EDF Energy will consider further resilience enhancements to its equipment and critical supplies which take onboard lessons of extendibility and issues that prolonged events could present. Extensive work has already begun to highlight updates to equipment, its location and deployment.	DNB 6.3	HNB 6.2	HPB 6.3	HRA 6.3	HYA 6.4	HYB 6.4	SZB 6.3	TOR 6.2	✓	✓
CSA069	Chapter 6: Severe Accident Management	EDF Energy to consider enhancing current telephony and communications systems to increase levels of resilience of key technological components based on learning from Japan.	DNB 6.4	HNB 6.3	HPB 6.4	HRA 6.4	HYA 6.5	HYB 6.5	SZB 6.5	TOR 6.3	✓	✓
CSA070	Chapter 6: Severe Accident Management	EDF Energy will consider a review of its mobile facilities and the resilience of equipment contained within.	DNB 6.5	HNB 6.4	HPB 6.5	HRA 6.5	HYA 6.6	HYB 6.6	SZB 6.6	TOR 6.4	✓	✓
CSA071	Chapter 6: Severe Accident Management	EDF Energy should consider reviewing existing arrangements to ensure the principles of extendibility are adhered to.	DNB 6.6	HNB 6.5	HPB 6.6	HRA 6.6	HYA 6.9	HYB 6.9	SZB 6.7	TOR 6.5	✓	✓
CSA072	Chapter 6: Severe Accident Management	<p>Further mitigation against beyond design basis accidents could be provided by additional emergency backup equipment. This equipment could be located at an appropriate off-site location close to the station to provide a range of capability to be deployed in line with initial post-event assessment. This equipment may include the following capabilities:</p> <ul style="list-style-type: none"> <li>■ Electrical supplies for plant facilities.</li> <li>■ Emergency command and control facilities including communications equipment.</li> <li>■ Emergency response / recovery equipment.</li> <li>■ Electrical supplies for lighting, control and instrumentation.</li> <li>■ Robust means for transportation of above equipment and personnel to the site post-event.</li> <li>■ Equipment to provide temporary shielding and deal with waste arising from the event.</li> </ul>	DNB 6.7	HNB 6.6	HPB 6.7	HRA 6.7	HYA 6.10	HYB 6.10	SZB 6.8	TOR 6.6	✓	✓
CSA073	Chapter 6: Severe Accident Management	EDF Energy to review the adequacy of training in the use of the SAGs and the feasibility of implementing the advice in real scenarios.	DNB 6.8	HNB 6.7	HPB 6.8	HRA 6.8	HYA 6.11	HYB 6.11		TOR 6.7		✓

ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Site s	All AGR s
CSA074	Chapter 6: Severe Accident Management	EDF Energy should consider a review, extension and retraining for the SBERGs	DNB 6.9	HNB 6.8	HPB 6.9	HRA 6.10	HYA 6.12	HYB 6.12		TOR 6.8		✓
CSA075	Chapter 6: Severe Accident Management	<p>Further mitigation against beyond design basis accidents should be provided by additional emergency backup equipment. This equipment should provide additional diverse means of ensuring robust, long-term, independent supplies to the sites. This equipment should be located at an appropriate off-site location close to the station to provide a range of capability to be deployed in line with initial post-event assessment. This equipment may include the following capabilities:</p> <ul style="list-style-type: none"> <li>■ Equipment to enable pressure vessel cooling.</li> <li>■ Supply of suitable inert gas for primary circuit cooling (AGR only).</li> <li>■ Equipment to enable boiler feed.</li> <li>■ Compressed air supply for decay tube cooling (AGR only).</li> <li>■ Electrical supplies for primary circuit coolant circulation.</li> <li>■ Equipment to enable fuel pond cooling.</li> <li>■ Emergency command and control facilities including communications equipment.</li> <li>■ Emergency response / recovery equipment.</li> <li>■ Electrical supplies for lighting, control and instrumentation.</li> <li>■ Water supplies for cooling from non-potable sources.</li> <li>■ Robust means for transportation of above equipment and personnel to the site post-event.</li> </ul>	DNB 6.10	HNB 6.9	HPB 6.10	HRA 6.9	HYA 6.13	HYB 6.13		TOR 6.9		✓

ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Sites	All AGRs
CSA076	Chapter 6: Severe Accident Management	<p>Further mitigation against beyond design basis accidents should be provided by additional emergency backup equipment. This equipment should provide additional diverse means of ensuring robust, long-term, independent supplies to the sites. This equipment should be located at an appropriate off-site location close to the station to provide a range of capability to be deployed in line with initial post-event assessment. This equipment may include the following capabilities:</p> <ul style="list-style-type: none"> <li>■ Equipment to enable containment cooling.</li> <li>■ Equipment to enable steam generator feedwater.</li> <li>■ Electrical supplies for primary circuit make-up.</li> <li>■ Equipment to enable fuel pond cooling.</li> <li>■ Emergency command and control facilities including communications equipment.</li> <li>■ Emergency response / recovery equipment.</li> <li>■ Electrical supplies for lighting, control and instrumentation.</li> <li>■ Water supplies for cooling from non-potable sources.</li> <li>■ Robust means for transportation of above equipment and personnel to the site post-event.</li> </ul>							SZB 6.10			

ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Sites	All AGRs
CSA077	Chapter 6: Severe Accident Management	<p>Consideration should be given to providing further mitigation against beyond design basis accidents by the provision of additional emergency backup equipment. This equipment could provide additional diverse means of ensuring robust, long-term, independent supplies to the ponds. This equipment could be located at an appropriate off-site location close to the station to provide a range of capability to be deployed in line with initial post-event assessment. This equipment may include the following capabilities:</p> <ul style="list-style-type: none"> <li>■ Equipment to enable fuel pond cooling.</li> <li>■ Emergency command and control facilities including communications equipment.</li> <li>■ Emergency response / recovery equipment.</li> <li>■ Electrical supplies for lighting, control and instrumentation.</li> <li>■ Water supplies for cooling from non-potable sources.</li> <li>■ Robust means for transportation of above equipment and personnel to the site post-event.</li> </ul> <p>It would be appropriate, if this equipment was developed and in any case to capture learning from events in Japan to review and where necessary revise the documentation and training provided for severe accident management in the fuel route plant areas.</p>	DNB 6.11	HNB 6.10	HPB 6.11	HRA 6.11	HYA 6.14	HYB 6.14		TOR 6.10		✓

ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Sites	All AGRs
CSA078	Chapter 6: Severe Accident Management	<p>Consideration should be given to providing further mitigation against beyond design basis accidents by the provision of additional emergency backup equipment. This equipment could provide additional diverse means of ensuring robust, long-term, independent supplies to the ponds. This equipment could be located at an appropriate off-site location close to the station to provide a range of capability to be deployed in line with initial post-event assessment. This equipment may include the following capabilities:</p> <ul style="list-style-type: none"> <li>■ Equipment to enable fuel pond cooling.</li> <li>■ Emergency command and control facilities including communications equipment.</li> <li>■ Emergency response / recovery equipment.</li> <li>■ Electrical supplies for lighting, control and instrumentation.</li> <li>■ Water supplies for cooling from non-potable sources.</li> <li>■ Robust means for transportation of above equipment and personnel to the site post-event.</li> </ul> <p>Installation of a radiation hardened camera with infra-red capability in the fuel pond area to aid remote inspection of the fuel pond in fuel pond severe accidents. It would be appropriate, if this equipment was developed and in any case to capture learning from events in Japan to review and where necessary revise the documentation and training provided for severe accident management in the fuel route plant areas.</p>							SZB 6.14			
CSA079	Chapter 6: Severe Accident Management	There are currently no role specific details within the Emergency Scheme for the Fire Team Leader role in IRT. The development of this role detail is considered fundamental due to the requirement for a greater level of confidence / competence in this role during an emergency. In order to respond to the issue there is a need for specific training modules for this role, which is a role at Hinkley Point B station.			HPB 6.1							
CSA080	Chapter 6: Severe Accident Management	Complete Implementation of ECC Communication Co-ordinator role.				HRA 6.2	HYA 6.3	HYB 6.3	SZB 6.2			
CSA081	Chapter 6: Severe Accident Management	Review in detail the benefits of having a co-located ECC particularly focusing on the benefits that could be gained during Heysham 1 and 2 response to a multi unit event.					HYA 6.2	HYB 6.2				
CSA082	Chapter 6: Severe Accident Management	Due to Heysham 1 and 2 utilising the adjacent sites ECC as a back up facility this could potentially result in vulnerabilities in the station response to a multi unit event. Establishment of an independent back up ECC should be considered.					HYA 6.7	HYB 6.7				

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ID	Chapter	Consideration	DNB	HNB	HPB	HRA	HYA	HYB	SZB	TOR	All Sites	All AGRs
CSA083	Chapter 6: Severe Accident Management	Heysham 1 and 2 to carry out a review of equipment and where possible align to allow for ease of use during an emergency. Equipment logs and location should be kept in both stations ECC to allow emergency responders to quickly identify and access equipment as needed. Where possible equipment should be kept in diverse locations to increase the probability of access.					HYA 6.8	HYB 6.8				
CSA084	Chapter 6: Severe Accident Management	Ensure learning from Periodic Safety Review is incorporated into the emergency arrangements where appropriate.							SZB 6.4			
CSA085	Chapter 6: Severe Accident Management	Further mitigation against beyond design basis accidents could be provided by reviewing the feasibility of enhancing the plant design. These enhancements may include the following measures: <ul style="list-style-type: none"> <li>■ Installing a filtered containment venting system (FVC).</li> <li>■ Installing passive autocatalytic hydrogen recombiners to mitigate against hydrogen risk especially post-RB failure (or prior to containment venting).</li> <li>■ Installing quick hook-up points on the containment building fire suppression system to allow a flexible solution of containment water injection into containment.</li> </ul>							SZB 6.9			
CSA086	Chapter 6: Severe Accident Management	Once a strategy for back-up equipment has been finalised consideration should be given to a review of the SOI 8 series.							SZB 6.11			
CSA087	Chapter 6: Severe Accident Management	Review the severe accident mitigation procedure against best practice for Westinghouse plants and benchmark against severe accident procedures for French PWRs, specifically in terms of consistency of the procedure, priority of recovery actions and their feasibility of operation.							SZB 6.12			
CSA088	Chapter 6: Severe Accident Management	Consideration should be given to reviewing whether any airborne release from a severe accident in the fuel pond would affect the habitability of the MCR.							SZB 6.13			

**Table 3: Magnox Ltd Stress Test Considerations (Nuclear Power Plant)**

Considerations		Chapelcross	Dungeness A	Oldbury	Sizewell A	Wylfa	All Magnox Ltd sites
M1	Consideration will be given to enhancing the methods and equipment for primary pressure circuit sealing.			1		1	
M2	Consideration will be given to increasing the resilience of the Back-Up Feed System.			2			
M3	Consideration will be given to increasing the resilience of the back-up feed systems and tertiary feed systems.					2	
M4	Consideration will be given to increasing the resilience of the on-site electrical system.			3		3	
M5	Consideration will be given to providing a facility for the injection of nitrogen to support reactor hold-down.			4		4	
M6	Consideration will be given to enhancing the resilience of plant monitoring systems.			5		5	
M7	Consideration will be given to enhancing the availability of beyond design basis equipment.	1	1	6	1	6	✓
M8	Consideration will be given to providing further equipment to facilitate operator access around the Site.	2	2	7	2	7	✓
M9	Consideration will be given to reinforcing the training for staff who may be required to respond to extreme events.			8		8	
M10	Consideration will be given to enhancing on site arrangements for command, control and communications.	3	3	9	3	9	✓
M11	Consideration will be given to providing additional stocks of consumables for plant and personnel.			10		10	
M12	Consideration will be given to updating and enhancing severe accident management guidance.	4	4	11	4	11	✓
M13	Consideration will be given to enhancing the resilience of spent fuel pond equipment to severe events.	5		12	5		

**Table 4: Overall Summary of Recommendations or Actions in the UK (Nuclear Power Plant)**

Technical area	Industry commitments, recommendations or Considerations	Regulatory STF	Recommendations from the Chief Inspectors Report
<b>Within stress tests' scope</b>			
Earthquakes	CSA001–CSA007 M13, M7	STF-2, STF-3, STF-4, STF-5, STF-6, STF-14	IR-10, IR-13, IR-16, FR-2, FR-3, FR-4
Flooding	CSA008–CSA021 M13 M7	STF-3, STF-5, STF-7, STF-13, STF-14	IR-10, IR-13, IR-16, FR-2, FR-3
Extreme weather	CSA022–CSA036 M13	STF-3, STF-5, STF-14	IR-10, IR-13, IR-16, FR-2, FR-3
Loss of electrical supplies & Loss of UHS	CSA037–CSA065 M2–M6, M11, M7	STF-8, STF-9, STF-10, STF-11, STF-12, STF-13, STF-14	IR-17, IR-18, IR-19, IR-20
Severe accident management	CSA066–CSA088 M1, M7–M10, M12,	STF-15, STF-16, STF-17, STF-18	IR-6, IR-7, IR-21, IR-22, IR-24, IR-25, FR-4
<i>Process for implementing recommendations and findings</i>		<i>STF-1, STF-19</i>	<i>FR-12</i>
<b>Out of stress tests' scope</b>			
Emergency response information			IR-1
Global Nuclear Safety			IR-2
Safety assessment			IR-5
National emergency response			IR-2, IR-3, FR-6, FR-7
Planning Control			FR-5
Research			FR-10
Off site infrastructure			IR-8, IR-9
Safety case			IR-25, FR-4

**Notes**

CSA – *Considerations* (potential areas for improvement) from EDF NGL for AGR and PWR

M - *Considerations* (potential areas for improvement) from Magnox Ltd

STF – Stress Tests Finding as a result of review of licensees' stress tests reports

IR and FR – Recommendations from HM Chief Inspector's report (Ref. 2)

**Table 5: ONR's stress test findings (non-power generating nuclear facilities)**

Finding No.	ONR's Stress Tests Findings
STF-20	Sellafield Ltd, AWE, RRMPOLE, BAESM, DRDL, RRDL, Magnox Ltd and NNB GenCo should provide ONR with the decision-making process to be applied to their <i>Considerations</i> along with a report which describes the sentencing of all their <i>Considerations</i> . The report will need to demonstrate to ONR that the conclusions reached are appropriate.
STF-21	Sellafield Ltd should consider further and provide more details on how emergency arrangements to deal with a site-wide extreme event would anticipate and adapt to challenging criticality events.
STF-22	Sellafield Ltd should establish if there is anything reasonably practicable that can be done to provide / strengthen the provision of basic plant information (e.g. inventory level and temperature) during / following an extreme event on-site affecting high-hazard / high risk facilities.
STF-23	Sellafield Ltd should take note of NNP finding STF-2 [Ref. 10] and participate in the review as necessary where the seismicity of the area affecting the site is under consideration.
STF-24	Sellafield Ltd should review the information used to inform the seismic damage assessment conclusions in light of more recent experience and detailed analysis completed for periodic safety assessments to confirm expected withstand capacity for facilities with significant inventories.
STF-25	Sellafield Ltd should complete further work to assess the extent of seismic damage to local infrastructure. This work should demonstrate the extent to which local services can function following connection of temporary power supply.
STF-26	AWE should consider reassessing the nuclear safety implications of consequential events, such as water ingress, multi-facility fires and loss of emergency control and co-ordination centres, following a significant seismic event to establish whether further measures are needed to reduce the associated risks.
STF-27	RRMPOLE should consider reviewing whether the failure of the four buildings identified in its submission, when subjected to a design basis earthquake, could undermine the higher seismic withstand of the equipment those buildings contain.
STF-28	RRMPOLE should consider reviewing what improvements could be made to improve the seismic withstand of equipment within the production facility that could have an impact on radiological release.
STF-29	BAESM should consider reviewing whether there are any further options for minimising the potential for physical impacts during a seismic event on radioactive components during construction activities.
STF-30	BAESM should consider reviewing the seismic withstand capability of the dock sills and their impact for events exceeding the 1 in 100-year return period, when the dock walls are predicted to have failed.
STF-31	BAESM should consider the provision of a hardened robust emergency control centre or propose formalised alternative arrangements.
STF-32	DRDL should consider assessing the possible effects of fire following a seismic event.
STF-33	Sellafield Ltd should consider the range of beyond design basis earthquakes that could challenge containment to demonstrate the extent of robustness of facilities. The review can be based on reasoned engineering judgement and demonstration of ductile response rather than repeated analysis.
STF-34	Urenco UK Ltd should consider the impact on resources required to respond to combinations of more extreme events that might delay or prevent emergency actions. This review should examine the effect of concurrent criticality on ability to affect safe rescue of injured personnel and the validity of assumptions on capability to mitigate a severe accident propagating.
STF-35	BAESM should consider expanding its proposed assessment of the impact of a credible tsunami, to consider the effects of an earthquake exceeding the design basis earthquake for the plants and consequent flooding exceeding the design basis flood.
STF-36	RRMPOLE should consider assessing the challenges from increased seismically induced damage on-site and off-site and the limitations that imposes on external support and possible consequences of seismically induced fire.

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Finding No.	ONR's Stress Tests Findings
STF-37	Sellafield Ltd should complete further work to identify potential failure mechanisms following beyond design basis seismic events, including the possibility for sudden collapse and cliff-edge failure of safety function.
STF-38	Sellafield Ltd should, in light of advances in river modelling methodologies, climate change information and the known erosion of the river bed, reassess the flow capacity of the channel of the River Calder to better inform the assessment of risk of flood.
STF-39	BAESM should consider assessing the rate of water level rise and flow rate of flood waters for the site to determine if there is any erosion of safety margins during a dynamic flood event.
STF-40	DRDL should review its safety cases to confirm that the effect of rapid flooding of the dock from a failure of the watertight boundary is considered.
STF-41	AWE should consider reassessing the site flood model to determine the potential erosion of safety margins resulting from loss of the drainage networks.
STF-42	DSRL should demonstrate to ONR the rationale with which it has considered the mobility of waste inventories in flooding events when prioritising the order with which hazard reduction activities are planned within its decommissioning strategy.
STF-43	AWE should consider assessing the nuclear safety implications of consequential events including progressive loss of structures, systems and components following an extreme flooding event to establish whether further measures are needed to reduce the associated risks.
STF-44	BAESM should consider providing further substantiation of the claim that there is a 1.5m margin of safety beyond the design basis flood event.
STF-45	RRMPOL should consider assessing aspects of extreme weather other than snow and wind, such as high and low temperature and humidity, rainfall and lightning.
STF-46	RRMPOL should consider reassessing the design basis for extreme weather events.
STF-47	Magnox Ltd should carry out a review of the design basis and margins available against external hazards at each decommissioning site to ensure adequate provisions are in place throughout the decommissioning process commensurate with the remaining radiological hazard potential.
STF-48	RRMPOL should consider reviewing the utilisation factors and criteria used for assessing structural performance in extreme weather.
STF-49	AWE should consider assessing the nuclear safety implications of consequential events including progressive loss of structures, systems and components following an extreme weather event to establish whether further measures are needed to reduce the associated risks.
STF-50	Sellafield Ltd should complete a review of the possible impact of extreme weather conditions on service networks and temporary service connection points to ensure security of supply and confirm functionality of connection points.
STF-51	Sellafield Ltd should undertake regular load forecasting in order to identify likely shortfalls in the provisions for normal and back-up electrical supply in good time to plan and deliver effective remedial actions and hence avoid material shortfalls occurring.
STF-52	Sellafield Ltd should ensure that the learning from its resilience review regarding vital site loads is embedded into future periodic reviews of site electrical requirements and taken into consideration in the management of change process whenever site electrical loads are to be modified.
STF-53	Sellafield Ltd should complete its review of resilience, including the need for suitable event-qualified mobile diesel alternator connection points, and should undertake improvements where these would facilitate the reconnection of supplies to identified essential equipment.
STF-54	Sellafield Ltd should continue to identify and address potential vulnerabilities in the provision of electrical supplies to systems that may not have an explicit nuclear safety claim in facility safety cases but whose loss could severely hinder site emergency arrangement following a severe event.
STF-55	DSRL should identify and address potential vulnerabilities in the provision of electrical supplies to systems that may not have an explicit nuclear safety claim in facility safety cases but whose loss could severely hinder site emergency arrangement following a severe event.

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Finding No.	ONR's Stress Tests Findings
STF-56	RRMPOL should consider reviewing its strategy for demonstrating the continuing safety of the plant post incident, including a consideration of power requirements for instrumentation (e.g. criticality detection systems).
STF-57	BAESM should consider whether further measures are necessary that may improve the availability of electrical power supplies on-site under a full range of fault scenarios. This should include a review of the adequacy of back-up electrical supplies on-site that would support the management and operation of an emergency incident.
STF-58	NNB GenCo should consider further the ability of the site to respond to the partial or complete loss of electrical supplies and the autonomy times of systems without off-site support.
STF-59	Sellafield Ltd should explore the practicality and requirements of pumping water from the sea and other water sources such as local rivers to where it might be utilised, and establish if this could indeed be done in extremis with the systems currently available on-site.
STF-60	BAESM should consider reviewing the arrangements that ensure suitable systems are always available commensurate with expected levels of decay heat, and that resources (fuel and water) are available on-board and onshore for replenishment where necessary.
STF-61	DSRL should review the effectiveness of existing on-site communication arrangements which have not been subject to full evaluation during the stress tests process.
STF-62	DSRL should coordinate with the Highland Council to review the adequacy of existing local reception centres detailed in its off-site plan.
STF-63	Springfields Fuels Ltd should evaluate reasonably practicable structural improvements to its designated emergency control centre, taking into account reasonably foreseeable accidents that may hinder its availability.
STF-64	Sellafield Ltd should review the severe accident guidelines taking into account improvements to the understanding of severe accident progression, phenomena and the equipment available to mitigate severe accidents (in line with STF-16).
STF-65	Sellafield Ltd should develop and rehearse emergency exercise scenarios covering beyond design basis events and severe accident conditions.
STF-66	Sellafield Ltd should extend its review of the resilience of the back-up supplies in support of the site data network and assess the resilience of the site communication system to design basis natural events and severe accidents.
STF-67	Sellafield Ltd should extend its review of availability of external resource and review its in-plant communication systems used by site fire and rescue teams (e.g. radios) to ensure there is compatibility with equipment used by external emergency services, especially at identified radio shielded areas.
STF-68	Sellafield Ltd should extend its programme for development of severe accident management strategies to its strategic non-nuclear support facilities to ensure adequate information and support can be provided to the Sellafield emergency control centre in the event of a severe accident.
STF-69	Given the extent of the Sellafield site and the need for countermeasures on the site in the event of an accident, Sellafield Ltd should employ all reasonably practicable means to ensure weather forecast information can be made available to its emergency control centre / strategic management centre so that timely advice can be provided on-site.
STF-70	Sellafield Ltd should take cognisance of STF-14 [Ref. 10], and confirm the extent to which resilience enhancements are to be made to existing equipment and systems that are currently installed across the site. Information should be provided on the equipment and systems that may be affected and the nature of the resilience enhancement, including the mobile back-up equipment.
STF-71	Sellafield Ltd should further assess the availability and operability of electronic personal dosimeters in a prolonged station blackout, in conditions associated with design basis natural events and in severe accidents.
STF-72	Sellafield Ltd should develop a strategy for incorporating all reasonably practicable measures identified as part of its resilience evaluation process in its programme for enhancing its emergency response capability.

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Finding No.	ONR's Stress Tests Findings
STF-73	DSRL should extend its proposed review of resilience to long-lived events taking due cognisance of the impact of widespread (off-site) disruption to local and national infrastructure, continuing to coordinate with Nuclear Emergency Arrangements Forum.
STF-74	DSRL should further consider how the site might obtain technical support from the wider industry in the event of a severe accident.
STF-75	All defence licensees (AWE, RRMPO, BAESM, DRDL and RRDL) should consider the approach taken by several civilian licensees of using beyond design basis containers that contain a range of equipment and materials that could be beneficial when responding to a beyond design basis accident. This finding is of a similar nature to that raised in the ONR National Stress Tests Final Report for UK NPPs (STF-15).
STF-76	AWE should reconsider the provision of suitable contingencies in its emergency response to extreme external events if aggravating factors, which may impede accident management, are realised. These factors include impaired road access to both the sites themselves and to individual facilities on-site, loss of availability of co-ordination and control centres and loss of communication.
STF-77	AWE should consider collating requirements placed on the site-wide infrastructure and emergency arrangements by individual facility safety cases and consider the demands that may be placed on the organisation, infrastructure and resources should a response be required at two or more facilities simultaneously, or within the same incident. AWE should consider identifying other factors that may impair the emergency response and develop suitable contingencies to ensure that the logistics of the emergency response are robust.
STF-78	AWE should consider reviewing the on-site and off-site dose consequences of being unable to follow its strategy of making safe and evacuating high-hazard facilities in response to extreme external events.
STF-79	RRMPOL should consider reviewing the stress tests requirements when the manufacturing site regeneration project and modifications to the Neptune facility are sufficiently mature.
STF-80	RRMPOL should consider reviewing the resilience of Bronze Commands to seismic events or propose alternative arrangements.
STF-81	RRMPOL should consider reviewing its emergency arrangements for coincident events.
STF-82	DRDL should consider enhancing the withstand of the forward command posts to flooding and the Devonport accident control centre to seismic events or propose formalised alternative arrangements.
STF-83	Magnox Ltd should review, update and issue revised severe accident guidelines in the light of changing hazard at decommissioning sites; the guidelines should include human performance / welfare issues and availability of equipment located in beyond design basis containers.
STF-84	Urenco UK Ltd should review its existing emergency plans to ensure that, in relation to the response to a criticality accident, the plans incorporate further details to support the principle of extendibility for off-site response and control of reactivity through the use of neutron poisons if practicable.
STF-85	Springfields Fuels Ltd should consider whether the securing of neutron poisons is a reasonably practicable improvement to emergency preparedness following a repeating criticality incident.
STF-86	Sellafield Ltd should undertake safety margin analysis in order to determine relative withstand of containment structures to a beyond design basis overpressure.
STF-87	Sellafield Ltd should consider, in more detail, the consequences of fire coincident with criticality and the capability of Sellafield site to respond to these events.
STF-88	Springfields Fuels Ltd should demonstrate how its on-site and off-site plans cater for widespread dispersion of uranic material (in oxide form and uranium hexafluoride) predicated on concurrent seismic / hydrogen detonation events
STF-89	DRDL should consider reviewing its capability for severe accident management in cases of simultaneous core damage accidents.

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Finding No.	ONR's Stress Tests Findings
STF-90	AWE should consider reviewing the threat posed to containment systems from fire hazards and the potential dose consequences for on-site and off-site risk groups. AWE should consider, within its review, the potential dose consequences of an extreme event leading to a loss of containment and a consequential fire. In light of the assessed consequences for workers and the public, AWE should consider any further mitigation, in addition to those measures currently in place.
STF-91	DRDL should consider reviewing its responses required in the event of a loss of shielding of stored fuel.
STF-92	DRDL should consider reviewing the nuclear fuel and source movements on-site to demonstrate the comprehensiveness of the emergency response measures available.
STF-93	RSRL should review the availability and capability to deploy diesel and generators in order to sustain ventilation of hydrogen generating intermediate and low-level radioactive waste on the site; this may be adequately addressed through a suitable deterministic argument if one can be made regarding minimal generation rates when intermediate and low-level waste is in matrix form.
STF-94	Reports on the progress made in addressing the conclusions of the licensees <i>Considerations</i> and the ONR findings should be made available to ONR on the same timescale as that for HM Chief Inspector's recommendations (June 2012). These should include the status of plans and details of improvements that have been implemented.

**Table 6: Sellafield Ltd Considerations**

No	Consideration
SL-1	Provide local neutron inhibiting materials for emergency deployment to prevent / halt a potential criticality excursion.
SL-2	Review the arrangements for providing alternative sources of cooling water to HASTs in extreme circumstances.
SL-3	Review the arrangements for management of site fuel stocks.
SL-4	Procure a bowser / road tanker capable of transferring fuel efficiently around the site.
SL-5	Review the manning levels required to respond to prioritized site demands during a major event.
SL-6	Develop a programme to deploy, connect and test MDAs to EPD connection points routinely on safety significant plants.
SL-7	Enhance the robustness of the forced ventilation system for Magnox wastes to a severe seismic event.
SL-8	Review the potential for trapped hydrogen with the Magnox waste matrix being liberated as a result of a severe seismic event.
SL-9	Obtain skid-mounted diesel pumps for potential deployment in the later Magnox fuel storage pond following a severe seismic event.
SL-10	Review the robustness of alternative power supplies sufficient to allow timely crack repair (using already available dedicated repair plates, water containment and various pumping systems) following a severe seismic event.
SL-11	Seismically enhance existing bridges across the River Calder and develop the ability to deploy temporary structures.
SL-12	Confirm realistic rates of self-heating within Magnox fuel undergoing reprocessing and the minimum quantity of water required to prevent self-ignition on potential loss of cooling.
SL-13	Develop and substantiate specific contingency plans to extinguish a fire within solid waste facilities.
SL-14	Consider the need to engineer additional flood defences alongside the River Calder.
SL-15	Undertake more detailed modeling of surface run-off and drainage within built-up areas of the site.
SL-16	Review the resilience of the current arrangements to pump out the central drainage water collection and discharge system.
SL-17	Utilise the design of any future changes to the site infrastructure to direct rainfall flood flows so as to minimise ponding.
SL-18	Reengineer applicable flood defences to address very severe rainfall flooding.

No	Consideration
SL-19	Take local actions to address potential vulnerabilities to flooding of individual EPD boards and MDA connection points.
SL-20	Consider the procurement of pre-fabricated flood barriers for local ad hoc deployment.
SL-21	Take local actions to address the potential vulnerabilities of diesel stocks to protracted extremely low temperatures.
SL-22	Examine the potential to connect MDAs to facilitate the lowering safely of suspended flasks, skips and magazines in the event of a prolonged loss of electrical power.
SL-23	Examine the means by which product within the THORP centrifuge bowl can be kept wetted so as to avoid subsequent decomposition.
SL-24	Review the resilience of the water supplies to site in extreme circumstances.
SL-25	Increase the flexibility and use of the existing water supply cells.
SL-26	Consider the reinstatement of the River Calder pumphouse.
SL-27	Review the size, number and location of emergency pumps.
SL-28	Review the emergency responses for all spent fuel storage ponds to identify commonality between systems and equipment.
SL-29	Procure further portable bunds for potential deployment around spent fuel storage ponds.
SL-30	Utilise the site deep water facility to test both techniques and equipment and to carry out training and emergency exercises.
SL-31	Review the arrangements for personnel undertaking emergency roles.
SL-32	Maintain a list of key plant parameters within the SECC.
SL-33	Review ICC arrangements to ensure sufficient diversity to facilitate response to a multi-plant event.
SL-34	Ensure that due cognisance is given to the need to retain appropriate access for emergency services during future changes to the site infrastructure.
SL-35	Review the arrangements for fire and rescue response to a severe event.
SL-36	Consider the construction of hardened and sustainable physical control structures.
SL-37	Procure temporary mobile units (and possibly off-site air-transported deployable containers) for provision of either welfare support or to augment the management of emergencies.
SL-38	Enhance the resilience of the communications infrastructure.
SL-39	Review the provision of support to the communications infrastructure during a severe event.

No	Consideration
SL-40	Review the resilience of the site data network and the need to extend the period of monitoring and data transmission to SECC.
SL-41	Consider the balance to be struck between the deployment of DMVs on- and off-site and whether current provision is suitable and sufficient.
SL-42	Consider the criticality implications of using water sprays and / or foams to bring to ground potential aerial releases.
SL-43	Determine practical means for deploying safely widespread fixative agents to minimise potential spread of airborne contamination.
SL-44	Review the resilience of key support services likely to be necessary for ongoing plant control and / or emergency response.
SL-45	Engage with the Hydrogen Working Party to determine the minimum air displacement flows for the wet storage of Magnox wastes so as to remain below the lower flammable level.
SL-46	Determine, via simple modeling, whether either or both “natural ventilation” and / or “lifting plugs” would be effective as a back-up means for managing hydrogen during wet storage of Magnox wastes.
SL-47	Review the resilience of both power and steam supplies to HASTs in extreme circumstances.

**Table 7: Stress Test Considerations – Atomic Weapons Establishment**

No.	Consideration
AWE-1	Consider the provision of enhanced emergency response equipment and management.
AWE-2	Consider diverse storage area locations for emergency response equipment to provide resilience from common mode failure.
AWE-3	Consider enhancing preparation and planning for extreme events and long-term post-accident recovery.
AWE-4	Consider the provision of additional supplies following extreme external events.
AWE-5	Consider increasing defence-in-depth of emergency response staff.

**Table 8: Stress Test Considerations – Rolls-Royce Marine Power Operations Ltd**

No.	Consideration
RRM-1	Investigate the capability of the diesel generator to provide back up to the Emergency Control Centre (ECC) for extended periods (up to 24 hours, preferably longer) without need for off-site fuel supplies.
RRM-2	Consider improving the resilience of the site power distribution networks, site UPS and Chemical Plant and site diesel generators to improve availability post flood.
RRM-3	Consider improving the resilience of the Bronze Command to site flooding, provision of an alternative back up location that is not susceptible to Derwent River flooding, or relocating part or all of the stock of Health Physics instrumentation and PPE to a location not susceptible to flooding.
RRM-4	Consider improving the resilience of the ECC to site flooding, or provision of an alternative back up location that is not susceptible to Derwent River flooding and to which access from off-site locations can be assured.
RRM-5	Consider how to improve the resilience against combinations of earthquake and flooding of selected aspects of the manufacturing facilities.  Attention should be focussed especially on the use and integrity of the racking, including whether to change the loading arrangements to make formation of unfavourable arrangements of fissile material less likely following topple. The benefits of moving material to this store when flooding is predicted should also be reviewed.
RRM-6	Consider the need for a holding of Health Physics instrumentation and PPE in a location not susceptible to the same severe seismic events that could result in extensive production area damage.
RRM-7	Consider if a stock of neutron poisons should be retained in a location not susceptible to inaccessibility due to severe seismic events and flooding at the site, what form these could take and if there are practicable means of deployment following severe events.
RRM-8	Consider the provision, either as part of site infrastructure, or through arrangements with other sites or government providers, a means of safely accessing the site in the event of flooding at relatively short notice.

**Table 9: Stress Test Considerations – Rolls-Royce Marine Power Operations Ltd – Neptune Licensed Site**

No.	Consideration
RRM-9	Investigate the capability of the diesel generator to provide back up to the Emergency Control Centre for extended periods (up to 24 hours, preferably longer) without need for off-site fuel supplies.
RRM-10	Consider storing the Neptune portable generator within the reactor building or other location not susceptible to flooding to improve its availability post flood.
RRM-11	Consider improving the resilience of the Bronze Command to site flooding, provision of an alternative back up location that is not susceptible to Derwent River flooding, or relocating part or all of the stock of Health Physics instrumentation and PPE to a location not susceptible to flooding.
RRM-12	Consider improving the resilience of the Emergency Control Centre (ECC) to site flooding, or provision of an alternative back up location that is not susceptible to Derwent River flooding, and to which access from off-site locations can be assured.
RRM-13	Perform analyses of the Neptune buildings against snow and wind loadings.
RRM-14	Consider the need for a holding of Health Physics instrumentation and PPE in a location not susceptible to the same severe earthquakes that could result in extensive reactor plant damage.
RRM-15	Consider if a stock of neutron poisons should be retained in a location not susceptible to inaccessibility to severe earthquakes and flooding at the site, what form these could take, and if there are practicable means of deployment following severe events.
RRM-16	Consider the provision, either as part of site infrastructure, or through arrangements with other sites or government providers, a means of safely accessing the site in the event of flooding at relatively short notice.

**Table 10: Stress Test Considerations – BAE Systems Marine Ltd**

No.	Consideration
BAE-1	Consideration might be given to using the crew as part of the wider site emergency response.
BAE-2	The scenario with sea-levels beyond the design basis and / or a tsunami beyond the design basis, resulting in an energetic wave at the Wet Dock Quay, should be analysed more rigorously. This should include the implications for a submarine moored at the Wet Dock Quay.
BAE-3	The linkage between safety case accident sequences and emergency planning could be strengthened.
BAE-4	Multiple accidents involving nuclear fuel at the Barrow site cannot be ruled out.
BAE-5	A scenario, in which a radiological consequence has already happened, should be more closely studied and taken into account in the Emergency Arrangements.
BAE-6	Consider the need for a schedule, in a known, secure but accessible location, to inform personnel of the means by which installed water, electrical and gas services, etc, to the DDH can be isolated, and the locations of such means.
BAE-7	Consider the means of establishing the status of the plant in a damaged and unsafe location, e.g. monitoring the plant from some distance to forewarn of an incipient criticality accident, if advances in technology can provide this.
BAE-8	Consider the means of gaining access to a severely damaged building (e.g. the DDH), with concomitant requirements for lighting, shoring, etc.
BAE-9	Consider the means of safeguarding against a slowly developing criticality accident, which is easily and quickly applied.
BAE-10	Consider the availability, identification and training of personnel to carry out the above.
BAE-11	A scenario at the Wet Dock Quay, involving drainage of the Dock system, should be more closely studied, within a broader accident management coverage.
BAE-12	The existence, location and use of the 'high and dry' provisions, including portable diesel-powered pumps and hoses, to augment seawater services to a submarine at the Wet Dock Quay, need to be made known to all relevant personnel.
BAE-13	The existence, location and use of any other existing or new emergency provisions for a submarine at the Wet Dock Quay need to be made known to all relevant personnel.
BAE-14	Consider the need to store all this emergency equipment in a known, secure but accessible location.

No.	Consideration
BAE-15	Consider means of moving emergency support equipment, post event.
BAE-16	Consider the identification and training of personnel to carry out the above.
BAE-17	The Wet Dock Quay itself may be damaged by the seismic event. This will prevent access to / egress from the submarine until an alternative route is set up.
BAE-18	The implications of the above scenario include major damage to the Barrow Dock system and perhaps failure of the Michaelson Road Bridge: Thus, it may not be possible to move the submarine for some considerable time: Any specific procedures for dealing with this scenario should recognise this.
BAE-19	The effect of loss of dock water on the Fast Leak Drill (following a Loss of Coolant Accident (LOCA), as currently specified, should be assessed.
BAE-20	All the emergency provisions should be subject to EMIT by SQEP.
BAE-21	Consider the possibility of hardening buildings required by the Emergency Arrangements against environmental hazards and the provision of communications equipment that could operate after such hazards.
BAE-22	Consider recognising, in the Emergency Arrangements and emergency plans, the potential environment on and off-site, in which the arrangements and plans are to be used.
BAE-23	Consider how non-essential personnel will know that they should evacuate the site and how they can evacuate the site, if local structures and facilities, including road bridges and street lighting, are damaged.
BAE-24	Consider how the appropriate personnel on-site will know when not to expect guidance via the Emergency Arrangements and how they will be managed instead.
BAE-25	Consider how site personnel will communicate with each other (and off-site) if telephone systems (including mobile phone networks) have been damaged: It is noted that the submarine at the Wet Dock Quay will have very effective communication systems, but these will have a limited possible audience, which will not include personnel on-site.
BAE-26	Consider the skills that will be needed to respond to the particular situation developing on the site and whether such skills are readily available.
BAE-27	Recognise that personnel who are suitably qualified and experienced in the activity being undertaken at the time of the hazard, and in the safety issues associated with the activity, may be injured by damage caused by the initiating event.
BAE-28	Recognise that the seismic event may also damage office buildings on-site, so that other informed personnel may not be immediately available.
BAE-29	The plan to prevent a criticality accident may require ingress into a damaged, unlit building (e.g. the Devonshire Dock Hall (DDH), collapsed, unlit but on fire), with significant personnel safety implications, exacerbated by the possibility of a seismic aftershock: what guidance will be available to make the best decision.

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No.	Consideration
BAE-30	Recognise that BAE personnel off-site, who may be needed on-site, will not be available or even in communication with the site for some time and may have other priorities.
BAE-31	Recognise that Local Authority and specialist technical resources from off-site will not be available or even in communication with the site for some time. The Local Authority will anyway have other priorities.
BAE-32	Recognise that the initiating hazard will complicate off-site emergency measures.

**Table 11: Stress Test Considerations – Devonport Royal Dockyard Ltd**

Note that DRDL has identified considerations that apply to both the licensed site, and to the authorised site where activities in the wider Devonport area are under control of the MoD. Those considerations which are not within the scope of ONR regulation are highlighted in grey below, and are included here for completeness

No.	Consideration
DRD-1	Assess the hazard posed to the electrical systems by mechanical (e.g. freshwater) services within and the cryogenic storage tanks above the subways failing as a result of a seismic event and whether any reasonably practicable improvements can be made.
DRD-2	Consideration should be given to investigating the availability of cables with crimped ends, instead of the bespoke connector arrangements, thus allowing greater flexibility of connection.
DRD-3	Identify post seismic Shelter Stations, Forward Command Posts and alternative emergency response personnel.
DRD-4	Consider the benefit of an alternative 'clearway' to the helipad, noting the likely collapse of the Weston Mill Bridge (alternative landing site may be available on surface platforms within the DPoP).
DRD-5	Consideration may be given to the provision of alternative electrical generation equipment.
DRD-6	Consideration should be given to determining the potential flow rates as submarine non-tidal berths.
DRD-7	Ascertain the practicability of providing protection against ship collisions.
DRD-8	Consider relocating portable emergency response equipment (e.g. the PECWPs) to a location less likely to suffer flood / seismic damage and how their release may be controlled to prevent failure due to secondary effects following a seismic event.
DRD-9	Consideration could be given to providing alternative means of leak limitation to support freeze seals.
DRD-10	Although it is recognised that there is a robust understanding of the design basis, consideration should be given to ensuring that there is a nation wide programme of works to ensure that the modelling of extreme water level at individual sites is consistent and reviewed on a regular basis.
DRD-11	In addition to providing a means of preventing water ingress through the ducts, further alternatives, such as upgrading sump pumps, improving the water-tightness of equipment and connections, relocating potentially vulnerable equipment and the provision of additional / alternative Diesel Generators should be considered.

No.	Consideration
DRD-12	To protect electrical systems in the subways, consideration should be given to bunding around the hatches and fitting waterproof covers which are closed during periods of high tide.
DRD-13	To protect electrical systems in the subways, provision of engineered closures to transform the 9 Dock Crane Barrier into essentially a continuous perimeter bund for the Dock should be considered. This consideration should also be applied to 14 and 15 Docks.
DRD-14	To aid access / egress and keeping non-essential personnel safe, consideration should be given to restricting movements to essential personnel only and the marking of safe routes.
DRD-15	Consideration should be given to ensuring the volume of water ingress into the dock is minimised to increase the margins before a submarine in dock is affected.
DRD-16	To reduce the effect of unplanned slueing of a submarine off the dock cradle, consideration should be given to the attachment of mooring lines within the dock. This also applies to a sinker submarine docked down and an afloat submarine during a fast dock flood.
DRD-17	To protect the switchboards with the Electrical Plant Houses (EPHs), either the switchboards could be bunded or alternative supplies from existing or additional Diesel Generators should be considered.
DRD-18	To modify the diesel tank vents to prevent fuel contamination resulting from a flood.
DRD-19	Should brows and / or pontoons be lost, then for the Non Tidal X Berths (NTXBs), a Flat Bottomed Boat (FBB) or Rigid Inflatable Boat (rib) could be permanently moored within 5 Basin to provide access as required, and for the Docks, mobile cranes could be used to replace the brows.
DRD-20	In the highly unlikely event a submarine in Dock floats up under the Reactor Access House (RAH), increasing the sinker configuration of the submarine; redesigning the RAH to accept a rising submarine; and / or building a flood barrier around the dock / caisson should be considered.
DRD-21	Investigate the use of the cryogenic stores on 5 Basin Arm and 9 Dock to supply liquid nitrogen for freeze seals.
DRD-22	Either increase the bunding or install waterproof containers for the 9 Dock Diesel Generators (DGs) providing power to the submarine and also the salt water cooling, salt water trim and day dock drainage systems. Similarly for Pumped Flood Main DGs.
DRD-23	Consider providing bunding to the Central Frequency Changing Station switchboards, and switching off supplies in good time to reduce damage.
DRD-24	Consider installing wireless systems and UPS in Emergency Monitoring Headquarters (EMHQ).
DRD-25	Access to a Tsunami warning system with suitable site-wide alarms should be investigated to allow time for personnel to take appropriate action.
DRD-26	Emergency equipment, whether in containers or in unsecured areas, should be identified and moved to secure locations.
DRD-27	Consider suitable mooring arrangements to restrain an afloat submarine fore and aft.

No.	Consideration
DRD-28	Local isolation of the Oil Fuel Depot Thanckes fuel tanks on Yonderberry Jetty should be considered in case of fire.
DRD-29	Consideration should be given to lengths of mooring lines employed.
DRD-30	Consider installing protective barriers, or relocating submarines to locations with improved protection, to avoid vessel impact.
DRD-31	Consider altering the lengths of hoses / cables employed so that their service is not affected by increasing pontoon height.
DRD-32	Consideration should be given to assessing buildings that have the potential to collapse onto over-side / cross-site services or affect access / egress as a result of natural external hazards and any reasonably practicable modifications undertaken.
DRD-33	Consideration should be given to assessing the effects of low temperatures (below the current design basis of -15°C) on the 60Hz electrical supply system.
DRD-34	Consideration for investigating options for the provision of alternative generators and associated equipment / tools.
DRD-35	Consideration be given to formalising the use of Elevated Thermal Roll Over (ETRO) for decay heat removal in 9 Dock and enhanced training be given to the operators in its application.
DRD-36	Consideration be given to moving the radioactive release monitors to a store which is resistant to large scale seismic and flooding events.
DRD-37	Consideration should be given to enhancing the communication system such that following postulated events and subsequent system failure, effective communication is maintained.
DRD-38	The stores holdings are to be reviewed and enhanced where appropriate to ensure sufficient basic stores (sandbags, light, etc) are in place to respond to large scale events.
DRD-39	Consider altering the lengths of hoses / cables employed so that their service is not affected by increasing pontoon height.

**Table 12: Stress Test Considerations – Rosyth Royal Dockyard Ltd**

No.	Consideration
RRD-1	Due to the low nature of the site the licensee has not identified any further considerations over and above its existing emergency arrangements, which can be scaled for major events.

**Table 13: Magnox Ltd Stress Test Considerations**

The *Considerations* below apply on all Magnox defuelled reactor sites. They are numbered to match the *Considerations* already presented in the National Final Report on Stress Tests for UK Nuclear Power Plants (Ref. 10), Annex 3

No.	Consideration
M-7	Consideration will be given to enhancing the availability of beyond design basis equipment.
M-8	Consideration will be given to providing further equipment to facilitate operator access around the Site.
M-10	Consideration will be given to enhancing on-site arrangements for command, control and communications.
M-12	Consideration will be given to updating and enhancing severe accident management guidance.
M-14	Consideration will be given to the fire safety case for ILW storage facilities to identify any appropriate enhancements to the level of resilience.

**Table 14: NNB GenCo Stress Test Considerations**

No.	Consideration
NNB-1	Seismic qualification of the valves and pipelines from the raw water storage system.
NNB-2	Carry out assessments of the seismic resistance of flood protection (volumetric protection).
NNB-3	Implementation of specific provisions to limit water ingress in to the cooling water pump house at the platform height.
NNB-4	Implementation of specific provisions to limit water ingress to buildings located on the outfall slab at the platform height.
NNB-5	Implementation of measures to protect the ultimate diesel generators and 12-hour batteries against flooding.
NNB-6	Measurement of the leak-tightness performance of security doors of buildings containing safety-related plant when flood water is present on the platform of the nuclear-island.
NNB-7	Extension of ultimate diesel generator autonomy by using mobile pumping of the main emergency diesel generator fuel tanks to recharge the ultimate diesel generator fuel tanks.
NNB-8	Extension of the duration of power supply of the essential functions by implementing additional stationary and / or mobile power sources (including any associated connection points).
NNB-9	Provision of means for re-powering the dedicated Severe Accident Instrumentation and Control equipment.
NNB-10	Provision of fixed connection points for the re-supply of electrical power to the reactor and fuel buildings.
NNB-11	Provision of an extra water supply for containment heat removal from the raw water storage system.
NNB-12	Provision of increased autonomy of the secondary circuit cooling through fresh water re-supply of the emergency feedwater system tanks by the raw water storage system.
NNB-13	Provision of an external connection to the fuel building to allow re-supply of the spent fuel cooling pools via the raw water storage system.
NNB-14	Establishment of passive or automatic opening of the spent fuel cooling pool hall to the nuclear auxiliary building to improve protection to over-pressurisation of the spent fuel pool hall.
NNB-15	Carry out a study of the equipment and organizational arrangements needed to facilitate the safe positioning of a fuel assembly being handled during a loss of electrical power event.
NNB-16	Integration of selected fuel building instrumentation in to the severe accident I&C scheme.

No.	Consideration
NNB-17	Addition of a remote operation capability to valves for introduction of extra water in the reactor building through the containment heat removal system spray nozzles.
NNB-18	Setting up a suitable communication system on the site in order to manage situations involving total loss of electrical power (i.e. sound-powered telephones).
NNB-19	Carry out a study and investigate the provision of diverse means of providing emergency feed water to the steam generators.
NNB-20	Carry out a study and investigate the provision of further systems or equipment to control containment over-pressure in severe accident conditions.
NNB-21	Carry out studies to investigate impact and advantages / disadvantages of adding means of cross connection between individual trains of safety systems. Both electrical and fluid systems to be considered.
NNB-22	Addition of diesel driven fire pumps.
NNB-23	Check containment penetration leakage beyond the current qualification requirements for the reactor containment.
NNB-24	Qualify the performance of instrumentation required for monitoring containment integrity for beyond design basis conditions.
NNB-25	Qualify the performance of the available instrumentation in the spent fuel cooling pool for prolonged boiling conditions.
NNB-26	Provision of a mobile pump for introduction of water in to the reactor building through the containment heat removal system spray nozzles.
NNB-27	Provision of a high power mobile emergency generator.
NNB-28	Carry out a study of the risk of hydrogen production due to radiolysis of water in the spent fuel cooling pool and if necessary identify and install additional equipment.
NNB-29	Carry out a study into the prevention and mitigation of hydrogen gas accumulation in the fuel building.
NNB-30	Ensure that severe accident management procedures provide contingencies for events which exceed both design basis and design extension conditions.

**Table 15: Overall Summary Table of Recommendations or Actions in the UK (non-power generating nuclear facilities)**

Technical area	Industry commitments, recommendations or Considerations	Regulatory STF	Recommendations from HM Chief Inspector's Report
<b>Within stress tests scope</b>			
Earthquakes	RRM-5, RRM-6, RRM-7, RRM-14, RRM-15, DRD-1, DRD-32, NNB-1, NNB-2	STF-23 to STF-25, STF-27 to STF-33, STF-35 to STF-37, STF-70	IR-10, IR-13, IR-16, FR-2, FR-3, FR-4
Flooding	RRM-4, RRM-5, RRM-8, RRM-10, RRM-11, RRM-12, RRM-15, RRM-16, BAE-2, DRD-10, DRD-12, DRD-13, DRD-15, DRD-17, DRD-18, DRD-20, DRD-22, DRD-23, NNB-3 to NNB-6	STF-35, STF-38 to STF-44, STF-70	IR-10, IR-13, IR-16, FR-2, FR-3
Extreme weather	RRM-13, DRD-32, DRD-33	STF-45 to STF-50, STF-70	IR-10, IR-13, IR-16, FR-2, FR-3
Loss of electrical supplies and Loss of ultimate heat sink	RRM-1, RRM-2, RRM-9, RRM-10, RRM-11, BAE-6, BAE-12, BAE-19, DRD-2, DRD-5, DRD-11 to DRD-13, DRD-17, DRD-22, NNB-7 to NNB-15, NNB-21, NNB-22, NNB-26	STF-51 to STF-60, STF-70, STF-93	IR-17, IR-18, IR-19, IR-20
Severe accident management	AWE-1 to AWE-5, RRM-3, RRM-4, RRM-7, RRM-15, BAE-1, BAE-3 to BAE-5, BAE-7 to BAE-11, BAE-13 to BAE-18, BAE-20 to BAE-32, DRD-2 to DRD-4, DRD-8, DRD-9, DRD-14, DRD-16, DRD-20 to DRD-31, DRD-34 to DRD-39, RRD-1, M-7, M-8, M-10, M-12, M-14, NNB-16 to NNB-20, NNB-22 to NNB-30	STF-21, STF-22, STF-26, STF-34, STF-61 to STF-69, STF-71 to STF-92	IR-6, IR-7, IR-21, IR-22, IR-24, IR-25, FR-4
Process for implementing recommendations and findings		STF-20, STF-94	FR-12
Technical area	Industry commitments, recommendations or Considerations (see Annexes 2 to 5)	Regulatory STF (see Table 0 in Executive Summary)	Recommendations from HM Chief Inspector's Report (see Annex 1)
Emergency response information			IR-1
Global nuclear safety			IR-2

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Technical area	Industry commitments, recommendations or Considerations	Regulatory STF	Recommendations from HM Chief Inspector's Report
Safety assessment			IR-5
National emergency response			IR-2, IR-3, FR-6, FR-7
Planning control			FR-5
Research			FR-10
Off-site infrastructure			IR-8, IR-9
Safety case			IR-25, FR-4

## Notes

Some STF are allocated to several technical areas.

AWE-n: *Considerations* from Atomic Weapons Establishment

RRM-n: *Considerations* from Rolls-Royce Marine Power Operations Ltd

BAE-n: *Considerations* from BAE Systems Marine Ltd

DRD-n: *Considerations* from Devonport Royal Dockyard Ltd

RRD-n: *Considerations* from Rosyth Royal Dockyard Ltd

M-n: *Considerations* from Magnox Ltd

NNB-n: *Considerations* from EDF Energy NNB Generation Company Ltd

STF-n: Stress Tests Finding as a result of review of licensees' stress tests reports

IR-n, FR-n: Recommendations from HM Chief Inspector's reports (Refs 1 and 2)

## Annex 3: ONR Expectations for Licensee Response to Recommendations

The expectations are “general” in terms of the overall requirements and “specific” in terms of individual technical or regulatory areas. The specific, technical expectations were developed by ONR’s nuclear topic lead inspectors for all of the site licensee facing recommendations. Although these expectations were developed for the recommendations they also inform the related stress test findings and considerations. Annex 1 shows how the recommendations, stress test findings and considerations are linked.

### General requirements:

For each Recommendation, STF and consideration we need a statement or commentary from the stakeholders of:

- a) **What the stakeholder considers to be the functional outcome, what they are trying to achieve by addressing the issue** – for example it could be new or improved plant or procedures or arrangements, or gaining increased understanding or knowledge which can then lead to improved plant or procedures. There may be other instances where the outcome is confirmation that the current situation is satisfactory.
- b) **what has actually been done so far** – factual statements which could include specification of new equipment, project team set up to review something, or for recent findings (like non PGNF STFs) “scoping exercise underway”.
- c) **whether the issue considered closed by the “stakeholder”** – obviously the stakeholder will have to provide a rationale for why the issue is closed and this will be a long the lines of an ALARP argument for licensees.
- d) **If it is not closed, what are they doing** – for instance is there a programme of work identified by the stakeholder in place to deal with the issue? As in c) above the stakeholder ought to give some rationale for why the programme of work (content and timescale) is a reasonable.

## ONR specific expectations

No.	Recommendation	Guidance
IR-8	<p>The UK nuclear industry should review the dependency of nuclear safety on off-site infrastructure in extreme conditions, and consider whether enhancements are necessary to sites' self sufficiency given for the reliability of the grid under such extreme circumstances.</p> <p>This should include: essential supplies such as food, water, conventional fuels, compressed gases and staff, as well as the safe off-site storage of any equipment that may be needed to support the site response to an accident; and timescales required to transfer supplies or equipment to site.</p>	<p>For this recommendation, ONR expects that the licensees and prospective licensees will review the support and provisions needed by a site during a nuclear emergency over a period of time. No fixed mission time is set, but the lessons from Fukushima are that a site could be self-sufficient for a significant period of time, no less than 72 hours, and that re-stock and re-supply may be difficult for an extended period.</p> <p>Sites already maintain reserves of supplies including fuel, gases, water and other materials to meet current operating rules. These reserves should be examined critically to determine how they could be extended and supplemented. In addition, provisions for staff both in terms of food and welfare should be reviewed to determine what can be done to keep staff and emergency responders fit and capable for an extended period.</p> <p>When considering re-supply and re-stocking of materials a wide range of initiating events should be considered to determine the potential difficulties in obtaining supplies. This could include coincident damage from the same hazard to locally sourced materials and damage to roads and infrastructure leading to delays in provision of materials from further afield. Similarly disruption to roads and traffic due to external hazards could also extend delivery times, and this needs factored into calculations of needs.</p> <p><b>Relevant SAPs:</b> SAPs FP7 and EES.3 and paragraphs 206, 207 and 371 are relevant.</p>
IR-9	<p>Once further relevant information becomes available, the UK nuclear industry should review what lessons can be learnt from the comparison of the events at the Fukushima-1 (Fukushima Dai-ichi) and Fukushima-2 (Fukushima Dai-ni) sites.</p>	<p>For this recommendation, ONR expects that the licensees will act in a coordinated manner (probably via the Safety Directors Forum) to acquire information from Fukushima and to review and analyse that information as part of their operational experience feedback.</p> <p>There are a significant number of international bodies with projects running or planned to review the events at these sites, and their differences, these are likely to include: IAEA ISSC; OECD/NEA; WANO; INPO; as well as learned societies and other recognised organisations. ONR expects a small group of specialists from the licensees will nominate individuals to interact with these projects to gain and disseminate information within their group, to their supply chain and to ONR, contributing to conferences and workshops as appropriate.</p> <p>The licensees are also expected to use their contacts with Japanese equivalents, mainly utilities, to ensure they gain access to relevant information as it becomes available.</p> <p>This will be a long term programme of work which will likely fit within the licensees' arrangements for research (the Nuclear Research Index) and/or continuous improvement.</p> <p><b>Relevant SAPs:</b> SAPs MS.4 and paragraphs 68 and 69 are relevant.</p>

No.	Recommendation	Guidance
IR-10	<p>The UK nuclear industry should initiate a review of flooding studies, including from tsunamis, in light of the Japanese experience, to confirm the design basis and margins for flooding at UK nuclear sites, and whether there is a need to improve further site-specific flood risk assessments as part of the periodic safety review programme, and for any new reactors. This should include sea-level protection.</p>	<p>For this recommendation, ONR expects that the licensees will review the existing flooding studies for individual sites using a structured and systematic process. For organisations which operate a fleet of licensed sites, ONR expect the process applied to be consistent, but adapted to the needs and challenges of each site. ONR will work with the Environment Agency and SEPA to review information provided for consistency with modern standards and with regional flood action planning.</p> <p>Having reviewed the design basis and the associated uncertainty, the available defences should also be reviewed by the licensees, both as individual barriers, and also as a system of engineered barriers, to determine the available margins. The potential future margins and variations in uncertainty due to climate change should also be considered, and defences should be reviewed for their potential for enhancement or adaptability beyond the next significant period of operation, typically using 10 yearly intervals to match Periodic Safety Review timings.</p> <p>The effects of potential flooding off the nuclear licensed site which could impair recovery actions should be considered by the licensees when reviewing emergency arrangements and re-stock and re-supply times. Flood depths and durations may have an impact on the types of vehicles used to deliver staff and equipment to sites in support of an emergency response and need to be determined on a consistent basis.</p> <p><b>Relevant SAPs:</b></p> <p>SAPs EHA.3, EHA.7, EHA.12 and paragraphs 227 and 228 are relevant. Annexes 1 and 6 of T/AST/013 is also relevant.</p>
IR-11	<p>The UK nuclear industry should ensure that safety cases for new sites for multiple reactors adequately demonstrate the capability for dealing with multiple serious concurrent events induced by extreme off-site hazards.</p>	<p>This recommendation specifically applies to new sites for multiple reactors, so responses from existing sites are not required.</p>
IR-12	<p>The UK nuclear industry should ensure the adequacy of any new spent fuel strategies compared with the expectations in the Safety Assessment Principles of passive safety and good engineering practice.</p> <p><i>Existing licensees are expected to review their current spent fuel strategies as part of their periodic review processes and make any reasonably practicable improvements, noting that any intended changes need to take account of wider strategic factors including the implications for the nuclear fuel cycle.</i></p>	<p>The licensee's response would be expected to include consideration of a number of aspects including:</p> <ul style="list-style-type: none"> <li>■ A clear demonstration of which sites/facilities are within or out with the scope of this recommendation. This necessarily includes existing spent fuel stocks as well as new spent fuel.</li> <li>■ A recognition and demonstration of arrangements to deal with existing spent fuel stocks.</li> <li>■ I expect that MOD / defence spent fuel stocks held on nuclear licensed sites to be covered within this recommendation</li> <li>■ I expect statements to be made on site/facility engagement and progress with national strategies to manage spent fuel eg Oxide Operating Plan and Magnox Operating Plan</li> <li>■ Key SAPs to be addressed include inter alia EKP3 (Defence in depth ) and RW 1 ( strategies for radioactive waste ).</li> <li>■ This topic includes a forward look on what might be expected in the future. Any discussion should where appropriate take account of wider aspects such as government policy, international good practice, security, transport, waste disposal, nuclear research etc.</li> </ul>

No.	Recommendation	Guidance
IR-13	<p>The UK nuclear industry should review the plant and site layouts of existing plants and any proposed new designs to ensure that safety systems and their essential supplies and controls have adequate robustness against severe flooding and other extreme external events.</p> <p><i>This recommendation is related to Recommendation IR-25 and should be considered along with the provisions put in place under that recommendation. It should include, for example, the operator's capability to undertake repairs and the availability of spare parts and components.</i></p>	<p>For this recommendation, ONR expects that the licensees and prospective licensees will review the site layouts and building elevations and thresholds to determine their susceptibility to flooding in a structured and systematic manner. All potential flooding routes into buildings from entrances, penetrations, service connections, etc., should be considered. The locations of key equipment within buildings should also be considered within the review.</p> <p>The outputs of these reviews should indicate the times and flood levels at which equipment and systems including their supplies and controls could be compromised and the likely effects on overall plant safety. Potential resilience enhancements should be identified and robust optioneering undertaken to determine which enhancements are ALARP including local (e.g bunding) and global (e.g. thresholds or sea defences) defences.</p> <p>A similarly robust approach should be adopted for other external events.</p> <p>The plant locations and layouts are important to the potential remedial actions which can be undertaken by the workforce and emergency response teams to control, mitigate, or prevent escalation of an event. The reviews should consider all locations to which teams may need access and ensure that safe routes are available for the teams and the associated equipment. This identification of safe routes should take due account of potential interactions from non-qualified or protected equipment and structures, for example, collapsed masonry or flood born debris fields.</p> <p><b>Relevant SAPs:</b></p> <p>SAP ELO.4 and paragraphs 206 and 207 are relevant.</p>
IR-14	<p>The UK nuclear industry should ensure that the design of new spent fuel ponds close to reactors minimises the need for bottom penetrations and lines that are prone to siphoning faults. Any that are necessary should be as robust to faults as are the ponds themselves.</p>	<p>The licensee's response would be expected to include consideration of a number of aspects including:</p> <ul style="list-style-type: none"> <li>■ A clear demonstration of which sites/facilities are within or out with the scope of this recommendation. This necessarily includes existing spent fuel ponds at other facilities and not necessarily just those next to reactors. The scope also includes proposals submitted under Generic Design Assessment.</li> <li>■ ONR will to gain confidence that arrangements under LCs 16, 23 and 28 are robust in order to identify, examine, test and inspect bottom penetrations of ponds as appropriate.</li> <li>■ Where ponds are identified which have bottom penetrations , then I would expect some discussion on what , if any improvements are possible, in line with LC15 safety case review arrangements, timescales for implementation, safety margins ie time to drain etc</li> <li>■ If pond draining has been identified as a fault, then I would expect licensee's to include some discussion on how this fault would be revealed. It may be not be self evident that a pond has started to drain.</li> <li>■ I would expect some discussion on the safety categorisation of systems and components to protect against pond draining faults.</li> </ul>
IR-15	<p>Once detailed information becomes available on the performance of concrete, other structures and equipment, the UK nuclear industry should</p>	<p>For this recommendation, ONR expects that the licensees will act in a coordinated manner (probably via the Safety Directors Forum) to acquire information from Fukushima and to review and analyse that information as part of their operational experience feedback.</p> <p>There are a significant number of international bodies with projects</p>

No.	Recommendation	Guidance
	<p>consider any implications for improved understanding of the relevant design and analyses.</p> <p><i>The industry focus on this recommendation should be on future studies regarding the continuing validation of methodologies for analysing the seismic performance of structures, systems and components important to safety. This should include concrete structures and those fabricated from other materials.</i></p>	<p>running or planned to review the seismic performance of structures, systems and components in light of the specific events at Fukushima, these are likely to include: IAEA ISSC; OECD/NEA; WANO; INPO; as well as learned societies and other recognised organisations. ONR expects a small group of seismic specialists from the licensees will nominate individuals to interact with these projects to gain and disseminate information within their group, to their supply chain and to ONR, contributing to conferences and workshops as appropriate.</p> <p>The licensees are also expected to use their contacts with Japanese equivalents, mainly utilities, to ensure they gain access to relevant information as it becomes available.</p> <p>This will be a long term programme of work which will likely fit within the licensees' arrangements for research (the Nuclear Research Index) and/or continuous improvement.</p> <p><b>Relevant SAPs:</b></p> <p>SAPs MS.4 and paragraphs 68 and 69 are relevant.</p>
IR-16	<p>When considering the recommendations in this report the UK nuclear industry should consider them in the light of all extreme hazards, particularly for plant layout and design of safety-related plant.</p>	<p>For this recommendation, ONR expects that the licensees will take a wide view of the potential for all forms of external hazards to effect their sites, and their structures, systems and components important to safety. Although the events at Fukushima were initiated by a major earthquake and the resulting tsunami, it is important to review a wider range of external hazards.</p> <p>On and off site emergency responses will be constrained by the prevailing conditions and the extent of damage resulting from the initiating external event. This needs to be factored into assessments for response times and actions to ensure that credible difficulties to emergency response have been considered and realistic times for response determined.</p> <p>All sites will have existing external hazards safety cases, or varying complexity and age. These should be reviewed to ensure all of the functions important to control, cooling and containment, including emergency response functions have their structures, systems and components reviewed to ensure they provide suitable levels of functionality following the full spectrum of potential external hazards.</p> <p><b>Relevant SAPs:</b></p> <p>SAPs EHA.1, EHA.6 and EHA.7 and Table 1 of T/AST/013 are relevant.</p>

No.	Recommendation	Guidance
FR-2	<p>The UK nuclear industry should ensure that structures, systems and components needed for managing and controlling actions in response to an accident, including plant control rooms, on-site emergency control centres and off-site emergency centres, are adequately protected against hazards that could affect several simultaneously.</p>	<p>For this recommendation, ONR expects that the licensees will undertake a review of functions needed to take command of and manage a nuclear emergency at a licensed site and their protection against external hazards.</p> <p>The range of functions required depends on the complexity of the licensed facility and the functional needs will vary in a proportionate manner. For power reactor sites, the following functional requirements provide a brief list of ONR's expectations for a new facility, but they need to be developed by the licensees in a structured and systematic manner.</p> <p>Primary and secondary control and indication centres for both the reactor and the spent fuel facilities:</p> <ul style="list-style-type: none"> <li>Reactivity or criticality control</li> <li>Control of cooling,</li> <li>Control of containment boundaries</li> </ul> <p>Emergency control centres Access Control Centres or Facilities Emergency Response Vehicles and Equipment and their associated garaging Welfare facilities for a significant number of emergency responders, including contamination control.</p> <p>For off-site facilities shared with other emergency responders and services, the licensee normally has no direct control over the resistance of the facility to external hazards. However the licensee is expected to review the capability of the facility and plan accordingly.</p> <p>For off-site facilities owned and operated by the licensee, the facility should be reviewed against the range of external hazards applicable to ensure they provide the necessary protection against these hazards.</p>
		<p>For existing nuclear licensed sites, many of these functions already exist, although they may have a varying degree of hazard resistance. ONR expects that a full list of functional requirements will be developed by the licensee and each facility already available will be reviewed against this list to perform a gap analysis of the current standard vs relevant good practice. The output of this gap analysis could inform a optioneering assessment of potential enhancements and then a structured reasonable practicability study presented to support proposals for improvement. How each licensee applies this approach, particularly for the smaller licensees should be discussed with the relevant programme leads in ONR.</p> <p><b>Relevant SAPs:</b></p> <p>SAPs FP.7, ELO.4, EHA.1, EHA.6 and EHA.7 and Table 1 of T/AST/013 are relevant.</p>

No.	Recommendation	Guidance
FR-3	Structures, systems and components needed for managing and controlling actions in response to an accident, including plant control rooms, on-site emergency control centres and off-site emergency centres, should be capable of operating adequately in the conditions, and for the duration, for which they could be needed, including possible severe accident conditions.	<p>This recommendation is closely related to FR-2. ONR expects that the licensees will undertake a review of functions needed to take command of and manage a nuclear emergency at a licensed site and their protection against external hazards.</p> <p>The key difference from Recommendation FR-2 is the need for the functions to be provided and operated for an extended period under significant duress induced initially by the external hazard and the potential resulting nuclear emergency. This implies that the facilities need to provide the following:</p> <ul style="list-style-type: none"> <li>Sufficient power to provide stable heating and lighting as well as communication and IT</li> <li>Facilities to ensure that emergency responders can be decontaminated, if necessary, and permitted to work in an environment conducive to secure decision making, without the need to work and rest in any form of protective clothing or PPE. Filtered ventilation systems will be expected along with any portable shielding needed.</li> <li>A means of providing food and rest for an extended period is expected.</li> </ul> <p>The range of functions required depends on the complexity of the licensed facility and the functional needs will vary in a proportionate manner. For power reactor sites, the following functional requirements provide a brief list of ONR's expectations for a new facility, but they need to be developed by the licensees in a structured and systematic manner.</p>
		<ul style="list-style-type: none"> <li>Primary and secondary control and indication centres for both the reactor and the spent fuel facilities:</li> <li>Emergency control centres</li> <li>Access Control Centres or Facilities</li> <li>Emergency Response Vehicles and Equipment and their associated garaging</li> <li>Welfare facilities for a significant number of emergency responders, including contamination control.</li> <li>Off-site facilities shared with other emergency responders and services</li> </ul> <p>Off-site facilities owned and operated by the licensees</p> <p><b>Relevant SAPs:</b> SAPs FP.7, ELO.4, EHA.1, EHA.6 and EHA.7 and Table 1 of T/AST/013 are relevant.</p>

No.	Recommendation	Guidance
IR-17	<p>The UK nuclear industry should undertake further work with the National Grid to establish the robustness and potential unavailability of off-site electrical supplies under severe hazard conditions.</p>	<p>A guiding principle for this one is that a licensee is not responsible for the grid and therefore any probabilistic claims made on the grid should be modest. I will split my guidance into procedural, deterministic and probabilistic claims.</p> <p><u>Procedural</u></p> <p>The licensee must be able to demonstrate that it has good working relationship with National Grid or the relevant Distribution Network Operator (DNO) depending on a site's connection arrangements for offsite power. There should be a full understanding of the key interfaces between the offsite supplier and the licensee and a rigorous understanding of where the responsibility for maintenance, testing and upgrade of electricity supply systems lies.</p> <p><u>Deterministic Principles</u></p> <p>Each site should preferably be supplied by dual circuits with a reasonable degree of separation between each circuit. At the site substation the layout should be such that a major disruptive failure in a single component such as a transformer would not result in a sustained (&gt;24 hrs) loss of the whole site supply. Relaxation can be applied for sites where the facilities can remain safe under sustained and lengthy loss of offsite power.</p> <p><u>Probabilistic Claims</u></p> <p>These are important as they are a key criteria for of the defence-in-depth applied to the onsite supplies. The following figures (site/yr) are typical of what should be a bounding claim for off-site supplies for the initiating event Loss Of Offsite Power (LOOP).</p> <p>Short Term LOOP (up to 2 hrs) 5E-2/yr                      Intermediate LOOP (2- 24 hrs) 1E-2/yr                      Long Term LOOP (&gt;24 - 192 hrs) 2E-4/yr                      Extreme LOOP (&gt;192 hrs) 2E-5/yr</p>
		<p>Any figure lower than these should be challenged vigorously. I am particularly keen to pursue the line that all LOOPS up to 24 hrs should be treated as a frequent event and every type of LOOP is a design basis accident.</p> <p>So what I am looking for from assessment inspectors is a brief analysis of the licensee's position against the criteria mentioned above.</p>
IR-18	<p>The UK nuclear industry should review any need for the provision of additional, diverse means of providing robust sufficiently long-term independent electrical supplies on sites, reflecting the loss of availability of off-site electrical supplies under severe conditions.</p> <p><i>This should be considered along with Recommendation IR-8 within the wider context of "on-site resilience".</i></p>	<p>This one will vary considerably because of the wide variation in integrity claimed for on-site supplies. The basic criterion that I am looking for is whether the licensee have challenged the robustness and resilience of their on-site electricity supply arrangements vigorously, certainly in response to the ENSREG type of requirement but ideally even broader than this. A good example is earthing, which is critical to the operation of all electricity supply systems. What safety classification does the licensee give to the earthing system? If it is lower than the on-site electricity system or non-classified can the on-site electricity perform its support safety function with a major earth fault?</p> <p>So I what I am looking for a is brief report describing how the licensees have challenged the robustness and resilience of their on-site electricity supplies or have a credible programme in place to undertake the work. Where improvements have already been identified then there should be a credible programme in place to implement the improvements.</p>

No.	Recommendation	Guidance
IR-19	<p>The UK nuclear industry should review the need for, and if required, the ability to provide longer term coolant supplies to nuclear sites in the UK in the event of a severe off-site disruption, considering whether further on-site supplies or greater off-site capability is needed. This relates to both carbon dioxide and fresh water supplies, and for existing and proposed new plants.</p>	<p>The dutyholder should identify the requirements for safety important active cooling on the nuclear site under both normal and fault conditions, and then assess the vulnerability of such cooling provision in the event of severe off site disruption.</p> <p>Where the dutyholder identifies a potential vulnerability, they should adopt a precautionary approach and then identify suitable provision in the form of either greater on site supplies of coolant, or greater off site supplies of coolant, or both.</p> <p>Where the need for greater on site supplies of coolant is identified, the dutyholder should identify a realistic forward programme for provision of such supplies, which will include for the generation of an adequate safety justification. The provision of such supplies should also cover suitable and sufficient means of delivering the coolant to the required location, accounting for redundancy, diversity, and segregation of routes and associated supply equipment. This safety justification should cover the need for the design of facilities and equipment to be robust to the circumstances causing the severe off site disruption. Safety important equipment and facilities should have an adequate safety function categorisation, and equipment classification, commensurate with their role. This should then lead to the identification of an appropriate EMIT regime.</p> <p>Similar considerations apply where the need for greater off site supplies of coolant are identified. However, for off site supplies, the dutyholder should recognise the greater vulnerability of such supplies to the severe off site disruption event, specifically in terms of delivery of coolant.</p> <p>Suitable margins should be identified for additional cooling supplies which are identified, in terms of quantity of coolant.</p> <p>Reliance on human interaction for provision of coolant supplies should be identified, accompanied by provision of suitable training of staff, identification of responsibilities, and generation of instructions.</p> <p>Generally the provision of additional coolant supplies should be based on principles of simplicity, flexibility, and robustness, given the general uncertainty associated with severe off site disruption events.</p> <p>The dutyholder should base their provision on a realistic assessment of timescales associated with severe off site disruption, and their arrangements should give appropriate consideration to longer term scenarios, based on considerations of hazard and risk.</p>

No.	Recommendation	Guidance
IR-20	<p>The UK nuclear industry should review the site contingency plans for pond water make up under severe accident conditions to see whether they can and should be enhanced given the experience at Fukushima.</p>	<p>The dutyholder should review the requirements for pond water make up on the nuclear site under severe accident conditions.</p> <p>Where the dutyholder identifies a potential vulnerability, they should adopt a precautionary approach and then identify suitable provision in the form of either greater on site supplies of pond water, or greater off site supplies of pond water, or both.</p> <p>Where the need for greater on site supplies of pond water is identified, the dutyholder should identify a realistic forward programme for provision of such supplies, which will include for the generation of an adequate safety justification. The provision of such supplies should also cover suitable and sufficient means of delivering the pond water to the required location, accounting for redundancy, diversity, and segregation of routes and associated supply equipment. This safety justification should cover the need for the design of facilities and equipment to be robust to the circumstances causing the severe accident. Safety important equipment and facilities should have an adequate safety function categorisation, and equipment classification, commensurate with their role. This should then lead to the identification of an appropriate EMIT regime.</p> <p>Similar considerations apply where the need for greater off site supplies of pond water are identified. However, for off site supplies, the dutyholder should recognise the greater vulnerability of such supplies to the severe accident, specifically in terms of delivery of pond water.</p> <p>Suitable margins should be identified for additional pond water supplies which are identified, in terms of quantity of pond water.</p> <p>Reliance on human interaction for provision of pond water supplies should be identified, accompanied by provision of suitable training of staff, identification of responsibilities, and generation of instructions.</p> <p>Generally the provision of additional pond water supplies should be based on principles of simplicity, flexibility, and robustness, given the general uncertainty associated with severe accidents.</p> <p>The dutyholder arrangements should specifically consider reactivity control considerations in respect of the provision of additional pond water.</p> <p>The dutyholder should specifically consider water chemistry control in respect of the provision of additional pond water.</p>

No.	Recommendation	Guidance
IR-21	<p>The UK nuclear industry should review the ventilation and venting routes for nuclear facilities where significant concentrations of combustible gases may be flowing or accumulating to determine whether more should be done to protect them.</p>	<p>The dutyholder should identify the potential for the generation of significant quantities of combustible gases under both normal and fault conditions (including severe accident conditions).</p> <p>The dutyholder should review the associated ventilation equipment and identify the present function of the ventilation system in protecting the nuclear facility from the hazard potential from combustible gases. Where the present design of the ventilation system does provide such protection, this should be recognised as an important safety function, and cascaded through the dutyholder arrangements and safety justifications as appropriate.</p> <p>Where a combustion hazard is identified, then the dutyholder should also assess whether it is reasonably practicable to modify the ventilation system to provide further protection, with a focus on suitable discharge routes, and/or other means (e.g. chemical) to eliminate or reduce anticipated combustible gases. Where such modifications are considered reasonably practicable, the dutyholder should identify a realistic forward programme for provision of such modifications, which will include for the generation of an adequate safety justification.</p>
IR-22	<p>The UK nuclear industry should review the provision on-site of emergency control, instrumentation and communications in light of the circumstances of the Fukushima accident including long timescales, wide spread on and off-site disruption, and the environment on-site associated with a severe accident.</p> <p><i>In particular, the review should consider that the Fukushima-1 site was equipped with a seismically robust building housing the site emergency response centre which had: adequate provisions to ensure its habitability in the event of a radiological release; and communication facilities with on-site plant control rooms and external agencies, such as TEPCO headquarters in Tokyo.</i></p>	<p>Key to the successful handling of any emergency is access to reliable data from on-site monitoring equipment because taking correct decisions in an emergency is dependent on having high quality information available and access to a reduced subset of controls independent of the main control room facilities.</p> <p>Similarly communications equipment within the site should be designed to be resilient to a wide range of hazardous and fault conditions. One of the key factors of importance in this work is the design of equipment to tolerate the harsh environmental conditions that can accompany a severe accident. Fukushima has taught us that the emergency may well have to operate for extended periods and therefore equipment qualification should not only address transient phenomena but also sustained levels of heat, humidity, vibration, shock tremors, temperature, radiation, pressure, chemical corrosion, raised levels of electromagnetic interference, and the potential for mechanical damage due to debris. The equipment qualification should also take into account that the systems will be subject to multiple challenges. So a key aspect of this recommendation is an evaluation of the licensee's assessment of the operability of key instrumentation, monitoring, control and communications equipment based on a realistic analysis of the hazardous environment over an extended period of time. Where detailed analysis of the harsh environment is not available then pessimistic assumptions may need to be made which is contrary to the more usual severe accident analysis which is based on best estimate methods. Best estimate is still the basis for this work but where either codes or experimental evidence is not available then pessimistic assumptions may need to be made. This does not mean that severe accident control, monitoring and communications equipment will need to be classified above Class 3. What it does mean is that there must be high level of confidence that the equipment will operate effectively in the harsh conditions following a severe accident and that the emergency response team can be highly confident that the control and instrumentation is giving and accurately communicating high quality data on the evolution of the accident and the effectiveness of licensee's mitigation measures. Emergency control can be achieved through local control panels however this is only acceptable if the in the environment in the location of the control panels following the accident is fit for safe operator occupation. If this is cannot be established then a remote shutdown and control centre is required and this RSC should be</p>

No.	Recommendation	Guidance
		well separated from the main control room.
IR-23	<p>The UK nuclear industry, in conjunction with other organisations as necessary, should review the robustness of necessary off-site communications for severe accidents involving widespread disruption.</p> <p><i>In addition to impacting communications, it is possible that external events could also affect off-site centres used to support at site in an emergency. Alternative locations should be available and they should be capable of being commissioned in an appropriate timescale.</i></p>	<p>Any major accident at a nuclear site will almost immediately become of international importance and significance. Key to the successful handling of such an event will be a high level of confidence that the site can effectively communicate the status of its facilities to key stakeholders outside of the site. This means that offsite communications should be diverse and resilient to a wide range of challenges particularly those that can cause a sustained loss of offsite power. This is particularly challenging as many of the hazardous conditions that can threaten the off-site electricity supplies (floods, fire, wind, space weather, lightning etc.) can also expose vulnerabilities of offsite communications equipment. However the licensee needs to demonstrate that for initiating events within the design basis and beyond sufficient communication equipment will remain operable to ensure that the site can both give and receive information with key offsite stakeholders and statutory bodies.</p>

No.	Recommendation	Guidance
IR-24	<p>The UK nuclear industry should review existing severe accident contingency arrangements and training, giving particular consideration to the physical, organisational, behavioural, emotional and cultural aspects for workers having to take actions on-site, especially over long periods. This should take account of the impact of using contractors for some aspects on-site such as maintenance and their possible response.</p> <p><i>This is a wide ranging recommendation and there are a number of aspects that need to be included:</i></p> <p>a) <i>the reviews need to acknowledge design differences between individual nuclear facilities and consider whether corporate Severe Accident Guidelines need to be customised;</i></p> <p>b) <i>adequacy of trained personnel numbers for long-term emergencies, particularly for multi-unit sites, and taking into account the potential impact of infrastructure damage and societal issues on the ability to mobilise large numbers of personnel;</i></p> <p>c) <i>the time windows for availability of off-site support may be challenged hence the role of on-site personnel may change, which has implications for procedures and training;</i></p>	<p>ONR's expectation is that the Licensee will write to ONR in June 2012, setting out to what extent its existing severe accident contingency arrangements and training, consider and have been informed by the matters identified in Recommendations IR-24. The Licensee should base its response on potential for severe accidents hence coordination with its safety case leads is needed to determine applicability and proportionality. The Licensee is expected to inform its response but not limited to, evaluation of the following aspects:</p> <ul style="list-style-type: none"> <li>■ Staffing needs and availability, both on and off-site, to perform anticipated response tasks within available time windows. The expectation is that the Licensee considers staffing and availability for anticipated tasks and conditions when moving from most onerous design basis to beyond design basis and into severe accidents.</li> <li>■ Competence and training needs (on and off site personnel and contractors, including any multi-skilling requirements)</li> <li>■ Communications and mobility requirements and how this is supported (on and off site, including necessary data and signals to allow for adequate levels of situational awareness and decision-making).</li> <li>■ Procedures required when moving from design basis to beyond design basis and into severe accident conditions; multiple procedure use, their coherency and availability.</li> <li>■ Impact of conducting tasks (cognitive and physical) and using equipment under extreme environmental conditions, time pressure, stress, wearing of PPE.</li> </ul> <p>This Licensee's response should account for human physical and psychological capabilities and limitations and the impact of likely prevailing conditions and damage states on personnel in terms of perception decision-making and action execution. The response should also consider long term severe accidents.</p> <p>The Licensee should demonstrate that a systematic process has been (or will be) applied to address these human factors matters in the context of severe accident contingency arrangements and training. The response should set out any identified shortfalls, what is being to done to address these shortfalls, and any progress to date and programme for continual improvement.</p>

No.	Recommendation	Guidance
	<p>d) <i>the review of Severe Accident Management Guidelines (SAMG) should consider not only critical safety functions prioritisation, but also whether and how SAMGs support any dynamic reprioritisation based on emerging information;</i></p> <p>e) <i>consideration should also be given to operator support requirements relating to tactical and strategic decision making; and</i></p> <p>f) <i>in addition to the acute phase of a severe accident, consideration also needs to be given to stabilisation, recovery and clean-up, and the personnel involved from the many organisations involved.</i></p>	<p>It is important to note that the Recommendation is associated with effective human factors considerations and specialist HF input to the development and suitability of the licensee's severe accident contingency arrangements and training. The Licensee should recognise that Recommendation IR-25 includes significant human factors considerations and ONR expects the Licensee's response to also reflect this. After considering and identifying all the aspects of the Recommendation(s), severe accident contingency arrangements and training need to be reviewed and updated as necessary. There are also links between this Recommendation and the emergency arrangements Recommendations; it is sensible for the Licensee to also ensure that responses on these are also consistent.</p> <p>Key to this Recommendation is the learning points from Fukushima that accident sequences do not end at arbitrary points in time (e.g. 24 hours) and have diversion and deviations that need to be anticipated and reacted to in order to reach a stable safe state.</p>
FR-11	<p>The UK nuclear industry should continue to promote sustained high levels of safety culture amongst all its employees, making use of the National Skills Academy for Nuclear and other schemes that promote "nuclear professionalism".</p>	<p>ONR's expectation is that the Licensee will write to ONR in June 2012, setting out its approaches to promoting and sustaining high levels of safety culture amongst all its employees. This should also include how the Licensee ensures that contractors are also imbued with an appropriate safety culture.</p> <p>It is recognised that safety culture is a very broad topic, but the licensee's response would be expected to include consideration of a number of aspects including:</p> <ul style="list-style-type: none"> <li>■ The policies and approaches taken and planned, to promote an effective safety culture within all staff including contractors. Demonstration that the licensees' policies, monitoring and promotion activities for safety culture are suitably addressed within the management system.</li> <li>■ How the Board and senior licensee managers set out, communicate and resource their expectations</li> <li>■ How the Board maintains oversight of the safety culture within its organisation</li> <li>■ How the licensee promotes and assures effective safety leadership at all levels within the organisation</li> <li>■ The measures taken to assess safety culture and current or planned measures being taken in response to assessments to further enhance the safety culture amongst all staff.</li> <li>■ The measures taken or planned to make use of the National Skills Academy for Nuclear and other schemes that promote 'nuclear professionalism'.</li> </ul>

No.	Recommendation	Guidance
IR-25	<p>The UK nuclear industry should review, and if necessary extend, analysis of accident sequences for long-term severe accidents. This should identify appropriate repair and recovery strategies to the point at which a stable state is achieved, identifying any enhanced requirements for central stocks of equipment and logistical support.</p> <p><i>Recommendation IR-25 is linked with Recommendation IR-13. Combining these two recommendations means that we would expect industry to:</i></p> <ul style="list-style-type: none"> <li>a) <i>identify potential strategies and contingency measures for dealing with situations in which the main lines of defence are lost. Considerations might include, for example, the operator's capability to undertake repairs and the availability of spares (capability includes the availability of personnel trained in the use of emergency equipment along with necessary supporting resources);</i></li> <li>b) <i>consider the optimum location for emergency equipment, so as to limit the likelihood of it being damaged by any external event or the effects of a severe nuclear accident;</i></li> <li>c) <i>consider the impact of potential initiating events on the utilisation of such equipment;</i></li> <li>d) <i>consider the need for remotely controlled equipment including valves;and</i></li> </ul>	<p>This one is much more straightforward than the recommendation on the L2 PSA although unless a licensee has undertaken a L2 PSA or an equivalent type of analysis demonstrating compliance will be very challenging as a basic assumption of the recommendation is that a baseline severe accident analysis that can be extended already exists. So what I will be looking for from the assessment inspector is a brief review of how a licensee has either achieved or plans to achieve clauses a) to h). To fully address this recommendation the accident analysis inspector will need to coordinate his or her responses with those inspectors undertaking the work on IR14 (plant layout) as the two are closely linked.</p>

No.	Recommendation	Guidance
	<p>e) <i>consider in the layout of the site effective segregation and bunding of areas where radioactive liquors from accident management may accumulate.</i></p> <p>Regarding other aspects of Recommendation IR-25, the industry needs to:</p> <p>f) ensure it has the capability to analyse severe accidents to properly inform and support on-site severe accident management actions and off-site emergency planning. Further research and modelling development may be required;</p> <p>g) ensure that sufficient severe accident analysis has been performed for all facilities with the potential for accidents with significant off-site consequences, in order to identify severe accident management and contingency measures. Such measures must be implemented where reasonably practicable and staff trained in their use; and</p> <p>h) examine how the continued availability of sufficient on-site personnel can be ensured in severe accident situations, as well as considering how account can be taken of acute and chronic stress at both an individual and team level (this is linked to Recommendation IR 24).</p>	

No.	Recommendation	Guidance
FR-1	<p>All nuclear site licensees should give appropriate and consistent priority to completing Periodic Safety Reviews (PSR) to the required standards and timescales, and to implementing identified reasonably practicable plant improvements.</p>	<p>ONR's expectation is that the Licensee will write to ONR in June 2012, setting out its approaches to ensuring compliance with LC15.</p> <p>In doing this SLCs are referred to SAPs expectations for PSRs under LC 15 which conform to IAEA International guidelines and to TAG/050 which is our internal guidance for assessing the adequacy of LC15 arrangements. Broadly summarised, the purpose of a PSR is to determine, by means of a comprehensive assessment:</p> <ol style="list-style-type: none"> <li>(1) the extent to which the nuclear facility conforms to modern standards and good practices,</li> <li>(2) the extent to which the licensing basis remains valid taking into account factors such as plant modifications, changes to modes of operation and degradation of the asset,</li> <li>(3) the adequacy of the arrangements in place to maintain safety until the next PSR (or the end of life), and,</li> <li>(4) safety improvements to be implemented to resolve safety issues. Whilst a PSR approximates to a 10 year periodicity, a need to carry out mini-PSRs on a more frequent basis may be obviated if situations dictate.</li> </ol> <p>The extent of the review should be proportionate to the risk and hazard of the facility under consideration.</p> <p>The Licensee's arrangements should set out a process for identifying facilities requiring a PSR in sufficient time that the review can be carried out in a timely manner.</p> <p>Primarily, a PSR should be of value to the licensee as an integral part of a company's approach to risk management. It should be documented and structured to be accessible and useable at different management and operational levels within the licensee's organisation. It should not be aimed solely or specifically at the regulator.</p> <p>The review should be wide ranging, 'open minded' and challenging. It should not be simply an assertion of safety. The review needs to encompass organisational and management system (people and process) aspects as well as the technical aspects of the facility. This includes so called 'softer issues' such as leadership and culture, which can have a profound effect on safety (as evidenced in the lessons from major events such as Fukushima). Threats posed to plant and facility integrity such as failure of infrastructure, poor asset management, or, infrequent situations that potentiate leak and escape scenarios should be addressed in the light of events such as Fukushima, where beyond design basis accidents (DBA) have occurred.</p> <p>In other words, <b>Safety cases should be current</b>; in particular, they need to have considered changes to modern standards, modifications to the plant, deferrals to Decommissioning Plans and any degradation mechanisms that could compound potential for loss of control or leak and escape of radiological inventories and the arrangements for PSR are a major contributor to achieving this overall objective.</p>

No.	Recommendation	Guidance
FR-4	<p>The nuclear industry should ensure that adequate Level 2 Probabilistic Safety Analyses (PSA) are provided for all nuclear facilities that could have accidents with significant off-site consequences and use the results to inform further consideration of severe accident management measures. The PSAs should consider a full range of external events including “beyond design basis” events and extended mission times.</p>	<p>This is perhaps the most difficult one as the only guidance available is for NPP and this is heavily biased towards light water reactors (IAEA Safety Guide SSG-4). The full L2 PSA applied to modern LWRs is undoubtedly a very large and challenging task as specified in IAEA document SSG-4. However for the majority of our facilities the depth and extent of L2 PSA will be a much more modest product. Much of the complexity of the LWR L2 PSAs comes from containment response analysis which is very complex and is largely irrelevant for the majority of the facilities managed by our licensees (the confinement safety function is there but this takes a diverse form of protection for all of our facilities).</p> <p>The L2 PSA starts when a significant plant damage state occurs, almost invariably due to a failure of the provided design basis safety measures in response to a postulated initiating event or a major failure in the design provisions, the latter being equivalent to a major structural failure that cannot be defended by DBA safety measures (on a LWR this would equate to a high pressure RPV failure or a massive structural failure of the fuel pond). From this starting point the key features that I am looking to have available in a licensee's documentation is evidence of:.</p> <ul style="list-style-type: none"> <li>■ an accident progression analysis typically in the form of an event tree analysis which can be qualitative if specific numerical data are not readily available, a key product of this is an understanding of where the confinement function has been seriously degraded or compromised..</li> <li>■ the accident progression analysis should lead to insights into the relevant importance of accident prevention and mitigation measures which will be used as the basis of a licensee's emergency response guidelines.</li> <li>■ another product of the accident progression analysis is a good understanding of how the source term will evolve over the whole period of the accident.</li> <li>■ identification of reasonably practicable improvements in either accident management and/or equipment in response to severe accidents.</li> </ul> <p>The end point(s) for the L2 analysis is usually a series release categories with source term information and associated frequencies.</p> <p>A brief example on a non NPP might be a pipe break in side a building which releases radioactive material. This can lead to different source terms with different frequencies depending on whether the shut-off valve works to isolate the release and/or if the building has ventilation dampers which can restrict the release to atmosphere if they work.</p> <p>If the assessment inspector is content that a licensee has the above characteristics in its current safety submissions for a facility or has a credible plan and description of methodologies in place to produce them then I will be satisfied that this will be the basis for the closure of the recommendation and a sound basis for moving future work into normal regulatory business.</p>

## Annex 4: ONR Judgements on licensee Responses

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
	<p>The licensee has provided an adequate description of what they are trying to achieve.</p> <p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p>	<p>The licensee has appropriate equipment / new processes already installed/in place.</p> <p>The licensee has identified / specified equipment/processes to be installed / implemented.</p> <p>The licensee has identified an appropriate forward work programme.</p> <p>The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.</p> <p>Nothing tangible at this stage.</p>	<p>Yes, and on the basis of the information / evidence ONR judge this to be reasonable.</p> <p>Yes, but ONR needs further information in order to form a view</p> <p>No. The licensee considers that the item remains open.</p>	<p>An acceptable forward work programme is underway and the timescale for delivery looks reasonable.</p> <p>An acceptable forward work programme is underway and ONR is discussing an appropriate timescale for delivery.</p> <p>There is good evidence / information that the licensee is developing an appropriate programme of work</p> <p>ONR is still in the process of agreeing a suitable work programme with the licensee</p>	<p>The licensee's work / proposals / plans are in accordance with ONR expectations.</p> <p>The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.</p> <p>The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.</p>

## Studsvik - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-11	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-12	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Studsvik - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-14	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

**Studsvik - Summary of Assessment of Licensee Compliance with ONR Expectations**

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-17	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-19	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-20	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-21	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-22	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-24	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-25	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Studsvik - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-4	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## GE Healthcare - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-11	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-12	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

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IR-14	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-17	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

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IR-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-19	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-20	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-21	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-22	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-24	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-25	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Low Level Waste Repository Ltd - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-11	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-12	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

### Low Level Waste Repository Ltd - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-14	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Low Level Waste Repository Ltd - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-17	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-18	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-19	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-20	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-21	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-22	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

### Low Level Waste Repository Ltd - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-24	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-25	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

### Low Level Waste Repository Ltd - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
LLWR-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
LLWR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
LLWR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Imperial College - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-11	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-12	N/A	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Imperial College - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-14	N/A	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Imperial College - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-17	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-19	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-20	N/A	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Imperial College - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-21	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-22	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-24	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Imperial College - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-25	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Research Sites Restoration Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, but ONR needs further information in order to form a view.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-11	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Research Sites Restoration Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-12	N/A	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-14	N/A	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Research Sites Restoration Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-17	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-19	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Research Sites Restoration Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-20	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-21	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-22	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-24	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Research Sites Restoration Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-25	The licensee has provided an adequate description of what they are trying to achieve.	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-1	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
FR-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Research Sites Restoration Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-93	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## Springfields - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-11	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-12	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Springfields - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-14	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Springfields - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-17	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-19	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-20	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Springfields - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-21	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-22	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-24	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Springfields - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-25	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-63	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Springfields - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	<b>(A)</b> Eventual outcome - what is the licensee trying to achieve	<b>(B)</b> What has the licensee done so far?	<b>(C)</b> Is the item considered closed by licensee?	<b>(D)</b> If the item is still open, what is being done by the licensee?	<b>(T)</b> Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-85	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-88	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Urenco UK Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-11	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Urenco UK Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-12	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-14	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Urenco UK Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-17	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-19	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Urenco UK Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-20	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-21	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-22	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-24	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Urenco UK Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-25	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and ONR is discussing an appropriate timescale for delivery.	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
FR-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Urenco UK Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-34	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-84	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
UUK-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
UUK-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Urenco UK Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
UUK-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
UUK-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
UUK-5	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
UUK-6	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Urenco UK Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
UUK-7	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
UUK-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
UUK-9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Dounreay - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-11	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-12	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Dounreay - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-14	N/A	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Dounreay - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-17	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-19	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-20	N/A	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Dounreay - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-21	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-22	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-24	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Dounreay - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-25	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Dounreay - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-5	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-7	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Dounreay - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-8	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-11	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-14	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Dounreay - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-16	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-17	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-42	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-55	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-61	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Dounreay - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-62	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-73	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-74	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, but ONR needs further information in order to form a view	N/a - Closed	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-9	The Licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view.  Note – Future work, when defined, will be moved into normal business, therefore ONR recommend this item should remain open.	There is good evidence/information that the Licensee is developing an appropriate programme of work.  Note – ONR recommend that the Licensee supplies Terms of Reference for the group and the programme of work for review.	The Licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-10	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified / specified equipment/processes to be installed/implemented.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	N/a - Closed	The Licensees work/proposals/plans/ is in accordance with ONR expectations.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-11	It is not clear that the Licensee is addressing the "item" in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The Licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the Licensee.  Note – ONR consider that strictly IR-11 is not directly applicable.	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.  Note – ONR consider that strictly IR 11 is not directly applicable.
IR-12	The Licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The Licensees work/proposals/plans/ is in accordance with ONR expectations.
IR-13	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified / specified equipment/processes to be installed/implemented.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The Licensees work/proposals/plans/ is in accordance with ONR expectations.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-14	<p>The Licensee has provided an adequate description of what they are trying to achieve.</p> <p>Note – The Licensee has linked resolution of this recommendation to IR-13.</p>	<p>The licensee has identified an appropriate forward work programme.</p>	<p>Yes, but ONR needs further information in order to form a view.</p> <p>Note – The Licensee under IR-13 plans further work but no work programme specific to IR-14 is provided.</p>	<p>N/a - Closed</p>	<p>The Licensees work/proposals/plans/ is in accordance with ONR expectations.</p>
IR-15	<p>The Licensee has provided an adequate description of what they are trying to achieve.</p>	<p>The Licensee has carried out work/studies/analysis and the results are being reviewed for next steps.</p>	<p>Yes, but ONR needs further information in order to form a view.</p> <p>Note – This issue will continue to be addressed as part of normal business.</p>	<p>We are still in the process of agreeing a suitable work programme with the Licensee.</p>	<p>The Licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.</p>
IR-16	<p>The Licensee has provided an adequate description of what they are trying to achieve.</p>	<p>The Licensee has identified/specified equipment/processes to be installed/implemented.</p>	<p>Yes, but ONR needs further information in order to form a view.</p> <p>Note – This issue will continue to be addressed as part of normal business.</p>	<p>An acceptable forward work programme is underway and the timescale for delivery looks reasonable.</p>	<p>The Licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.</p>

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-17	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified/specified equipment/processes to be installed/implemented.	No. The Licensee considers that the item remains open.  Note – Awaiting the issue of the final National Grid report. Recommendations from this report will need to be addressed	There is good evidence/information that the Licensee is developing an appropriate programme of work.	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-18	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified/specified equipment/processes to be installed/implemented.	Yes, but ONR needs further information in order to form a view.	N/a - Closed	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-19	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified/specified equipment/processes to be installed/implemented.	Yes, but ONR needs further information in order to form a view.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The Licensees work/proposals/plans/ is in accordance with ONR expectations.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-20	The Licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.  Note – Equipment has been specified and deployed at Oldbury.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	N/a – Closed	The Licensees work/proposals/plans/ is in accordance with ONR expectations.
IR-21	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified/specified equipment/processes to be installed/implemented.	Yes, but ONR needs further information in order to form a view.	There is good evidence/information that the Licensee is developing an appropriate programme of work.	The Licensees work/proposals/plans/ is in accordance with ONR expectations.  Note – The recommendation cannot be closed until the outcome of the further analysis is known.
IR-22	The Licensee has provided an adequate description of what they are trying to achieve.  Note – The Licensee has linked the resolution of this recommendation to IR-8, IR-13, IR-23, FR-2 and FR-3.	The Licensee has identified/specified equipment/processes to be installed/implemented.	Yes, but ONR needs further information in order to form a view.  Note – Further work is planned by the Licensee under other IRs and FRs but no work programme specific to IR-22 is provided.	N/a – Closed	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-23	The Licensee has provided an adequate description of what they are trying to achieve.  Note – The Licensee has linked the resolution of this recommendation to IR-4, IR-8 and IR-22.	The Licensee has identified/specified equipment/processes to be installed/implemented.	No. The Licensee considers that the item remains open.	There is good evidence/information that the Licensee is developing an appropriate programme of work.	The Licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-24	The Licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The Licensee considers that the item remains open.	An acceptable forward work programme is underway and ONR is discussing an appropriate timescale for delivery.	The Licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-25	It is not clear that the Licensee is addressing the “item” in the most appropriate way and discussions are ongoing.	The Licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The Licensee considers that the item remains open.	There is good evidence/information that the Licensee is developing an appropriate programme of work.	The Licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-1	The Licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The Licensees work/proposals/plans/ is in accordance with ONR expectations.
FR-2	The Licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view.  Note – ONR consider that there are a number of further tasks to be carried out and therefore this item should remain open.	N/a - Closed	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.
FR-3	The Licensee has provided an adequate description of what they are trying to achieve.  Note – The Licensee has linked resolution of this Recommendation to IR-8, IR-22, IR-23 and FR-2.	The Licensee has identified/specified equipment/processes to be installed/implemented.	Yes, but ONR needs further information in order to form a view.  Note – Further work is planned by the Licensee under other IRs and FRs but no work programme specific to FR-3 is provided.	N/a - Closed	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-4	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The Licensee considers that the item remains open.	There is good evidence/information that the Licensee is developing an appropriate programme of work.	The Licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	N/a - Closed	
STF-2	The Licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage. Note – The Licensee has made no progress towards addressing this Finding.	No. The Licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the Licensee.	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-3	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified/specified equipment/processes to be installed/implemented. Note – ONR are looking for further evidence of adequacy.	Yes, but ONR needs further information in order to form a view. Note – ONR consider that his item should remain open.	N/A – Licensee consider this item closed.	The Licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-4	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The Licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the Licensee.	The Licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
STF-5	The Licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view.  Note – ONR consider that his item should remain open.	N/A – Licensee consider this item closed.	The Licensees work/proposals/plans/ is in accordance with ONR expectations.
STF-6	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	N/a - Closed	The Licensees work/proposals/plans/ is in accordance with ONR expectations.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-7	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.  Note – ONR will seek evidence of enhancements proposed by Magnox and progress regarding their implementation	N/a - Closed	The Licensees work/proposals/plans/ is in accordance with ONR expectations.
STF-8	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified/specified equipment/processes to be installed/implemented.	Yes, but ONR needs further information in order to form a view.	N/a - Closed	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	Yes, but ONR needs further information in order to form a view.	We are still in the process of agreeing a suitable work programme with the Licensee.	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-10	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified/specified equipment/processes to be installed/implemented.	Yes, but ONR needs further information in order to form a view.	N/a - Closed	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-11	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified/specified equipment/processes to be installed/implemented.	Yes, but ONR needs further information in order to form a view.	N/a - Closed	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-12	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified/specified equipment/processes to be installed/implemented.	Yes, but ONR needs further information in order to form a view.	N/a - Closed	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-13	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has appropriate equipment/new processes already installed/in place.	Yes, but ONR needs further information in order to form a view.  Note – ONR consider that his item should remain open.	N/A – Licensee consider this item closed.	The Licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
STF-14	The Licensee has provided an adequate description of what they are trying to achieve.	The Licensee has identified/specified equipment/processes to be installed/implemented.	Yes, but ONR needs further information in order to form a view.  Note – ONR consider that his item should remain open.	There is good evidence/information that the Licensee is developing an appropriate programme of work.	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-15	The Licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.  Note – The response indicates that this STF is being addressed as part of several other findings, notably IR-13, IR-22 and IR-23.	No. The Licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The Licensees work/proposals/plans/ is in accordance with ONR expectations.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The Licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensees work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
STF-17	It is not clear that the Licensee is addressing the "item" in the most appropriate way and discussions are ongoing.	The Licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The Licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the Licensee.	The Licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
STF-18	N/A – See Table 1.	N/A – See Table 1.	N/A – See Table 1.	N/A – See Table 1.	N/A – See Table 1.
STF-47	It is not clear that the Licensee is addressing the "item" in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view.  Note – ONR consider that his item should remain open.	N/a - Closed	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.

## Magnox - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-83	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme. (whilst generally true some aspects need further discussion).	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.

## Rosyth Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	<p>The licensee has appropriate equipment already in place.</p> <p>RRDL states that the site is not dependent upon the reliability of the grid or the supply of consumables to preserve the safety of radioactive materials on the site.</p> <p>ONR states in Ref 3 a severe accident is not possible at the site, and that enhancements to the organisation and arrangements of RRDL are not required.</p>	Yes, and on the basis of the information presented in ONR judge this to be reasonable.	N/A	The licensee's work is in accordance with ONR expectations.

## Rosyth Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.  ONR considers this is not unexpected as the full assessment comparison between the responses of the two Fukushima plants is not yet available.	No. The licensee considers that the item remains open.	There is good information that the licensee is developing an appropriate programme of work  RRDL states that it will review the relevant information when it becomes available.	The licensee's proposals are in accordance with ONR expectations.  When appropriate Fukushima research information is available, RRDL has stated it will review this information and consider what lessons can be learned.
IR-10	It is not clear that the licensee is addressing the recommendation in the most appropriate way and discussions are ongoing	The licensee has identified nothing tangible at this stage	Yes, but ONR needs further information in order to form a view	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee s work requires further development before ONR can be content that it has adequately addressed ONR's expectations
IR-11	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.  However, ONR considers that no response is required.	Yes, and on the basis of the information presented ONR judge this to be reasonable.	N/A	N/A
IR-12	This Recommendation is not applicable to the licensee.	N/A	N/A	N/A	N/A

## Rosyth Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-13	It is not clear that the licensee is addressing the recommendation in the most appropriate way and discussions are ongoing	The licensee has identified nothing tangible at this stage	Yes, but ONR needs further information in order to form a view	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work requires further development before ONR can be content that it has adequately addressed ONR's expectations.
IR-14	This Recommendation is not applicable to the licensee.	N/A	N/A	N/A	N/A
IR-15	The licensee has provided an adequate description of what they are trying to achieve but have not fully identified all areas that might be influenced by the findings	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	It is not clear that the licensee is addressing the recommendation in the most appropriate way and discussions are ongoing	The licensee has identified nothing tangible at this stage	Yes, but ONR needs further information in order to form a view	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work requires further development before ONR can be content that it has adequately addressed ONR's expectations
IR-17	The licensee has provided an adequate description of what they are trying to achieve	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Rosyth Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-19	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not identified an eventual outcome.	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not done anything so far.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	The item is considered to be closed by the licensee, which ONR judges to be reasonable.	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not identified an eventual outcome.
IR-20	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not identified an eventual outcome.	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not done anything so far.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	The item is considered to be closed by the licensee, which ONR judges to be reasonable.	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not identified an eventual outcome.
IR-21	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage. However, ONR considers that no further work is required.	Yes, and on the basis of the information presented ONR judge this to be reasonable.	N/A	N/A

## Rosyth Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-22	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-24	N/A	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	N/A

## Rosyth Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-25	The licensee has provided an adequate description of what they are trying to achieve.	<p>The licensee has appropriate equipment already in place.</p> <p>RRDL states that potential strategies and contingency measures following extreme external events can be met using field arrangements and back-up equipment, and staff, which the current arrangements already provide.</p> <p>ONR states in Ref 3 a severe accident is not possible at the site, and that enhancements to the organisation and arrangements of RRDL are not required.</p>	Yes, and on the basis of the information presented ONR judge this to be reasonable.	N/A	N/A

## Rosyth Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-1	<p>The licensee has provided an adequate description of what they are trying to achieve.*</p> <p><i>[*In the context of the current PSR position. ONR will be seeking further improvements in the manner in which PSR are undertaken and utilised]</i></p>	<p>The licensee has identified an appropriate forward work programme.</p>	<p>Yes, but ONR needs further information to form a view.*</p> <p><i>[* On the grounds that ONR will be seeking further improvements in the manner in which PSR are undertaken and utilised]</i></p>		<p>The licensees' approach to PSR needs further consideration before ONR can be content that they adequately address ONR expectations.</p> <p><i>[Note: this conclusion is formed on the basis of ONR's intention to seek further improvements in the manner in which PSR are undertaken and utilised]</i></p>
FR-2	<p>It is not clear that the licensee is addressing the recommendation in the most appropriate way and discussions are ongoing</p>	<p>The licensee has identified nothing tangible at this stage</p>	<p>Yes, but ONR needs further information in order to form a view</p>	<p>ONR is still in the process of agreeing a suitable work programme with the licensee</p>	<p>The licensee's work requires further development before ONR can be content that it has adequately addressed ONR's expectations</p>
FR-3	<p>It is not clear that the licensee is addressing the recommendation in the most appropriate way and discussions are ongoing</p>	<p>The licensee has identified nothing tangible at this stage</p>	<p>Yes, but ONR needs further information in order to form a view</p>	<p>ONR is still in the process of agreeing a suitable work programme with the licensee</p>	<p>The licensee's work requires further development before ONR can be content that it has adequately addressed ONR's expectations</p>

## Rosyth Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-4	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.  However, ONR considers that no response is required.	Yes, and on the basis of the information presented iONR judge this to be reasonable.	N/A	N/A  RRDL states that operations at Rosyth do not have the potential for a severe accident, or one with significant off-site consequences.  ONR considers that a severe accident is not possible at the site.
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work/proposals/plans/ are broadly in line with ONR expectations and ONR is discussing these plans with the licensee.
STF-75	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.

## AWE - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8,	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.  The licensee has carried out a review and has concluded that its provisions with respect to self-sufficiency in on-site supplies are adequate. Self-sufficient with regard to staff will be taken forward via IR-24.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	Not applicable - Item can be closed.	The licensee's work to date and plans are in accordance with ONR expectations.
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view	ONR is still in the process of agreeing a suitable work programme with the licensee  An acceptable arrangement is in place to participate in a national review, but timescales will be contingent on information becoming available.	The licensee's plans need further development / information before ONR can be content that they adequately address ONR expectations.

## AWE - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements
IR-11	Not applicable	Not applicable	Yes, and on the basis of the information provided ONR judge this to be reasonable.	Not applicable	Not applicable
IR-12	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
IR-13	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, but ONR needs further information in order to form a view	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements
IR-14	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	Not applicable	The licensee's work to date and plans are in accordance with ONR expectations.

## AWE - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-16	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements
IR-17	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate processes already in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	Not applicable	The licensee's work to date and plans are in accordance with ONR expectations.
IR-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	Not applicable	The licensee's work to date and plans are in accordance with ONR expectations.
IR-19	Not applicable	Not applicable	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	Not applicable	Not applicable
IR-20	Not applicable	Not applicable	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	Not applicable	Not applicable
IR-21	Not applicable	Not applicable	Yes, and on the basis of the information provided ONR judge this to be reasonable.	Not applicable	Not applicable

## AWE - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-22	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open	There is good evidence that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, but ONR needs further information in order to form a view	Not applicable	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-24	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing	Nothing tangible at this stage.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-25	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open. For some sub-items AWE argues that pre-Fukushima arrangements are adequate.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## AWE - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, but ONR needs further information in order to form a view	Not applicable	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements
FR-4	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements.
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information provided ONR judge this to be reasonable.	Not applicable	The licensee's work to date and plans are in accordance with ONR expectations.

## AWE - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-26	Not applicable.  In the light of work already completed and ongoing against other items. AWE consider that no further response is required	Not applicable	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	Not applicable	Not applicable
STF-41	Not applicable	Not applicable	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	Not applicable	Not applicable
STF-43	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, but ONR needs further information in order to form a view	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensees proposals are broadly in line with ONR expectations and we are discussing potential improvements
STF-49	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensees proposals are broadly in line with ONR expectations and we are discussing potential improvements

## AWE - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-75	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements
STF-76,	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.  The licensee has identified some appropriate work for the forward work programme.	No. The licensee considers that the item remains open, with respect to the seismic hazard.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-77	Not applicable	Not applicable	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.  Transferred to other items and ongoing projects	Not applicable	Not applicable.
STF-78,	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## AWE - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-90	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open but consider that it should be transferred to the NFSIP project.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
AWE-1,	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.  The licensee has identified some appropriate work for the forward work programme.	No. The licensee considers that the item remains open, with respect to the seismic hazard.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
AWE-2,	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.  The licensee has identified some appropriate work for the forward work programme.	No. The licensee considers that the item remains open, with respect to the seismic hazard.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## AWE - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
AWE-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.  The licensee has identified some appropriate work for the forward work programme.	No. The licensee considers that the item remains open, with respect to the seismic hazard.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
AWE-4,	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.  The licensee has carried out a review and has concluded that its provisions with respect to self-sufficiency in on-site supplies are adequate. Self-sufficient with regard to staff will be taken forward via IR-24.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	Not applicable - Item can be closed.	The licensee's work to date and plans are in accordance with ONR expectations.

## AWE - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
AWE-5	The licensee has provided an adequate description of what they are trying to achieve.	<p>The licensee has identified / specified equipment/processes to be installed / implemented.</p> <p>The licensee has carried out a review and has concluded that its provisions with respect to self-sufficiency in on-site supplies are adequate. Self-sufficient with regard to staff will be taken forward via IR-24.</p>	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	Not applicable - Item can be closed.	The licensee's work to date and plans are in accordance with ONR expectations.

## Rolls Royce Marine Power Operations Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	<p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p> <p>RRMPOL hope to demonstrate that the site does not rely on off-site infrastructure for the maintenance of nuclear and radiological safety.</p> <p>The intent of IR-8 is also to assess whether the site can be made more self-sufficient, and ONR considers this applies to monitoring and recovery.</p>	<p>The licensee has carried out some analysis and the results are being reviewed for next steps.</p> <p>RRMPOL has submitted its PRS to ONR in June 2012.</p> <p>A significant volume of food supplies will be purchased and placed in storage by mid to late 2012.</p> <p>A larger replacement Emergency Control Centre generator is available for installation in the near future.</p>	<p>No. The licensee considers that the item remains open.</p> <p>Not explicitly stated as either open or closed by the Licensee. Further work being undertaken by the Licensee implies that it is not considered closed.</p>	<p>ONR is still in the process of agreeing a suitable work programme with the licensee.</p> <p>RRMPOL is considering IR-8 in the context of its ongoing PRS process which is due for completion by November 2014.</p>	<p>The licensee's proposals need further development before ONR can be content that they adequately address ONR expectations.</p> <p>ONR notes the actions taken to date but considers that a systematic review should be undertaken.</p> <p>RRMPOL considers that nuclear and radiological safety is not dependent upon off-site infrastructure. However, ONR considers that the ability to monitor and recover the site needs to be addressed, even if there has not been a nuclear or radiological consequence from a severe site wide hazard.</p>

## Rolls Royce Marine Power Operations Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.  However, RRMPO has appointed a Safety Director who sits on the Safety Directors Forum.  ONR recognise that there are a significant number of international bodies with projects planned to review the lessons learned at both Fukushima reactor sites. This will be a long term programme of work.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee  Visibility of international and national programmes to investigate the lessons that can be learned from both Fukushima plants is awaited.  RRMPOL are intending to address the findings within its PRS programme which is due for completion by November 2014.	
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-11	The Recommendation is not considered applicable by the Licensee.	Not applicable.	No. The licensee considers that the item remains open.	Not applicable.	Not applicable. RRMPO does not operate multiple reactors at the Derby site.

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IR-12	The Recommendation is not considered applicable by the Licensee.	Not applicable.	Not applicable.	Not applicable.	Not applicable.
IR-13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-14	The Recommendation is not considered applicable by the Licensee.	Not applicable.	Not applicable.	Not applicable.	Not applicable.
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme by stating that it will form part of normal procedures.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	ONR will agree a suitable work programme with the licensee when the information becomes available.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

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IR-17	<p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p> <p>(Note – the licensee’s submission considers that the item does not apply, however some actions are underway in respect of this issue)</p>	<p>The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.</p> <p>(Note – the licensee’s submission considers that the item does not apply, however some actions are underway in respect of this issue)</p>	<p>Yes, but ONR needs further information in order to form a view</p> <p>(Note – the licensee considers that the item does not apply)</p>	<p>ONR is still in the process of agreeing a suitable work programme with the licensee</p> <p>(Note – the licensee considers that the item does not apply)</p>	<p>The licensee’s work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.</p> <p>(Note – the licensee considers that the item does not apply)</p>
IR-18	<p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p> <p>(Note – the licensee’s submission considers that the item does not apply, however some actions are underway in respect of this issue)</p>	<p>The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.</p> <p>(Note – the licensee’s submission considers that the item does not apply, however some actions are underway in respect of this issue)</p>	<p>Yes, but ONR needs further information in order to form a view</p> <p>(Note – the licensee considers that the item does not apply)</p>	<p>ONR is still in the process of agreeing a suitable work programme with the licensee</p> <p>(Note – the licensee considers that the item does not apply)</p>	<p>The licensee’s work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.</p> <p>(Note – the licensee considers that the item does not apply)</p>

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-19	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not identified an eventual outcome.	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not done anything so far.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	The item is considered to be closed by the licensee, which ONR judges to be reasonable.	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not identified an eventual outcome.
IR-20	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not identified an eventual outcome.	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not done anything so far.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	The item is considered to be closed by the licensee, which ONR judges to be reasonable.	The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not identified an eventual outcome.

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IR-21	<p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p> <p>This is because RRMPO has restricted IR-21 to the Neptune reactor. ONR questions whether it should also be addressed for the manufacturing plant.</p>	<p>Nothing tangible at this stage.</p> <p>RRMPOL intends to conduct the work as part of the Neptune PRS which has not yet commenced.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good information that the licensee is developing an appropriate programme of work</p> <p>The above statement is derived from the stated intention of RRMPO to conduct the work as part of the Neptune PRS.</p> <p>However, the Neptune PRS is programmed for 2017, but may be brought forward to 2015. RRMPO notes that an interim review of safety is due in 2013.</p>	<p>The licensee's proposals need further development before ONR can be content that they adequately address ONR expectations.</p> <p>The above statement is made to reflect the possibility of applying IR-21 to the manufacturing plant.</p> <p>Also ONR considers that IR-21 could be addressed prior to the PRS date, and the interim review of safety in 2013 would be more appropriate.</p>
IR-22	<p>The licensee has provided an adequate description of what they are trying to achieve.</p>	<p>The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>ONR is still in the process of agreeing a suitable work programme with the licensee</p>	<p>The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.</p>

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IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-24	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-25	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.  A plan and methodology for the work has not been presented.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.  The location of additional equipment in a dry non-seismically vulnerable off-site location is under consideration.  A PRS for the manufacturing plant is in progress.	No. The licensee considers that the item remains open.	There is good information that the licensee is developing an appropriate programme of work  This statement is chosen because RRMPO is currently updating its manufacturing plant safety cases by 2014, options for alternative command centres and central stocks of equipment is to be completed by Q3 2013, and	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.  RRMPOL state that there may be limited severe accident analysis is the updated manufacturing plant and Neptune safety cases. ONR stated in the Stress Test Report (Ref 3) that the potential for a severe accident at the Derby site is

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				the Neptune PSR interim safety report is due in 2013.	small. However, the scope for the application of severe accident analysis remains unclear due to a lack of technical proposals by RRMPO to date.
FR-1	The licensee has provided an adequate description of what they are trying to achieve.*	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open. <i>[* On the grounds that ONR will be seeking further improvements in the manner in which PSR are undertaken and utilised. See Section 3 of this report (3.2.6)]</i>	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

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FR-4	<p>The licensee has provided an adequate description of what they are trying to achieve.</p> <p>RRMPOL states it will incorporate an appropriate level of PSA in their safety cases. ONR agrees with the need for an appropriate level of PSA to be used. However, the extent that Level 2 PSA applies or not to RRMPOL facilities required clarification.</p>	<p>Nothing tangible at this stage.</p> <p>However, ONR notes that RRMPOL safety cases currently contain an element of PSA information.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good information that the licensee is developing an appropriate programme of work</p> <p>RRMPOL states that the updated manufacturing safety cases will incorporate the appropriate level of PSA by November 2014.</p> <p>For the Neptune reactor RRMPOL state that the PRS work is due for 2017 but may be brought forward to 2015. ONR considers that an earlier completion date may be appropriate.</p>	<p>The licensee's work plans need further development before ONR can be content that they adequately address ONR expectations.</p> <p>The scope of the technical proposal by RRMPOL required further clarification. This is because the extent to which Level 2 PSA applies to the manufacturing plants and the Neptune reactors remains unclear. Previous ONR interventions reveals that for various areas of the facilities the potential for off-site releases may be such that Level 2 PSA is not applicable.</p>
FR-11	<p>The licensee has provided an adequate description of what they are trying to achieve.</p>	<p>The licensee has identified an appropriate forward work programme.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good information that the licensee is developing an appropriate programme of work</p>	<p>The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.</p>

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STF-27	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-28	The licensee has provided an adequate description of what they are trying to achieve.	The licensee is in the process of identifying an appropriate forward work programme.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-32	The licensee has provided an adequate description of what they are trying to achieve.	The licensee is in the process of identifying an appropriate forward work programme.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-45	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

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STF-46	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-48	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-56	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee (note – the existing scope of proposals require justification)	N/A
STF-75	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee (note – the existing scope of proposals requires justification)	N/A

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STF 79	The licensee has provided an adequate description of what they are trying to achieve.	<p>The licensee has carried out analysis and the results are being reviewed for next steps.</p> <p>RRMPOL has started assessing the requirements for the modifications to the Neptune facility which were planned before the Fukushima event.</p> <p>The manufacturing plant is being progressively replaced over the period 2011 to 2023.</p>	No. The licensee considers that the item remains open.	<p>There is good information that the licensee is developing an appropriate programme of work</p> <p>RRMPOL state that the modifications to the Neptune facility will need to be scoped following the set of requirements being identified by Q3 2012. The programme for modifications is required to be completed by 2015.</p>	<p>The licensee's proposals plans need further development before ONR can be content that they adequately address ONR expectations.</p> <p>RR discuss the review of modifications to the Neptune facility. However, the technical scope of the work is not yet available to determine the extent to which it will take into account Fukushima lessons learned.</p> <p>The replacement of the manufacturing facility Contact and Clean Shop are due for completion by 2023, with initial construction of the new Clean Shop in 2013. ONR considers that review of the Fukushima recommendations should be adopted as part of the design process.</p>

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STF 80	<p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p> <p>This statement arises because the Beyond Design Basis Assessment has not been reported by RRMPO (BDBA).</p>	<p>The licensee has identified specified equipment to be installed implemented.</p> <p>RRMPOL has stated that a seismically qualified Bronze Command will be included as part of the new Reception Centre. Completion is stated by RRMPO in early 2014.</p> <p>RRMPOL considers that in the meantime Bronze Command is interchangeable between the manufacturing plant and the Neptune reactor sites and re-locatable to the Emergency Control Centre.</p>	<p>Yes, but ONR needs further information in order to form a view.</p> <p>ONR assumes that the seismic qualification of the new Bronze Command will be to modern standards. The provision of this is supported. However, RRMPO's response does not assess the BDBA resilience of the site.</p>	<p>N/A from RRMPO's perspective.</p>	<p>The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.</p> <p>ONR acknowledge that RRMPO has initiated a significant programme of work to address the effect of site wide disruptive external events. However, the interim contingency plan for dealing with the common cause effects of seismic events across both sites should be further clarified.</p>

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STF 81	<p>The licensee has provided an adequate description of what they are trying to achieve.</p> <p>This has been provided by RRMPO as an adequate high level statement.</p>	<p>The licensee has carried out work and the results are being reviewed for next steps.</p> <p>RRMPOL has identified the provision of a new Bronze Command in the new Reception Centre building. This will be seismically qualified and raised to 1m for flooding. Also Bronze Command is interchangeable between the manufacturing plant and the Neptune reactor sites and re-locatable to the Emergency Control Centre.</p> <p>Item 4) has been chosen instead of item 2) because the 1m flood level is not consistent with the modern standard design basis approach which ONR considers suggests a flood level of 1.47m.</p>	No. The licensee considers that the item remains open.	<p>There is good information that the licensee is developing an appropriate programme of work.</p> <p>RRMPOL has committed to reviewing its emergency arrangements for coincident events. Options are being considered for a back-up off-site Silver Command are being considered. Options for site access and back-up facilities are being considered for completion by the end of 2012. The improved Bronze Command facility is intended for 2014.</p>	<p>The licensee's proposals plans are broadly in line with ONR expectations and we are discussing potential improvements to current proposals.</p> <p>The intended review of emergency plans in conjunction with an improved Bronze Command is appropriate. However, confirmation whether the design of the Bronze Command will meet modern standards for flooding is needed.</p> <p>ONR acknowledge that RRMPO has initiated a significant programme of work to address the effect of site wide disruptive external events. However, the interim contingency plan for dealing with the common cause effects of seismic and flooding events across both sites should be further clarified.</p>

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RRM -1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
RRM -2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
RRM -3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
RRM -4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

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RRM -5	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.		The licensee's work / proposals / plans are in accordance with ONR expectations.
RRM -6	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
RRM -7	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
RRM -8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.

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RRM -9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
RRM -10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
RRM -11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
RRM -12	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## Rolls Royce Marine Power Operations Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
RRM -13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
RRM -14	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
RRM -15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
RRM -16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	<p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p> <p>BAE Systems Marine Ltd identify at a high level the need to assess the level of self-sufficiency of the site rather than relying on off-site infrastructure, and the implementation of enhancements. However,, no additional information on re-stock and re-supply of staff, provisions, consumables, equipment and timescales is provided.</p>	<p>Nothing tangible at this stage.</p> <p>It should be noted that BAE Systems Marine Ltd intends to address this STF in their PRS which has recently commenced. Engagement with the nuclear industry has commenced. However, no output is reported.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good evidence / information that the licensee is developing an appropriate programme of work</p> <p>The designation of (3) given above relies upon the submission to ONR of Ref 9 which states that BAE Systems Marine Ltd will complete its assessment of vulnerabilities by early 2013, and focus will be given to Fukushima issues prior to the next Power Range Testing (PRT) operations in 2014.</p>	<p>The licensee's proposals need further development before ONR can be content that they adequately address ONR expectations.</p> <p>BAE Systems Marine Ltd provide very high level information on the content and methodology for its investigations.</p>

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.  ONR recognise that there are a significant number of international bodies with projects planned to review the lessons learned at both Fukushima reactor sites. This will be a long term programme of work.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee  Visibility of international and national programmes to investigate the lessons that can be learned from both Fukushima plants is awaited.  Ref 8 states that BAE Systems Marine Ltd will complete its assessment of vulnerabilities by early 2013, and focus will be given to Fukushima issues prior to the next Power Range Testing (PRT) operations in 2014.	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements to current plans.  Only a very high level technical objective has been presented. However, ONR recognises the need for national and international research to progress before BAE Systems can take this item forward.
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence that BAES is developing an appropriate programme of work and ONR is discussing an appropriate timescale for delivery.	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements to current plans.

**BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations**

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-11	The IR is not considered applicable by the Licensee.	Not applicable.	No. The licensee considers that the item remains open.	Not applicable.	Not applicable. BAE Systems Marine Ltd does not operate multiple reactors at the Barrow site.
IR-12	This Recommendation is not applicable to the licensee.	N/A	N/A	N/A	N/A
IR-13	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence that BAES is developing an appropriate programme of work and ONR is discussing an appropriate timescale for delivery.	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements to current plans.
IR-14	This Recommendation is not applicable to the licensee.	N/A	N/A	N/A	N/A
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations.

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-16	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence that BAES is developing an appropriate programme of work and ONR is discussing an appropriate timescale for delivery.	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements to current plans.
IR-17	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage. (Note: the progress so far is limited to industry engagement and it appears from the submission that site-specific review of the issues raised has not commenced)	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-18	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage. (Note: the progress so far is limited to industry engagement and it appears from the submission that site-specific review of the issues raised has not commenced)	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-19	<p>The licensee has provided an adequate description of what they are trying to achieve.</p> <p>An adequate high level statement has been provided by BAESM, but limited detail has been provided at this time.</p>	<p>Nothing tangible at this stage.</p> <p>BAESM has not reported any technical outcome at this time but stated that it is working with other organisations to address this recommendation.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good information that the licensee is developing an appropriate programme of work.</p> <p>BAESM intends to address the technical issues as part of the PRS process. The timescale for considering any resultant implementation opportunities is targeted for PRT of HMS Artful, and it can then be applied to subsequent submarines.</p>	<p>The licensee's proposals and plans need further development before ONR can be content that they adequately address ONR expectations.</p> <p>BAESM is in the process of developing a plan of work. Technical proposals have not yet been presented to compare with ONR expectations.</p>
IR-20	<p>The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not identified an eventual outcome.</p>	<p>The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not done anything so far.</p>	<p>Yes, and on the basis of the information / evidence ONR judge this to be reasonable.</p>	<p>The item is considered to be closed by the licensee, which ONR judges to be reasonable.</p>	<p>The licensee does not consider that the item applies to them and they have provided an acceptable justification. They have therefore not identified an eventual outcome.</p>

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-21	<p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p> <p>An appropriate high level outcome is described as - review of sources of combustible gases and the adequacy of measures to prevent explosion. However, no information is presented on which parts of the site/facilities could give rise to combustible gases or how significant the issue may be to the licensee.</p>	<p>Nothing tangible at this stage.</p> <p>The definition of the scope and plan of work is underway as part of the PRS.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good information that the licensee is developing an appropriate programme of work.</p> <p>The scope and plan of work document is stated to be drafted by Q4 2012.</p> <p>The designation of (3) above relies upon the submission to ONR of Ref 8 which states that BAE Systems Marine Ltd will complete its assessment of vulnerabilities by early 2013, and focus will be given to Fukushima issues prior to the next Power Range Testing (PRT) operations in 2014.</p>	<p>The licensee's proposals, plans need further development before ONR can be content that they adequately address ONR expectations.</p> <p>No technical output is available at this time.</p> <p>It is unclear how BAE Systems Marine Ltd will address the potential fault sequences arising from combustible gas generation during accidents from the Naval Reactor Plant (NRP).</p>
IR-22	<p>The licensee has provided an adequate description of what they are trying to achieve.</p>	<p>Nothing tangible at this stage.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>ONR is still in the process of agreeing a suitable work programme with the licensee</p>	<p>The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.</p>

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-24	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-25	<p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p> <p>A high level statement to understand long duration accident sequences and identify recovery strategies is presented. However, no further information is presented on sub-clauses items a) to h) which present ONR's more detailed expectations.</p>	<p>Nothing tangible at this stage.</p> <p>BAE Systems Marine Ltd state their intention to work with other nuclear industry organisations. However, no findings or technical insights are presented at this time.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good evidence / information that the licensee is developing an appropriate programme of work</p> <p>The designation of (3) above relies upon the submission to ONR of Ref 8 which states that BAE Systems Marine Ltd will complete its assessment of vulnerabilities by early 2013, and focus will be given to Fukushima issues prior to the next Power Range Testing (PRT) operations in 2014.</p>	<p>The licensee's proposals, plans need further development before ONR can be content that they adequately address ONR expectations.</p> <p>No technical output is available at this time.</p> <p>It is unclear how BAE Systems Marine Ltd will address the impact on emergency planning that may arise from potential long duration fault sequences arising from the Naval Reactor Plant (NRP).</p>

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-1	<p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p> <p><i>[*In the context of the current PSR position. ONR will be seeking further improvements in the manner in which PSR are undertaken and utilised See Section 3 of this report (3.2.6)]</i></p>	Nothing tangible at this stage.	<p>No. The licensee considers that the item remains open.</p> <p><i>[* On the grounds that ONR will be seeking further improvements in the manner in which PSR are undertaken and utilised. See Section 3 of this report (3.2.6)]</i></p>	ONR is still in the process of agreeing a suitable work programme with the licensee.	<p>The licensees' approach to PSR needs further consideration before ONR can be content that they adequately address ONR expectations.</p> <p><i>[Note: this conclusion is formed on the basis of ONR's intention to seek further improvements in the manner in which PSR are undertaken and utilised. See Section 3 of this report (3.2.6)]</i></p>
FR-2	It is not clear that BAES is addressing the recommendation in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence that BAES is developing an appropriate programme of work and ONR is discussing an appropriate timescale for delivery.	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements to current plans.

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-3	It is not clear that BAES is addressing the recommendation in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence that BAES is developing an appropriate programme of work and ONR is discussing an appropriate timescale for delivery.	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements to current plans.

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-4	<p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p> <p>The need for suitable and sufficient Level 2 PSA is acknowledged. The content and methodology to be employed is not presented.</p> <p>BAE Systems Marine Ltd need to understand the contribution that can be made from Level 2 PSA for faults arising on the site and faults arising within the NRP.</p>	<p>Nothing tangible at this stage.</p> <p>BAE Systems Marine Ltd state that they will need to seek advice from the Naval Reactor Plant Authorisee (NRPA) and the Defence Nuclear Safety Regulator (DNSR) regarding Level 2 PSA information for the NRP. This is agreed by ONR for the contribution to Level 2 PSA information arising from the NRP. It is noted that BAE Systems Marine Ltd will also need to pursue Level 2 PSA information for their site hazards.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good evidence that the licensee is developing an appropriate programme of work.</p> <p>The designation of (3) above relies upon the submission to ONR of Ref 8 which states that BAE Systems Marine Ltd will complete its assessment of vulnerabilities by early 2013, and focus will be given to Fukushima issues prior to the next Power Range Testing (PRT) operations in 2014.</p> <p>ONR considers that any programme of work will be constrained by the NRPA contribution.</p>	<p>The licensee's work proposals need further development before ONR can be content that they adequately address ONR expectations.</p> <p>Although a commitment to work is provided in Ref 8, the content of technical work needed remains outstanding.</p>

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-29	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-30	The licensee is addressing the item in a way that requires MoD to determine whether the response is appropriate	Not applicable	Not applicable	Not applicable	Not applicable
STF-31	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-35	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing. The licensee considers that the item is not applicable.	No. The licensee currently considers that the item is not applicable.	The licensee considers that the item is not applicable.	No. The licensee considers that the item is not applicable.
STF-39	It is not clear that BAES is addressing the finding in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence that BAES is developing an appropriate programme of work and ONR is discussing an appropriate timescale for delivery.	The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements to current plans.
STF-44	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.
STF-57	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-60	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-75	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
BAE-2	Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
BAE-12	<p>The licensee has provided an adequate description of what they are trying to achieve.</p> <p>An adequate high level statement has been provided by BAESM, but limited detail has been provided at this time.</p>	<p>Nothing tangible at this stage.</p> <p>BAESM stated that this Consideration should be considered during review of emergency arrangements within the scope of the PRS.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good information that the licensee is developing an appropriate programme of work.</p> <p>BAESM intends to address the technical issues as part of the PRS process. The timescale for considering any resultant implementation opportunities is targeted for a specific milestone of HMS Artful, and it can then be applied to subsequent submarines.</p>	<p>The licensee's proposals and plans need further development before ONR can be content that they adequately address ONR expectations.</p> <p>BAESM is in the process of developing a plan of work. Technical proposals have not yet been presented to compare with ONR expectations.</p>

## BAE Systems Marine Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
BAE-19	<p>The licensee has provided an adequate description of what they are trying to achieve.</p> <p>An adequate high level statement has been provided by BAESM, but limited detail has been provided at this time.</p>	<p>Nothing tangible at this stage.</p> <p>BAESM stated that this Consideration should be considered within the scope of the PRS.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good information that the licensee is developing an appropriate programme of work.</p> <p>BAESM intends to address the technical issues as part of the PRS process. The timescale for considering any resultant implementation opportunities is targeted for a specific milestone of HMS Artful, and it can then be applied to subsequent submarines.</p>	<p>The licensee's proposals and plans need further development before ONR can be content that they adequately address ONR expectations.</p> <p>BAESM is in the process of developing a plan of work. Technical proposals have not yet been presented to compare with ONR expectations.</p>

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	<p>The licensee has provided an adequate description of what they are trying to achieve.</p> <p>An adequate high level statement has been provided by DRDL, but no detail has been provided at this time.</p>	<p>Nothing tangible at this stage.</p> <p>DRDL has not reported any technical outcome at this time. However, DRDL state that this item has been identified in its stress test review, and is working with HMNB to undertake a review and prioritisation process and produce a plan.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good information that the licensee is developing an appropriate programme of work.</p> <p>DRDL briefly describe its work with HMNB to produce a sentencing and prioritisation exercise by 30 September 2012, and a finalised programme to address IR-8 by 31 December 2012.</p>	<p>The licensee's proposals and plans need further development before ONR can be content that they adequately address ONR expectations.</p> <p>DRDL are in the process of developing a plan of work. Technical proposals have not yet been presented to compare with ONR expectations.</p>
IR-9	<p>The licensee has provided an adequate description of what they are trying to achieve.</p>	<p>Nothing tangible at this stage.</p> <p>ONR recognise that there are a significant number of international bodies with projects planned to review the lessons learned at both Fukushima reactor sites. This will be a long term programme of work.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>ONR is still in the process of agreeing a suitable work programme with the licensee</p> <p>Visibility of international and national programmes to investigate the lessons that can be learned from both Fukushima plants is awaited.</p> <p>DRDL has stated its intent to</p>	<p>The licensee's proposals are broadly in line with ONR expectations and we are discussing potential improvements to current plans.</p> <p>Only a very high level technical objective has been presented. However, ONR recognises the need for national and international research to progress before DRDL</p>

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
				contribute through various industry fora and working Groups including the Safety Directors Forum.	can take this item forward.
IR-10	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has identified an appropriate programme of work	No. The licensee considers the item remains open	An acceptable forward work programme is underway and the timescale for delivery looks reasonable	The licensee needs to provide further information before ONR can be content that it is adequately addressing ONR expectations
IR-11	The licensee has provided an adequate description of what they are trying to achieve.  This option has been chosen because DRDL present an adequate high level statement of what needs to be achieved. No further technical detail is presented at this time.	Nothing tangible at this stage.  DRDL has not reported any technical outcome at this time. However, DRDL are in the process of producing a plan of work with HMNB.	No. The licensee considers that the item remains open.	There is good information that the licensee is developing an appropriate programme of work.  DRDL briefly describe its work with HMNB to produce a sentencing and prioritisation exercise by 30 September 2012, and a finalised programme to address IR-11 by 31 December 2012.	The licensee's proposals and plans need further development before ONR can be content that they adequately address ONR expectations.  DRDL are in the process of developing a plan of work. Technical proposals have not yet been presented to compare with ONR expectations.

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-12	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-13	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has identified an appropriate programme of work	No. The licensee considers that the item remains open	An acceptable forward work programme is underway and the timescale for delivery looks reasonable	The licensee needs to provide further information before ONR can be content that it is adequately addressing ONR expectations
IR-14	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme by stating that it will form part of normal procedures.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	ONR will agree a suitable work programme with the licensee when the information becomes available.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has identified an appropriate programme of work	No. The licensee considers that the item remains open	An acceptable forward work programme is underway and the timescale for delivery looks reasonable	The licensee needs to provide further information before ONR can be content that it is adequately addressing ONR expectations

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-17	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-18	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-19	<p>The licensee has provided an adequate description of what they are trying to achieve.</p> <p>Specifically, DRDL presented an adequate high level statement of what needs to be achieved. No further technical detail is presented at this time.</p>	<p>Nothing tangible at this stage.</p> <p>DRDL has not reported any technical outcome at this time. However, DRDL are in the process of producing a plan of work with HMNB.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good evidence / information that the licensee is developing an appropriate programme of work.</p> <p>DRDL briefly described its work with HMNB to produce a sentencing and prioritisation exercise by 30 September 2012, and a finalised programme to address IR-19 by 31 December 2012.</p>	<p>The licensee's proposals and plans need further development before ONR can be content that they adequately address ONR expectations.</p> <p>DRDL are in the process of developing a plan of work. Technical proposals have not yet been presented to compare with ONR expectations.</p>
IR-20	<p>The licensee has provided an adequate description of what they are trying to achieve.</p>	<p>The licensee has claimed that its existing equipment is adequate.</p> <p>However, DRDL has not provided justification by DRDL of its claims for the adequacy of this existing equipment.</p>	<p>Yes, but ONR needs further information in order to form a view</p>	<p>The item is considered to be closed by the licensee.</p>	<p>The licensee considers that its existing equipment is adequate, but further information is required from the licensee for its justification against the licensee's claims for its performance under extreme conditions.</p>
IR-21	<p>It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.</p>	<p>Nothing tangible at this stage.</p> <p>DRDL states that IR-21 will be addressed as part of the PCD</p>	<p>No. The licensee considers that the item remains open.</p>	<p>ONR is still in the process of agreeing a suitable work programme with the licensee</p> <p>The date for the PCD PRS</p>	<p>The licensee's proposals need further development before ONR can be content that they adequately address ONR</p>

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
	DRDL has restricted the scope of IR-21 on the site to the PCD building. This may be appropriate, but would need to be substantiated with information that combustible gases are not an issue elsewhere.	PRS programme.		programme completion has not been stated by DRDL.	<p>expectations.</p> <p>The technical content of the work plan is not available at this time. Clarification is needed on whether the PCD building is the only facility on the site for which IR-21 applies. For example hydrogen is carried onboard submarines and discharges from submarines to effluent tanks may contain hydrogen.</p> <p>It is unclear how DRDL will address the potential fault sequences arising from combustible gas generation during accidents from the Naval Reactor Plant (NRP).</p>
IR-22	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-23	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-24	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-25	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage. DRDL's response recognises the relevance of IR-25 to its site. However, DRDL states that progress is dependent on the MoD.	No. The licensee considers that the item remains open.  This statement has been chosen to reflect DRDL's statement that closure of IR-25 is Not Applicable to itself.	ONR is still in the process of agreeing a suitable work programme with the licensee.  DRDL consider progress to be determined by the MoD. Therefore DRDL has provided no programme information.	The licensee's proposals need further development before ONR can be content that they adequately address ONR expectations.  The technical content of any work plan is not available for comparison with ONR expectations.  It is not clear to ONR that progress is entirely dependent upon further

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
					<p>work by the MoD. IR-25 items a) to e) and item h) can be progressed separately from further severe accident analysis work. IR-25 items f) and g) are dependent upon further severe accident analysis.</p> <p>The provision of severe accident analysis from the NRPA/MoD to DRDL is needed to complete IR-25.</p>
FR-1	<p>The licensee has provided an adequate description of what they are trying to achieve.*</p> <p><i>[*In the context of the current PSR position. ONR will be seeking further improvements in the manner in which PSR are undertaken and utilised]</i></p>	<p>The licensee has identified an appropriate forward work programme.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>An acceptable forward work programme is underway and the timescale for delivery looks reasonable.</p>	<p>The licensee's approach to PSR needs further consideration before ONR can be content that they adequately address ONR expectations.</p> <p><i>[Note: this conclusion is formed on the basis of ONR's intention to seek further improvements in the manner in which PSR are undertaken and utilised.]</i></p>

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-2	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has identified an appropriate programme of work	No. The licensee considers that the item remains open	An acceptable forward work programme is underway and the timescale for delivery looks reasonable	The licensee needs to provide further information before ONR can be content that it is adequately addressing ONR expectations
FR-3	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has identified an appropriate programme of work	No. The licensee considers that the item remains open	An acceptable forward work programme is underway and the timescale for delivery looks reasonable	The licensee needs to provide further information before ONR can be content that it is adequately addressing ONR expectations
FR-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.  DRDL has not presented any technical output at this time. However, ONR expectations behind FR-4 appear to be understood.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work.  DRDL is currently updating its safety case production procedures to reflect the requirements of FR-4.  A review of DRDL Category A safety cases and a gap analysis is planned. The outcome of this will be implemented in DRDL's PRS	The licensees proposals are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.  DRDL propose the following items of work:  Review the level and extent of existing PSAs and level of compliance with a modern standard L2 PSA.  Conduct a pilot study on a single Category A facility which will apply

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
				<p>process.</p> <p>A pilot study will be undertaken on a single Category A facility which will assess extended accident timescales and investigate risk reduction measures.</p> <p>A well defined programme of work is not available. However, a coherent and logical approach is being taken to produce a plan and programme.</p>	<p>standard PSA methods of accident progression event trees to investigate extended accident timescales and recovery actions. Collaboration with EDF is proposed.</p> <p>Review and revise its safety case production procedures.</p> <p>Revise safety cases in a progressive manner in accordance with PRS requirements.</p> <p>This is broadly consistent with ONR expectations. However, no technical plans have been presented at this time.</p>
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are broadly in line with ONR expectations.

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-32	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-40	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has identified an appropriate programme of work	No. The licensee considers that the item remains open	An acceptable forward work programme is underway and the timescale for delivery looks reasonable	The licensee needs to provide further information before ONR can be content that it is adequately addressing ONR expectations
STF-75	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-82	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee  DRDL state that STF-82 has cross site implications and will	The licensee's proposals plans need further development before ONR can be content that they adequately address ONR expectations.

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
				be managed through the joint HMNB Devonport and DRDL sentencing process.	No technical proposals have been presented at this time. DRDL states that STF-82 is closely related to IR-10. IR-10 concerns the review flooding studies. However, STF-82 concerns flooding and resilience to seismic events.
STF-89	<p>The licensee has provided an adequate description of what they are trying to achieve.</p> <p>This option has been chosen because DRDL present an adequate high level statement of what needs to be achieved. No further technical detail is presented at this time.</p>	<p>Nothing tangible at this stage.</p> <p>DRDL has not reported any technical outcome at this time. However, DRDL are in the process of producing a plan of work with HMNB.</p>	<p>No. The licensee considers that the item remains open.</p>	<p>There is good information that the licensee is developing an appropriate programme of work.</p> <p>DRDL briefly describe its work with HMNB to produce a sentencing and prioritisation exercise by 30 September 2012, and a finalised programme to address STF-89 by 31 December 2012.</p>	<p>The licensee's proposals and plans need further development before ONR can be content that they adequately address ONR expectations.</p> <p>DRDL are in the process of developing a plan of work. Technical proposals have not yet been presented to compare with ONR expectations.</p>

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-91	The licensee has provided an adequate description of what they are trying to achieve.	<p>The licensee has appropriate equipment already in place.</p> <p>This statement applies directly to the storage of fuel in the Used Fuel Flasks.</p> <p>ONR notes that the LLRF wet pits are not currently in use.</p>	<p>Yes, and on the basis of the information presented ONR judge this to be reasonable.</p> <p>The UFF are considered to be very robust to external events.</p>	N/A	<p>The licensee's work proposals are in accordance with ONR expectations.</p> <p>Comprehensiveness of the emergency response measures available.</p>
STF-92	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	<p>There is good information that the licensee is developing an appropriate programme of work.</p> <p>DRDL state that HMNB Devonport and itself have full confidence in the methodologies and procedures in place but will provide the appropriate assurance.</p>	<p>The licensee's work proposals need further development before ONR can be content that they adequately address ONR expectations.</p> <p>The approach adopted by DRDL appears generally reasonable at a high level. Technical detail has not been provided hence item 3) has been chosen.</p>

## Devonport Royal Dockyard - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
Considerations 1-39	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open	There is good evidence/information that the licensee is developing an appropriate programme of work	<p>The licensee's work proposals need further development before ONR can be content that they adequately address ONR expectations.</p> <p>The approach adopted by DRDL appears generally reasonable at a high level. Technical detail has not been provided hence item 3) has been chosen.</p>

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-10	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations
IR-11	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-12	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified / specified equipment/processes to be installed / implemented.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-14	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-16	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-17	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-19	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-20	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme. (whilst generally true some aspects need further discussion).	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-21	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-22	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work.	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-24	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-25	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
FR-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	Yes, and on the basis of the information ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The Licensees' work/proposals/plans need further development/evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
FR-4	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
FR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-2	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-3	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-4	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-5	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-6	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-7	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF- 8	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-9	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-10	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-11	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-12	Applies to Magnox Ltd only.	N/A	N/A	N/A	N/A
STF-13	Applies to Magnox Ltd only.	N/A	N/A	N/A	N/A
STF-14	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-15	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-16	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
STF-17	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-001	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-002	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-003	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-004	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-005	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-006	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-007	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence/information that the Licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-008	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-009	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-010	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-011	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-012	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-013	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-014	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-015	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-016	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-017	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified / specified equipment/processes to be installed / implemented.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	N/A	N/A

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-018	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-019	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-020	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-021	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-022	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-023	The Licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-024	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-025	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-026	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-027	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-028	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-029	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-030	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-031	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-032	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-033	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-34	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-35	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-36	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-037	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-038	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-039	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-040	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-41	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-042	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and ONR is discussing an appropriate timescale for delivery.	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-043	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-044	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-045	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CAS-046	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-047	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-048	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-049	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-050	The licensee has provided an adequate description of what they are trying to achieve	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-051	The licensee has provided an adequate description of what they are trying to achieve	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-052	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-053	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view.	N/A	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-054	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-055	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-056	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, but ONR needs further information in order to form a view.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-057	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-058	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-059	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view.	N/A	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-060	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-061	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	Yes, but ONR needs further information in order to form a view.	N/A	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-062	The licensee has provided an adequate description of what they are trying to achieve	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-063	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-064	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The Licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-065	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme. (whilst generally true some aspects need further discussion).	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensees work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-66	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-67	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensees work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-68	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-069	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-70	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	Yes, but ONR needs further information in order to form a view.	N/A	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-71	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-72	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
CSA-73	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-74	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-75	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-076	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-077	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-78	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-79	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-80	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-81	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, but ONR needs further information in order to form a view.	N/A	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-82	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, but ONR needs further information in order to form a view.	N/A	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-83	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, but ONR needs further information in order to form a view.	N/A	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-84	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	N/A	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-085	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.

## EDF Nuclear Generation Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
CSA-86	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-87	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
CSA-88	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
CSA-89	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
. Chief Inspectors Report Recommendations					
IR-1	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
FR-9	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
IR-2	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
IR-3	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
FR-6	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensee's work/proposals/plans/ is in accordance with ONR expectations.

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-7	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
FR-5	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
IR-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	N/A	N/A
FR-8	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	The licensee has provided an adequate description of what they are trying to achieve		The licensee's work / proposals / plans are in accordance with ONR expectations
IR-5	The licensee has provided an adequate description of what they are trying to achieve	N/A	The licensee has provided an adequate description of what they are trying to achieve		N/A
IR-6	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-7	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
FR-10	The licensee has provided an adequate description of what they are trying to achieve	N/A	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		N/A
IR-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	Yes, but ONR needs further information in order to form a view	We are still in the process of agreeing a suitable work programme with the licensee	The licensees' work/ <u>proposals</u> /plans need further <u>development</u> /evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-10	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results have demonstrated that nuclear facilities on the Sellafield site are not threatened by flooding resulting from rises in sea level or tsunamis. The work has indicated that there is a potential for river flooding to effect a limited area of the site and that extreme rainfall could surcharge the existing surface water drainage system and cause local flooding of facilities	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No The Licensee considers that the item remains open	An acceptable forward work programme is underway and the timescale for delivery looks reasonable	The licensees work/proposals/plans/ is in accordance with ONR expectations.

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-12	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment/new processes already installed/in place.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-13	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	There is good evidence that the licensee is developing an appropriate programme of work	The licensees work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans
IR-14	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment/new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensees work/proposals/plans/ is in accordance with ONR expectations
IR-15	The licensee has provided an adequate description of what they are trying to achieve	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations.
IR-16	The licensee has provided an adequate description of what they are trying to achieve	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations

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FR-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
FR-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-17	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensees work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-18	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensees work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

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IR-19	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
IR-20	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans
IR-21	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans..

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-22	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	ONR is still in the process of agreeing a suitable work programme with the licensee.	Details of Sellafield's work to respond to this recommendation are not finalised. Further engagement with Sellafield is required to agree a suitable work programme with the licensee.
IR-23	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
IR-24	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	There is evidence that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
FR-11	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	There is evidence that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
IR-25	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	There is good evidence that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
FR-1	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment/ <u>new processes</u> already installed/ <u>in place</u> .	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work/proposals/ <u>plans</u> / is in accordance with ONR expectations.
FR-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable	The licensee's work/proposals/plans/ is in accordance with ONR expectations.
IR-26	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out the requested work and produced the requested reports by the requested dates	Yes		The licensee's work/proposals/ <u>plans</u> / is in accordance with ONR expectations

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
FR-12	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out the requested work and produced the requested reports by the requested dates	Yes		The licensee's work/proposals/plans/ is in accordance with ONR expectations
NPP Stress Test Findings					
STF-1	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out the requested work and produced the requested reports by the requested dates	Yes		The licensee's work/proposals/plans/ is in accordance with ONR expectations
STF-2	The licensee has provided an adequate description of what they are trying to achieve	This STF is being addressed as part of STF-37 which was raised specifically against SL	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-5	The licensee has provided an adequate description of what they are trying to achieve.	This STF is being addressed as part of STF-23 which was raised specifically against SL	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-6	The licensee does not consider that the item applies to them and they have provided an acceptable justification	Not Applicable Site Specific	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-7	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable. Further work is associated with close out SL-17, SL-18 and SL-20		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	-	The licensee's work / proposals / plans are in accordance with ONR expectations.

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

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STF-9	The licensee does not consider that the item applies to them and they have provided an acceptable justification – for Calder Hall.	Nothing further has been done with respect to Calder Hall.  The ONR assessor is satisfied that the issues raised for the wider site are being addressed elsewhere – e.g. IR-8 and IR-24	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-10	The licensee does not consider that the item applies to them and they have provided an acceptable justification – for Calder Hall.	Nothing further has been done with respect to Calder Hall.  The ONR assessor is satisfied that the issues raised for the wider site are being addressed elsewhere – e.g. IR-8.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	-	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-12	The licensee has provided an adequate description of what they are trying to achieve..	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	-	The licensee's work / proposals / plans are in accordance with ONR expectations.

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STF-13	The licensee does not consider that the item applies to them and they have provided an acceptable justification – for Calder Hall.	Nothing further has been done with respect to Calder Hall.  SL has provided a satisfactory response to STQ/SL/24 (see Annex J below) which considers applicability to wider Sellafield site.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-14	The. The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.		The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-15	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	ONR is still in the process of agreeing a suitable work programme with the licensee.	Details of Sellafield's work to respond to this recommendation are not finalised. Further engagement with Sellafield is required to agree a suitable work programme with the licensee.
STF-16	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	There is good evidence that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

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STF-17	The licensee does not consider that the item applies to them and they have provided an acceptable justification	Not Applicable –Site Specific	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-18	The licensee does not consider that the item applies to them and they have provided an acceptable justification	Not Applicable Site Specific	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-19	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out the requested work and produced the requested reports by the requested dates	Yes		The licensee's work/proposals/plans/ is in accordance with ONR expectations
Non NGPF Stress Test Findings – Sellafield					
STF-20	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out the requested work and produced the requested reports by the requested dates	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

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STF-21	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	There is good evidence that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
STF-22	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	ONR is still in the process of agreeing a suitable work programme with the licensee.	Details of Sellafield's work to respond to this recommendation are not finalised. Further engagement with Sellafield is required to agree a suitable work programme with the licensee.
STF-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-24	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage..	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations.

### Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

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STF -25	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, but ONR needs further information in order to form a view	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations
STF-33	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations
STF-37	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	This item is being taken forward as part of IR-25	The licensee's work / proposals / plans are in accordance with ONR expectations
STF-38	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations
STF-50	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-51	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-52	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified an appropriate forward work programme.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-53	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-54	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has identified / specified equipment/processes to be installed / implemented.	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-59	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations.

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STF-64	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
STF-65	The licensee has provided an adequate description of what they are trying to achieve.	Nothing tangible at this stage.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans need further development before ONR can be content that they adequately address ONR expectations.
STF-66	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-67	It is not clear that the licensee is addressing the item in the most appropriate way and discussions are ongoing.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

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STF-68	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-69	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-70	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-71	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	The licensee considers that the work to support this item is complete.	N/A	No specific expectation was provided for this finding but the licensee's response meets the ONR's intent .

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-72	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
STF-86	The Licensee's original response did not provide an adequate description and did not meet ONR's intent. The Licensee's subsequent response reflects ONR's discussions held during the course of this assessment and is adequate.	N/A  The licensee considered that no additional value will be obtained for undertaking the analysis.	The licensee considers that no further work is required at this stage.	N/A	The licensee's proposals / plans are in accordance with ONR expectations.
STF-87	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-94	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out the requested work and produced the requested reports by the requested dates	Yes		
Non NGPF Stress Test Findings – Sellafield consideration of other licensees STFs					
STF-26	The licensee does not consider that the item applies to them and they have provided an acceptable justification	This item was included in the ENSREG stress test review	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-27	The licensee does not consider that the item applies to them and they have provided an acceptable justification	Not Applicable Site Specific	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-28	The licensee does not consider that the item applies to them and they have provided an acceptable justification	This item was included in the ENSREG stress test review	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations

**Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations**

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-29	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	This item is being taken forward as SL-52	The licensee's work / proposals / plans are in accordance with ONR expectations
STF-30	The licensee does not consider that the item applies to them and they have provided an acceptable justification	Not Applicable Site Specific	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-31	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations
STF-32	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations
STF-34	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-35	The licensee does not consider that the item applies to them and they have provided an acceptable justification	This item was included in the ENSREG stress test review	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STF's and Considerations with the intent)
STF-39	The licensee does not consider that the item applies to them and they have provided an acceptable justification	Not Applicable Site Specific	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-40	The licensee does not consider that the item applies to them and they have provided an acceptable justification	Not Applicable Site Specific	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-41	Although the licensee does not consider that the item applies to them they have initiated work packages to address possible consequences from flooding events not related to tsunami or rise in sea level	See comments in STF-38 and SL-15	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-42	The licensee does not consider that the item applies to them and they have provided an acceptable justification	Not Applicable Site Specific	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-43	Although the licensee does not consider that the item applies to them they have initiated work packages to address possible consequences from flooding events not related to tsunami or rise in seal level	See comments in STF-38 and SL-15	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-44	The licensee does not consider that the item applies to them and they have provided an acceptable justification	Not Applicable Site Specific	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-45	The licensee does not consider that the item applies to them and they have provided an acceptable justification	This item was included in the ENSREG stress test review	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-46	The licensee does not consider that the item applies to them and they have provided an acceptable justification	This item was included in the ENSREG stress test review	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-47	The licensee does not consider that the item applies to them and they have provided an acceptable justification	Not Applicable Site Specific	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-48	The licensee does not consider that the item applies to them and they have provided an acceptable justification	The licensee has appropriate processes already in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-49	The licensee does not consider that the item applies to them and they have provided an acceptable justification	This item was included in the ENSREG stress test review	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-55	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	The licensee's work / proposals / plans are in accordance with ONR expectations.
STF-56	As IR-22	As IR-22	As IR-22	As IR-22	As IR-22

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-57	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable.	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.
STF-58	The licensee has provided an adequate description of what they are trying to achieve.	SL has claimed this is covered by IR-18	Yes, and on the basis of the information / evidence ONR judge this to be reasonable (although IR-18 continues)		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-60	The licensee has provided an adequate description of what they are trying to achieve.	SL has claimed this is covered by SL-2, SL-24, IR-19 and IR-20.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable (although the identified Considerations and Recommendations continue).		The licensee's work / proposals / plans are in accordance with ONR expectations
STF-61	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-62	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-63	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
STF-73	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-74	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-75	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-76	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-77	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-78	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-79	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-80	As IR-23	As IR-23	As IR-23	As IR-23	As IR-23
STF-81	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-82	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-83	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-84	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STF's and Considerations with the intent)
STF-85	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-88	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-89	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-90	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-91	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-92	As IR-25	As IR-25	As IR-25	As IR-25	As IR-25
STF-93	The licensee has provided an adequate description of what they are trying to achieve.	SL has claimed this is covered by SL-45 and SL-46.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable (although the identified Considerations continue).		The licensee's work / proposals / plans are in accordance with ONR expectations

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL Stress Test Resposde Report Recommendations					
SL-1	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
SL-2	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps..	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations.
SL-3	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations.
SL-4	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps..	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and the timescale for delivery looks reasonable.	The licensees work/proposals/plans/ is in accordance with ONR expectations.

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL-5	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
SL-6	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensee's work/proposals/plans/ is in accordance with ONR expectations
SL-7	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations
SL-8	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment/new processes already installed/in place.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
SL-9	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL-10	The licensee has provided an adequate description of what it is trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensee's work/proposals/plans/ is in accordance with ONR expectations
SL-11	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations
SL-12	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensee's work/proposals/plans/ is in accordance with ONR expectations.
SL-13	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
SL-14	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has completed river channel improvement works and is carrying out further assessment of river flow capacity	No. The licensee considers that the item remains open	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL-15	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations
SL-16	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, and on the basis of the information / evidence ONR judge this to be reasonable		The licensee's work / proposals / plans are in accordance with ONR expectations
SL-17	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Close out of this item is linked with SL-15	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations
SL-18	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	There is good evidence / information that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are in accordance with ONR expectations
SL-19	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations

**Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations**

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL-20	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed and is reviewing further requirements	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations
SL-21	The licensee has provided an adequate description of what it is trying to achieve.	Nothing tangible at this stage	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations
SL-22	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations
SL-23	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations.
SL-24	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations.

**Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations**

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL-25	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations.
SL-26	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations.
SL-27	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations.
SL-28	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations.
SL-29	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps	Yes, but ONR needs further information in order to form a view	We are still in the process of agreeing a suitable work programme with the licensee	The licensees work/proposals/plans/ is in accordance with ONR expectations

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL-30	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment/new processes already installed/in place.	Yes, but ONR needs further information in order to form a view		The licensees work/proposals/plans/ is in accordance with ONR expectations.
SL-31	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
SL-32	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
SL-33	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

### Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL-34	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
SL35	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
SL36	The licensee has provided an adequate description of what they are trying to achieve  This work is covered by FR-2 and FR-3.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
SL-37	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL-38	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	ONR is still in the process of agreeing a suitable work programme with the licensee.	Details of Sellafield's work to respond to this recommendation are not finalised. Further engagement with Sellafield is required to agree a suitable work programme with the licensee.
SL-39	As SL-38	As SL-38	As SL-38	As SL-38	As SL-38
SL-40	As SL-38	As SL-38	As SL-38	As SL-38	As SL-38
SL-41	As SL-38	As SL-38	As SL-38	As SL-38	As SL-38
SL-42	The licensee has provided an adequate description of what it is trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No	There is good evidence that the licensee is developing an appropriate programme of work	The licensee's work / proposals / plans are broadly in line with ONR expectations and we are discussing potential improvements to current work/proposals/plans.

## Sellafield Limited - Summary of Assessment of Licensee Compliance with ONR Expectations

Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL-43	The licensee has provided an adequate description of what they are trying to achieve	The licensee has identified an appropriate forward work programme	No. The licensee considers that the item remains open.	An acceptable forward work programme is underway and we are discussing an appropriate timescale for delivery.	The licensee's work/proposals/plans/ is in accordance with ONR expectations.
SL-44	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps..	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensee's work/proposals/plans/ is in accordance with ONR expectations.
SL-45	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment/new processes already installed/in place.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable		The licensee's work/proposals/plans/ is in accordance with ONR expectations
SL-46	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment/new processes already installed/in place.	Yes, and on the basis of the information/evidence ONR judge this to be reasonable		The licensee's work/proposals/plans/ is in accordance with ONR expectations
SL-47	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensee's work/proposals/plans/ is in accordance with ONR expectations.

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL-48***	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee's work / proposals / plans need further development / evidence information/ before ONR can be content that they adequately address ONR expectations.
SL-49***	The licensee has provided an adequate description of what they are trying to achieve	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	ONR is still in the process of agreeing a suitable work programme with the licensee.	The licensee <u>needs to develop</u> work / proposals / plans / evidence information/ before ONR can be content that they adequately address ONR expectations.
SL-50***	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations
SL-51***	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has appropriate equipment / new processes already installed/in place.	Yes, but ONR needs further information in order to form a view.	Close out of this item is linked to IR-25	The licensee's work / proposals / plans are in accordance with ONR expectations
SL-52***	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open	ONR is still in the process of agreeing a suitable work programme with the licensee	The licensee's work / proposals / plans are in accordance with ONR expectations

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Item No.	(A) Eventual outcome - what is the licensee trying to achieve	(B) What has the licensee done so far?	(C) Is the item considered closed by licensee?	(D) If the item is still open, what is being done by the licensee?	(T) Is there a reasonable match with ONR Champions expectations (or for STFs and Considerations with the intent)
SL-53***	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work / studies / analysis and the results are being reviewed for next steps.	Yes, but ONR needs further information in order to form a view.	Close out of this item is linked to IR-25	The licensee's work / proposals / plans are in accordance with ONR expectations
SL-54***	The licensee has provided an adequate description of what they are trying to achieve.	The licensee has carried out work/studies/analysis and the results are being reviewed for next steps.	No. The licensee considers that the item remains open.	We are still in the process of agreeing a suitable work programme with the licensee	The licensee's work/proposals/plans/ is in accordance with ONR expectations

## Annex 5: UK's National Action Plan for ENSREG

ONR has engaged with ENSREG in the development, conduct and peer review of the European Stress Tests and is currently assisting ENSREG in the development of a specification National Action Plans that all European Countries with NPP will be producing at the end of 2012. We anticipate that these plans will, amongst other things, provide updates on:

- the National regulators stress test report,
- ENSREG main & country peer review report
- Any additional recommendations from the extraordinary CNS meeting
- Additional activities derived from national reviews

This current "implementation" report covers bullets 1, 2 and 4 above and will provide much of the basic information that will go into the UK National Action Plan for ENSREG, and indeed into the ONR's report for the 6<sup>th</sup> IAEA CNS meeting to be held in 2013. As part of the outcome of the European Peer review of the stress tests, ENSREG identified a number of technical work areas (see Table 2 of this Annex) which are being coordinated through WENRA's Reactor Harmonisation Working Group and ONR is actively involved in all of these work areas.

**Table 1: European Peer Review of UK Stress test report**

Item for follow up	Location in the report	UK recommendation, STF or consideration that bounds or includes the item
Full scope L2 PSAs not yet performed for GCRs (see below)	1.3, 3.1.3	FR4
BDB capability – margins & cliff edges	2.1.3, 2.23	IR 10, STF5
DBF assessments have not accounted for recent tsunami research	2.2.3	IR10
No satisfactory evidence of capability of the plants beyond the design basis	2.2.3, 2.3.3	STF5
Inclusion of defence in depth principle as part of margin an cliff edge work	2.2.3	STF5
Not all plants fully comply with WENRA RLs yet (apart from the PSA issue, there were no other examples in this section of none or partial WRL compliance cited by the peer review team)	3.3	FR4 for the L2 PSA elements – we also need to have a view to general implementation of WRLs on NPPs – we have to do this anyway.
Consider injection of water in to GCR core to provide heat removal when boilers not available	3.3	IR25, IR24, STF16
Consider having 72 hr fuel and other stocks (eg CO2)	3.3	STF 9, CSA043, IR8
Consider improving battery capacity	3.3	STF9 CSA 59, CSA 061
Consider increasing robustness of the operating environment of the SZB steam driven ECS pumps	3.3	IR25, FR3
Strengthen on site emergency facilities against ext. Hazards and severe accidents	4.3	STF15,

Assessment of severe accident(s) at multiple facilities	4.3	CSA 081, CSA 082, CSA 083, IR 11
Consider need for back up control room	4.3	IR 22, STF 15 (in part)
Further development of SBERGs and SAGs – all accident types and operating modes.	4.3	STF16
Improved training for “improved” SBERGs and SAGs	4.3	IR 24, IR 25, STF16
Analysis of severe accident radiation conditions on site & development of measure to address them	4.3	IR24, IR 25
Consider operability issues for new SAM hardware in severe external hazard conditions & SBO	4.3	IR16, IR24, IR 25, FR2, FR3, CSA 040 (in part), STF8
Consider strengthening SFP coolant inventory top up capability	4.3	IR 19, IR 20, STF 9

The Overall Peer review report on European NPPs draws from all of the individual country peer reviews and makes 4 main recommendations which are considered in the table 2 below:

**Table 2: Overall Peer Review Report on European NPP**

ENSREG recommendation	ONR coverage
The peer review Board recommends that WENRA, involving the best available expertise from Europe, develop guidance on natural hazards assessments, including earthquake, flooding and extreme weather conditions, as well as corresponding guidance on the assessment of margins beyond the design basis and cliff-edge effects.	ONR is leading the WENRA task group on this topic. IR 10, STF 5
The peer review Board recommends that ENSREG underline the importance of periodic safety review. In particular, ENSREG should highlight the necessity to re-evaluate natural hazards and relevant plant provisions as often as appropriate but at least every 10 years.	ONR is participating in the WENRA task group looking at revising the PSR WRLs. FR1
Urgent implementation of the recognised measures to protect containment integrity is a finding of the peer review that national regulators should consider. The measures to be taken can vary depending on the design of the plants. For water cooled reactors, they include equipment, procedures and accident management guidelines to: <ul style="list-style-type: none"> <li>■ depressurise the primary circuit in order to prevent high-pressure core melt;</li> <li>■ prevent hydrogen explosions;</li> <li>■ prevent containment overpressure.</li> </ul>	STF18, CSA 085
Necessary implementation of measures allowing prevention of accidents and limitation of their consequences in case of extreme natural hazards is a finding of the peer review that national regulators should consider.	IR 16, FR2, FR3

## ENSREG Compilation of Recommendations

The compilation repeats the items in table 2, but in section 3 identifies a number of other items to be considered. For clarity the ENSREG numbering scheme has been retained.

### **Other topics to be considered**

The peer review report dealt with many topics in addition to the four previous ones.

These topics should be considered by regulators in preparing or reviewing the national action plans. These include recommendations and suggestions, measures to increase robustness and measures already decided or implemented by some countries.

### **3.1 Topic 1 items (natural hazards) to be considered**

#### 3.1.1 Hazard Frequency

The use a return frequency of 10-4 per annum (0.1g minimum peak ground acceleration for earthquakes) for plant reviews/back-fitting with respect to external hazards safety cases.

#### 3.1.2 Secondary Effects of Earthquakes

The possible secondary effects of seismic events, such as flood or fire arising as a result of the event, in future assessments.

#### 3.1.3 Protected Volume Approach

The use a protected volume approach to demonstrate flood protection for identified rooms or spaces.

#### 3.1.4 Early Warning Notifications

The implementation of advanced warning systems for deteriorating weather, as well as the provision of appropriate procedures to be followed by operators when warnings are made.

#### 3.1.5 Seismic Monitoring

The installation of seismic monitoring systems with related procedures and training.

#### 3.1.6 Qualified Walkdowns

The development of standards to address qualified plant walkdowns with regard to earthquake, flooding and extreme weather – to provide a more systematic search for non-conformities and correct them (e.g. appropriate storage of equipment, particularly for temporary and mobile plant and tools used to mitigate beyond design basis (BDB) external events).

#### 3.1.7 Flooding Margin Assessments

The analysis of incrementally increased flood levels beyond the design basis and identification of potential improvements, as required by the initial ENSREG specification for the stress tests.

#### 3.1.8 External Hazard Margins

In conjunction with recommendation 2.1 and 3.1.7, the formal assessment of margins for all external hazards including, seismic, flooding and severe weather, and identification of potential improvements.

### **3.2 Topic 2 items (loss of safety systems) to be considered**

#### 3.2.1 Alternate Cooling and Heat Sink

The provision of alternative means of cooling including alternate heat sinks. Examples include steam generator (SG) gravity alternative feeding, alternate tanks or wells on the site, air-cooled cooling towers or water sources in the vicinity (reservoir, lakes, etc) as an additional way of enabling core cooling.

## 3.2.2 AC Power Supplies

The enhancement of the on-site and off-site power supplies. Examples include adding layers of emergency power, adding independent and dedicated backup sources, the enhancement of the grid through agreements with the grid operator on rapid restoration of off-site power, additional and/or reinforced off-site power connections, arrangements for black start of co-located or nearby gas or hydro plants, replacing standard ceramic based items with plastic or other material that are more resistant to a seismic event. Another example is the possible utilisation of generator load shedding and house load operation for increased robustness, however, before introducing such arrangements the risks need to be properly understood.

## 3.2.3 DC Power Supplies

The enhancement of the DC power supply. Examples include improving the battery discharge time by upgrading the existing battery, changing/diversifying battery type (increasing resistance to common-mode failures), providing spare/replacement batteries, implementing well-prepared loadshedding/ staggering strategies, performing real load testing and on-line monitoring of the status of the batteries and preparing dedicated recharging options (e. g. using portable generators).

## 3.2.4 Operational and Preparatory Actions

Implementation of operational or preparatory actions with respect to the availability of operational consumables. Examples include, ensuring the supply of consumables such as fuel, lubrication oil, and water and ensuring adequate equipment, procedures, surveillance, drills and arrangements for the resupply from off-site are in place.

## 3.2.5 Instrumentation and Monitoring

The enhancement of instrumentation and monitoring. Examples include separate instrumentation and/or power sources to enable monitoring of essential parameters under any circumstances for accident management and the ability to measure specific important parameters based on passive and simple principles.

## 3.2.6 Shutdown Improvements

The enhancement of safety in shutdown states and mid-loop operation. Examples of improvements include, reducing or prohibiting mid-loop operation, adding dedicated hardware, procedures and drills, the use of other available water sources (e. g. from hydro-accumulators), requiring the availability of SGs during shutdown operations and the availability of feedwater in all modes.

## 3.2.7 Reactor Coolant Pump Seals

The use of temperature-resistant (leak-proof) primary pump seals.

## 3.2.8 Ventilation

The enhancement of ventilation capacity during SBO to ensure equipment operability.

## 3.2.9 Main and Emergency Control Rooms

The enhancement of the main control room (MCR), the emergency control room (ECR) and emergency control centre (ECC) to ensure continued operability and adequate habitability conditions in the event of a station black-out (SBO) and in the event of the loss of DC (this also applies to Topic 3 recommendations).

## 3.2.10 Spent Fuel Pool

The improvement of the robustness of the spent fuel pool (SFP). Examples include reassessment/upgrading SFP structural integrity, installation of qualified and power-independent monitoring, provisions for redundant and diverse sources of additional coolant resistant to external hazards (with procedures and drills), design of pools that prevents drainage, the use of racks made of borated steel to enable cooling with fresh (unborated) water without having to worry about possible recriticality, redundant and independent SFP cooling systems, provision for additional heat exchangers (e. g. submerged in the SFP), an external connection for refilling of

the SFP (to reduce the need for an approach linked to high doses in the event of the water falling to a very low level) and the possibility of venting steam in a case of boiling in the SFP.

### 3.2.11 Separation and Independence

The enhancement of the functional separation and independence of safety systems. Examples include the elimination of full dependence of important safety functions on auxiliary systems such as service water and the introduction of an alternate source of cooling.

### 3.2.12 Flow Path and Access Availability

The verification of assured flow paths and access under SBO conditions. Ensure that the state in which isolation valves fail and remain, when motive and control power is lost, is carefully considered to maximise safety. Enhance and extend the availability of DC power and instrument air (e. g. by installing additional or larger accumulators on the valves). Ensure access to critical equipment in all circumstances, specifically when electrically operated turnstiles are interlocked.

### 3.2.13 Mobile Devices

The provision of mobile pumps, power supplies and air compressors with prepared quick connections, procedures, and staff training with drills. Mobile devices are intended to enable the use of existing safety equipment, enable direct feeding of the primary or secondary side, allow extended use of instrumentation and operation of controls, allow effective fire-fighting, and ensure continued emergency lighting. The equipment should be stored in locations that are safe and secure even in the event of general devastation caused by events significantly beyond the design basis (this also applies to Topic 3 recommendations).

### 3.2.14 Bunkered/Hardened Systems

The provision for a bunkered or “hardened” system to provide an additional level of protection with trained staff and procedures designed to cope with a wide variety of extreme events including those beyond the design basis (this also applies to Topic 3 recommendations).

### 3.2.15 Multiple Accidents

The enhancement of the capability for addressing accidents occurring simultaneously on all plants of the site. Examples include assuring preparedness and sufficient supplies, adding mobile devices and fire trucks and increasing the number of trained and qualified staff (this also applies to Topic 3 recommendations).

### 3.2.16 Equipment Inspection and Training Programs

The establishment of regular programs for inspections to ensure that a variety of additional equipment and mobile devices are properly installed and maintained, particularly for temporary and mobile equipment and tools used for mitigation of BDB external events. Development of relevant staff training programmes for deployment of such devices.

### 3.2.17 Further Studies to Address Uncertainties

The performance of further studies in areas where there are uncertainties.

Uncertainties may exist in the following areas:

- The integrity of the SFP and its liner in the event of boiling or external impact.
- The functionality of control equipment (feedwater control valves and SG relief valves, main steam safety valves, isolation condenser flow path, containment isolation valves as well as depressurisation valves) during the SBO to ensure that cooling using natural circulation would not be interrupted in a SBO (this is partially addressed in recommendation xxxx).
- The performance of additional studies to assess operation in the event of widespread damage, for example, the need for different equipment (e.g. bulldozers) to clear the route to the most critical locations or equipment. This includes the logistics of the external support and related arrangements (storage of equipment, use of national defence resources, etc.).

## 3.3 Topic 3 items (severe accident management) to consider

### 3.3.1 WENRA Reference Levels

The incorporation of the WENRA reference levels related to severe accident management (SAM) into their national legal frameworks, and ensure their implementation in the installations as soon as possible. This would include:

- Hydrogen mitigation in the containment - Demonstration of the feasibility and implementation of mitigation measures to prevent massive explosions in case of severe accidents.
- Hydrogen monitoring system - Installation of qualified monitoring of the hydrogen concentration in order to avoid dangerous actions when concentrations that allow an explosion exist.
- Reliable depressurization of the reactor coolant system – Hardware provisions with sufficient capacity and reliability to allow reactor coolant system depressurization to prevent high-pressure melt ejection and early containment failure, as well as to allow injection of coolant from low pressure sources.
- Containment overpressure protection - Containment venting via the filters designed for severe accident conditions.
- Molten corium stabilization - Analysis and selection of feasible strategies and implementation of provisions against containment degradation by molten corium.

### 3.3.2 SAM Hardware Provisions

Adequate hardware provisions that will survive external hazards (e.g. by means of qualification against extreme external hazards, storage in a safe location) and the severe accident environment (e.g. engineering substantiation and/or qualification against high pressures, temperatures, radiation levels, etc), in place, to perform the selected strategies.

### 3.3.3 Review of SAM Provisions Following Severe External Events

The systematic review of SAM provisions focusing on the availability and appropriate operation of plant equipment in the relevant circumstances, taking account of accident initiating events, in particular extreme external hazards and the potential harsh working environment.

### 3.3.4 Enhancement of Severe Accident Management Guidelines (SAMG)

In conjunction with the recommendation 2.4, the enhancement of SAMGs taking into account additional scenarios, including, a significantly damaged infrastructure, including the disruption of plant level, corporate-level and national-level communication, long-duration accidents (several days) and accidents affecting multiple units and nearby industrial facilities at the same time.

### 3.3.5 SAMG Validation

The validation of the enhanced SAMGs.

### 3.3.6 SAM Exercises

Exercises aimed at checking the adequacy of SAM procedures and organisational measures, including extended aspects such as the need for corporate and nation level coordinated arrangements and long-duration events.

### 3.3.7 SAM Training

Regular and realistic SAM training exercises aimed at training staff. Training exercises should include the use of equipment and the consideration of multi-unit accidents and long-duration events. The use of the existing NPP simulators is considered as being a useful tool but needs to be enhanced to cover all possible accident scenarios.

## 3.3.8 Extension of SAMGs to All Plant States

The extension of existing SAMGs to all plant states (full and low-power, shutdown), including accidents initiated in SFPs.

## 3.3.9 Improved Communications

The improvement of communication systems, both internal and external, including transfer of severe accident related plant parameters and radiological data to all emergency and technical support centre and regulatory premises.

## 3.3.10 Presence of Hydrogen in Unexpected Places

The preparation for the potential for migration of hydrogen, with adequate countermeasures, into spaces beyond where it is produced in the primary containment, as well as hydrogen production in SFPs.

## 3.3.11 Large Volumes of Contaminated Water

The conceptual preparations of solutions for post-accident contamination and the treatment of potentially large volumes of contaminated water.

## 3.3.12 Radiation Protection

The provision for radiation protection of operators and all other staff involved in the SAM and emergency arrangements.

## 3.3.13 On Site Emergency Centre

The provision of an on-site emergency center protected against severe natural hazards and radioactive releases, allowing operators to stay onsite to manage a severe accident.

## 3.3.14 Support to Local Operators

Rescue teams and adequate equipment to be quickly brought on site in order to provide support to local operators in case of a severe situation.

## 3.3.15 Level 2 Probabilistic Safety Assessments (PSAs)

A comprehensive Level 2 PSA as a tool for the identification of plant vulnerabilities, quantification of potential releases, determination of candidate high-level actions and their effects and prioritizing the order of proposed safety improvements. Although PSA is an essential tool for screening and prioritising improvements and for assessing the completeness of SAM implementation, low numerical risk estimates should not be used as the basis for excluding scenarios from consideration of SAM especially if the consequences are very high.

## 3.3.16 Severe Accident Studies

The performance of further studies to improve SAMGs. Examples of areas that could be improved with further studies include:

- The availability of safety functions required for SAM under different circumstances.
- Accident timing, including core melt, reactor pressure vessel (RPV) failure, basemat melt-through, SFP fuel uncover, etc.
- PSA analysis, including all plant states and external events for PSA levels 1 and 2.
- Radiological conditions on the site and associated provisions necessary to ensure MCR and ECR habitability as well as the feasibility of AM measures in severe accident conditions, multi-unit accidents, containment venting, etc.
- Core cooling modes prior to RPV failure and of re-criticality issues for partly damaged cores, with un-borated water supply.

- Phenomena associated with cavity flooding and related steam explosion risks. Engineered solutions regarding molten corium cooling and prevention of
- basemat melt-through.
- Severe accident simulators appropriate for NPP staff training.

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