

# Efforts to Improve Safety: UK Perspective

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## Presentation Overview

- Introductory discussion
- UK response
- Principles for the way forward

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# Introductory Discussion

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## Great East Japan Earthquake 11/3/11

- Magnitude 9 earthquake
- Subsequent tsunami
- ~20000 dead or missing
- Massive destruction
- Impaired infrastructure
- Affected all nuclear plants on the east coast
- Greatest consequences at Fukushima Dai-ichi



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# Great efforts since 11<sup>th</sup> March 2011

- Admiration of efforts
  - witnessed response first hand on site
  - massive progress since along road map
  - off-site remediation underway
- Key now is trust and confidence



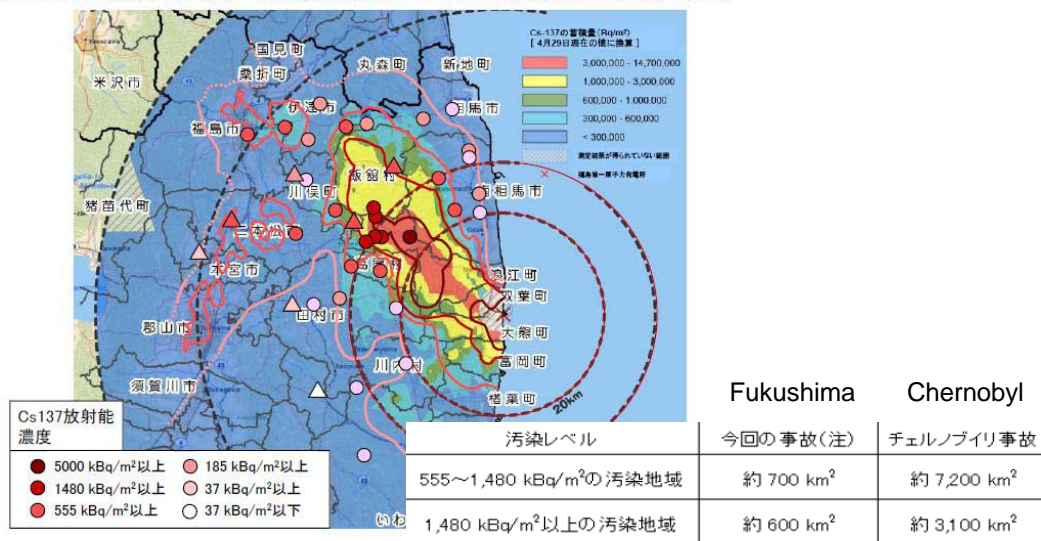
Current Status of Roadmap (issues/targets/major countermeasures) as of May 17

Issues	As of April 17	Step I (around 1 month; already in progress)	Step II (around 2 to 4 months after starting the)	Mid-term issues
1. Cooling	Cooling by immersion (circulation cooling)	Establishment of circulation cooling	Establishment of circulation cooling	Protection against corrosion cracking of structural materials
	Construction and preparation of reuse of accumulated water	Reuse of accumulated water	Reuse of accumulated water	PCV flooding
2. Containment	Management of gas emission	Management of gas emission	Management of gas emission	PCV flooding
	Sealing measure at building points of PCV	Sealing measure at building points of PCV	Sealing measure at building points of PCV	PCV flooding
3. Decontamination	Removal of debris	Removal of debris	Removal of debris	Removal of debris
	Removal of debris	Removal of debris	Removal of debris	Removal of debris
4. Decontamination	Removal of debris	Removal of debris	Removal of debris	Removal of debris
	Removal of debris	Removal of debris	Removal of debris	Removal of debris

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# People's Concern About Residual Risks after Remediation

5月6日公表文科省・米国DOE航空機モニタリング結果との重ね合わせ



Source: T. Kawada, "Current Status of Soil Contamination and how to respond," Presentation at Japan Atomic Energy Commission Meeting, May 24, 2011

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## People's Concern about Safe Operation of Nuclear Power

- Learnt the lessons & taken action
- Residual risks in context
- Strong effective independent regulation
- Open and transparent industry & regulator
- Benefits are worth having



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## UK response

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## UK Circumstances – Different Reactor Technology & Seismicity

- Mainly Advanced Gas Cooled
  - far larger core with less lower energy density
  - Single phase coolant
- Middle of stable tectonic plate with very low tsunami hazard
- But ...



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## Office for Nuclear Regulation (ONR)

- 1/4/11 ONR created as an agency of HSE prior to legislation to form as Statutory Corporation
- Safety (NII), Security (OCNS), Safeguards (UKSO), Transport (RMTT)
- NII >50 years old
- 450 staff, ~50% technical
- >95% costs recovered
- Joint Purpose: ‘Secure the protection of people and society from hazards’



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# UK Nuclear Industry basis

... Philosophy of sustained nuclear safety – **continuous improvement**

- Over 50 year nuclear industry history alongside powerful independent regulatory body
- Goal setting regulatory regime
  - onus on industry to demonstrate safety
  - regulator to challenge that demonstration and seek even lower residual risks
- No fault liability but limited liability
- Legally required to reduce risks so far as is reasonably practicable

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# ONR Response to Fukushima

**‘Securing the Protecting People and Society’**

**-17000 UK Nationals in Japan**

- Setting up RCIS
- Advice to SAGE and COBR
- Links with International Stakeholders
- Prompt re-assurance of UK fleet
- Reports to UK Government
- Stress Tests
- International Work



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## Chief Inspector Interim Report

- Focus on UK Civil Nuclear Power Plants (NPP)
- Background to radiation, nuclear technology, risks and regulation
- Timeline of events
- Comparison of Japan situation and UK
- Helped by ONR technical specialists through submissions
  - Independent Technical Advisory Panel
- 11 Conclusions, 26 Recommendations
- Published 15<sup>th</sup> May 2011

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## Chief Inspector Final Report

- Inclusion of all UK Nuclear Facilities
- Built on Interim Report
- Additional information considered by ONR specialists (IAEA mission, substantial Japanese report, responses to Interim Report, more submissions)
- 6 additional conclusions and 12 additional recommendations
- Published October 2011

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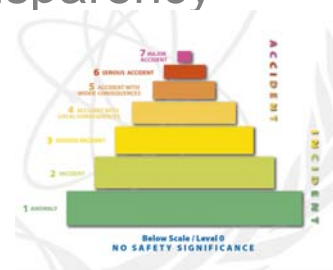
# Interim Report Recommendations

- General
- Relevant to the Regulator
- Relevant to the Nuclear Industry
- Way Forward

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## General Recommendations

- Internationally Improve dissemination of information
- Identify lessons for contingency planning
- Review UK nuclear emergency arrangements
- Enhance Openness and Transparency



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## Recommendations for the Regulator

- Review detailed Safety Assessment Principles
- Consider exercising long term accidents
- Review ONR's response capabilities for such events
- Accelerate moves to more openness and transparency



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## Recommendations for Industry

- Review site dependency - enhance self sufficiency
- Compare difference of consequences at Fukushima Dai-ichi and Dai-ni
- Review flooding studies
- Ensure adequate safety cases for new sites for multi reactors



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## Recommendations for Industry

- Ensure adequacy of spent fuel management strategies
- Review plant layout
- Ensure adequacy of the design of new spent fuel ponds
- Consider details of performance of concrete and other structures



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## Recommendations for Industry

- Consider the impact of the robustness of the UK grid in severe conditions
- Review the need for long term diverse supplies
- Review contingency plans for pond water make up
- Review venting routes
- Review provision of control
- Review communications



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# Recommendations for Industry

- Review and extend accident analysis sequences



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## EC Stress Tests

- **Origins:**
  - 24/25<sup>th</sup> March 2011, European Council declared that safety should be reviewed
  - WENRA developed the scope of the review
  - ENSREG endorsed the scope on 12/13<sup>th</sup> May 2011 and produced a specification
- **Peer Review of national reports**
- **Can be seen as sub-set of CI reviews**



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# EC Stress Test Specification

- Initiating Events
  - Extreme natural hazards
- Loss of Safety Systems
  - Cooling and Power
- Severe Accident Management



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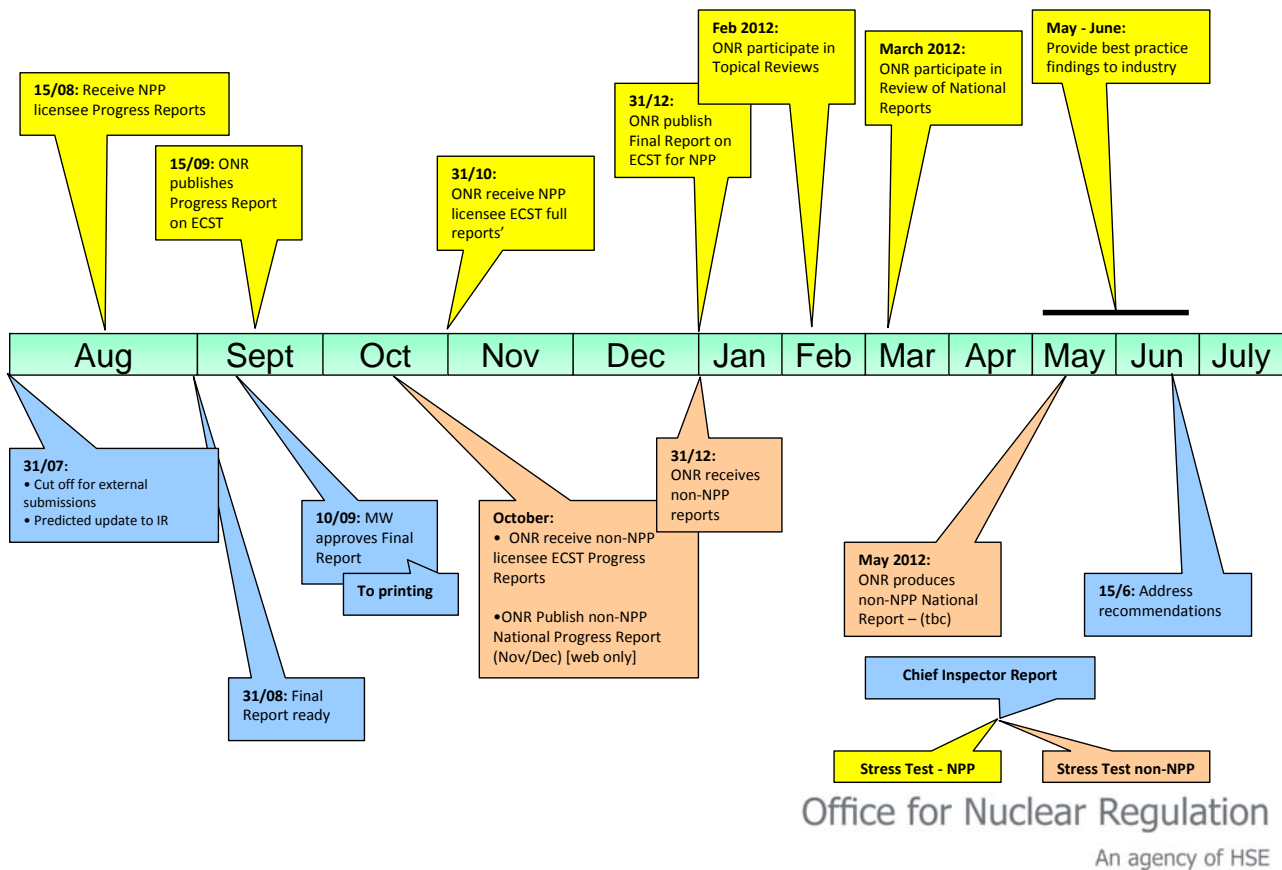
# UK Stress Test – Request to non-NPP

- ONR also requested all UK nuclear installations undertake the ‘stress test’
- All installations have reported
- ‘non-NPP’ National Report due Spring 2012
- All alongside other work



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## Opportunities to embrace

We ...

- Must be seen to be addressing lessons with full vigour and utmost commitment
- Must expand openness and transparency
- Must continue to develop and embed a vibrant nuclear safety culture, especially in supply industry
- Must deliver commitments

# KEY MESSAGES

- Confident no fundamental weakness in UK nuclear facilities or systems
- No matter how high the standards, the quest for improvement must never stop
- Vital to learn lessons and take action
- Underlying it all is a need for a vibrant and active safety culture



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## Principles for the way forward

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## Building trust & confidence

- Openness and transparency is key
- No longer sufficient to assume authority and powers lead to automatic trust and confidence
- The world of communications and media has changed

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## Openness

- All ONR reports on our website
- All licensee reports redacted and published on their websites
- All submissions from all stakeholders published on our website (together with how ONR have considered and sentenced every one)
- All new regulatory decision documents on web site

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## The future

- Operators must never be faced with a Fukushima scenario
- Need to pursue safety culture right throughout all organisations
- Need to engender a spirit of continuous improvement and learning
- Basis: leadership with humility
- **Bedrock of sustained high standards of nuclear safety and public trust and confidence into future**

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## ONR's purpose stays the same:



**To secure the protection of people and society**



**From the hazards of the nuclear industry**

On sites and during transport

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