

Nuclear & Local Engagement - UK Practice

Hong Kong University Symposium on Nuclear Safety

Trust and Governance

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www.cnec.group.cam.ac.uk

Agenda

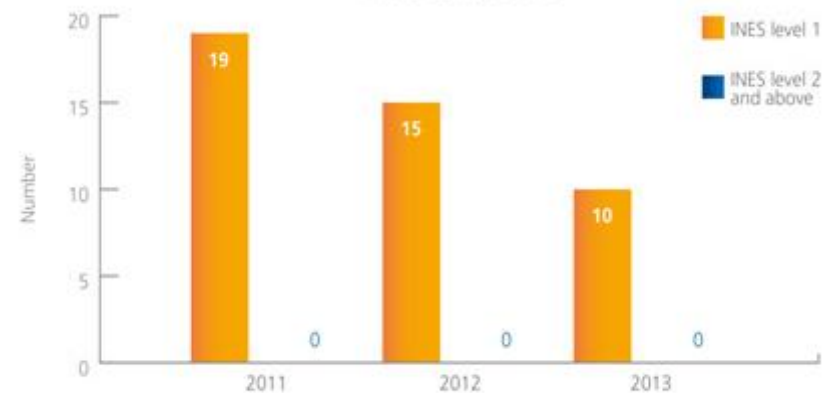
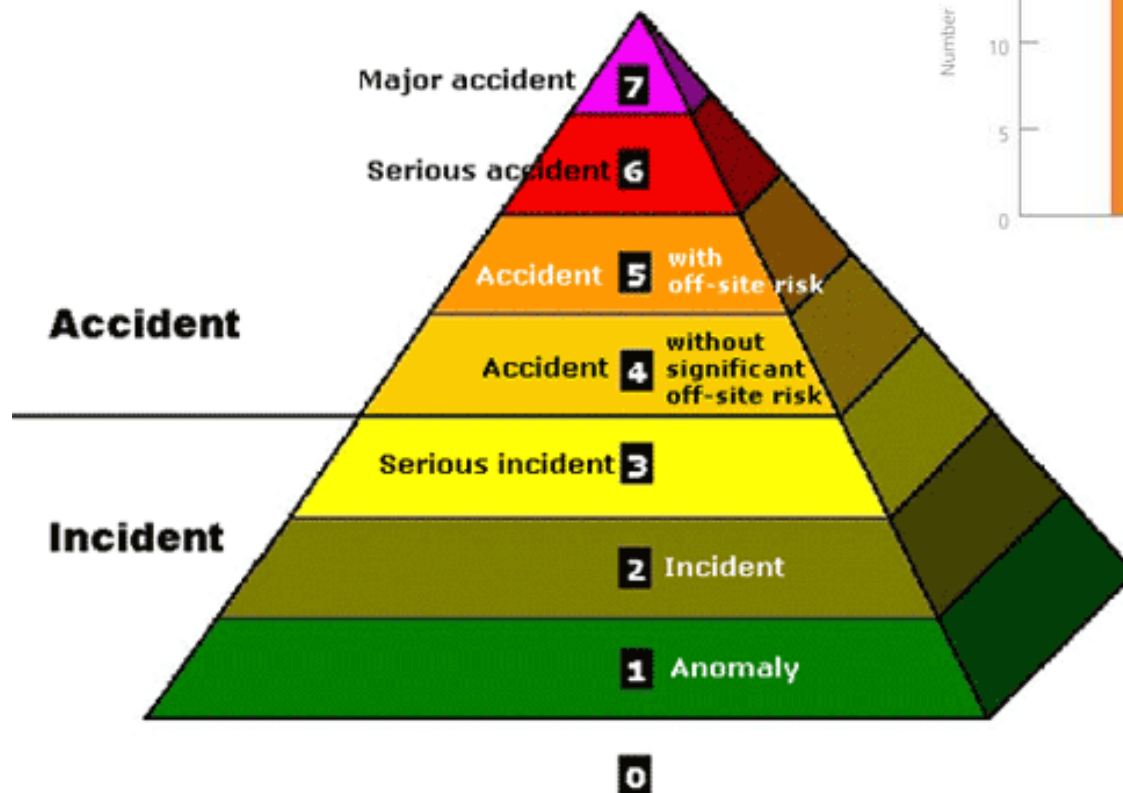
- Local engagement – Why?
- What type of emergency to plan for?
- Local consultation and emergency planning process
- Example: Sizewell B local consultation, and emergency planning.

Local Engagement – Why?

- Those people immediately affected by a potential nuclear incident, live and work nearby;
- Understanding of nuclear energy is best built by progressive engagement – rather than campaigns of public information;
- Tacit accept of the nuclear energy is required for:
 - Day-to-day operations – contrast the on-going hostility in Germany, and
 - New Build – UK is planning its new build programme to be on existing nuclear sites, where there is an understanding built-up over many years and acceptance of the risks and benefits;



Incident & Accident Scale



EDF Energy UK incident data

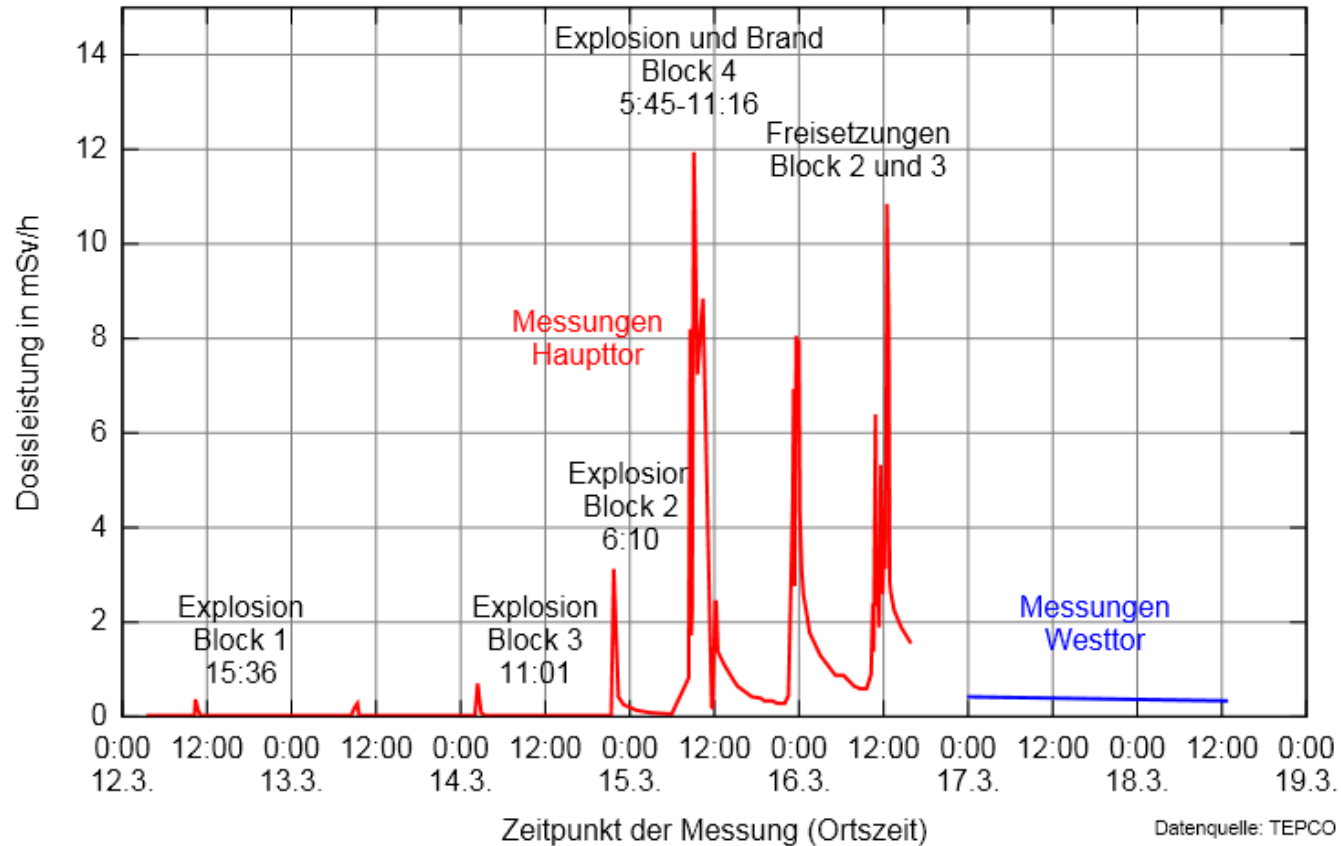
EXAMPLES OF EVENTS AT NUCLEAR FACILITIES

	People and Environment	Radiological Barriers and Control	Defence-in-Depth
7	<i>Chernobyl, 1986</i> — Widespread health and environmental effects. External release of a significant fraction of reactor core inventory.		
6	<i>Kyshtym, Russia, 1957</i> — Significant release of radioactive material to the environment from explosion of a high activity waste tank.		
5	<i>Windscale Pile, UK, 1957</i> — Release of radioactive material to the environment following a fire in a reactor core.	<i>Three Mile Island, USA, 1979</i> — Severe damage to the reactor core.	
4	<i>Tokaimura, Japan, 1999</i> — Fatal overexposures of workers following a criticality event at a nuclear facility.	<i>Saint Laurent des Eaux, France, 1980</i> — Melting of one channel of fuel in the reactor with no release outside the site.	
3	<i>No example available</i>	<i>Sellafield, UK, 2005</i> — Release of large quantity of radioactive material, contained within the installation.	<i>Vandelllos, Spain, 1989</i> — Near accident caused by fire resulting in loss of safety systems at the nuclear power station.
2	<i>Atucha, Argentina, 2005</i> — Overexposure of a worker at a power reactor exceeding the annual limit.	<i>Cadarache, France, 1993</i> — Spread of contamination to an area not expected by design.	<i>Forsmark, Sweden, 2006</i> — Degraded safety functions for common cause failure in the emergency power supply system at nuclear power plant.
1			Breach of operating limits at a nuclear facility.

Fukushima 12 March - Hydrogen Explosion - unit 1



Onsite Radiation Peaks at West Gate



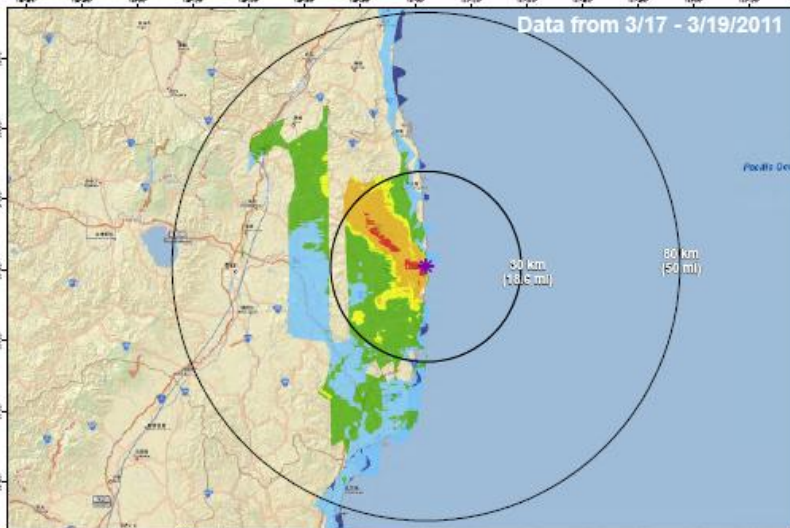
Normal background ~1 micro Sv/hr

Radiation dose limit 100 mSv raised to 250 mSv pa

Aerial Monitoring Survey Areas

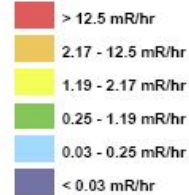
Overview Aerial Monitoring Contoured Results (3/17 - 04/17/2011)

FUKUSHIMA DAIICHI
JAPAN

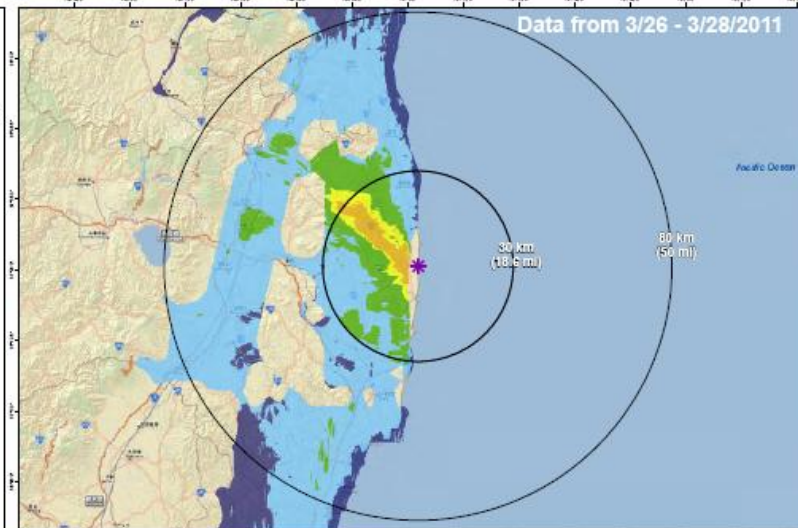


UNCLASSIFIED

Aerial Data (3/17 - 4/17/2011)
Exposure Rate at 1 Meter



This map was produced by the Geographic Information Systems department of NNSA's Remote Sensing Laboratory (RSL) at Nellis AFB, Las Vegas, Nevada. ESRI World Street Map and CMHT databases were used for map generation.



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Nuclear Accidents – Main Issues of Concern

- Spread of radioactivity – what radioactivity?
 - Overheated core releases volatile isotopes:
 - Nobel Gases – Xenon, Neon and Krypton – little significance to human health;
 - Main volatile fission products of interest (half-life):
Iodine-131 (8 days), Caesium-137 and Strontium-90 (30years).
- Measurement and countermeasures:
 - Sheltering;
 - Prevent up-take of key isotopes – iodine tablets;
 - Food & water sources control;
 - Evacuation.

UK Local Consultation

- Series Site Stakeholder Groups for each existing and shut down nuclear site – managed by the NDA;
- Groups review regular (quarterly) reports from the:
 - Reactor Management – operations and incidents;
 - Safety Regulator – ONR – nuclear safety regulatory actions
 - Environment Agency – site releases.
- Emergency response plans are developed by the local authority, following a public consultation and are openly available on the web.

Emergency Plan is required by Law

- Plan [1] written in accordance with REPPiR Regulations (2001):
 - Prepare an off site emergency plan for reasonably foreseeable emergencies at Sizewell.
 - Review and test the Sizewell off site emergency plan at least every 3 years.
 - Provide information to the public in the event of a radiation emergency.
 - Identify hazards and evaluate the risks from work with ionising radiation.
 - Prepare an on-site emergency plan for reasonably foreseeable emergencies at Sizewell.
 - Provide prior information to identifiable population groups that could reasonably be affected by a radiation emergency, this should include information about the risk assessment.

Emergency Response Local Planning

- Response plans include:
 - Responsibilities and who will act in an emergency;
 - Coordinates operator and local official responsibilities and tasks;
 - Radiation monitoring;
 - Arrangements for informing & warning;
 - Public countermeasures;
 - Evacuation centres.



	Lower ERL (mSv)	Downwind distance out to which the countermeasure may be justified	Upper ERL (mSv)	Downwind distance out to which the countermeasure may be justified
Shelter (Whole Body)	3 mSv	<10km	30mSv	<3km
Evacuation (Whole Body)	30mSv	<3km	300mSv	<4km
Potassium iodate	30mSv	<15km	300mSv	<4km

Emergency Response Planning

- National coordination [4] and communication with:
 - Government;
 - Safety regulator;
 - Home Office & Police.
- Both local and national arrangements are tested by exercises regularly, to ensure that they are effective and the current managers and staff are knowledgeable and up-to date.
- Also international nuclear hazards are considered!



References

1. Sizewell Off-site Emergency Plan <http://www.suffolkresilience.com/information-and-advice/sizewell/> - 1 Dec 2013
2. Public site stakeholder website. <http://www.sitestakeholdergroups.org.uk/>
3. Sizewell emergency information for local residents.
<http://www.sitestakeholdergroups.org.uk/sizewell/upload/Draft-Residents-Calendar-2012.pdf>
4. Nuclear emergency planning liaison group guidance.
<https://www.gov.uk/government/publications/nuclear-emergency-planning-consolidated-guidance>