

Nuclear Free Local Authorities **briefing**



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Subject: Fukushima nuclear incident and the UK nuclear safety review

1. **Introduction**

This briefing has been produced by the NFLA Secretary and provides member authorities with a general overview and analysis of the Fukushima nuclear accident in eastern Japan, which occurred on March 11th 2011. On the 12th April this had been classed by the International Atomic Energy Authority (IAEA) as a 'category 7' nuclear accident, which is the same level given to the Chernobyl disaster of April 26th 1986, the worst accident in the nuclear age.

This briefing also provides an overview of the interim Weightman review of the technical implications of the Fukushima incident on UK nuclear safety. It notes the NFLA's initial submission to the review, the interim report and prospective future developments.

The briefing concludes with a consideration of the implications of the incident on national and international nuclear safety and wider issues around the appropriate future energy mix.

2. **Japan's 'triple' disaster – earthquake, tsunami, nuclear accident**

The circumstances which led to the huge damage of the Fukushima nuclear reactors arose from one of the worst natural disasters in recent history. At 14.46pm on Friday March 11th a huge earthquake hit the north eastern coast off the Japanese island of Honshu. The epicentre was off the north east coast of Japan around 140 miles from Tokyo and reached 9.0 on the Beaufort scale, one of the largest earthquakes in the world for over a century. The earthquake destroyed considerable parts of eastern Japan's infrastructure and many buildings, but also triggered a huge tsunami which was up to more than 24 metres high in magnitude (1).

The tsunami devastated large swathes of the north east coast and thousands were killed within a matter of minutes. As of 1st June 2011, 15,281 people had died in these combined incidents and 8,492 people are still missing, presumed dead. There were also 5,363 people injured. A total of 88,873 houses were damaged, 3,970 roads were damaged and 71 bridges damaged or completely destroyed (2). A 14 metre wave smashed into the Fukushima nuclear reactor, vastly higher than its 5.9m safety walls. These seriously damaged the outer shell of four of the six reactors and initiated a combination of factors that have led to a major nuclear incident and the necessity of initiating the largest peacetime evacuation in Japan's history.

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3. History of the Fukushima Daiichi reactor and previous incidents

Japan started building nuclear reactors in the 1960s as part of a national energy policy to reduce its dependence on foreign imports. This intensified after the oil crisis of the early 1970s, where Japan followed a similar trajectory to France in developing a large civil nuclear power sector in order to make itself more energy self-sufficient and more resistant to international energy crises.

The Fukushima Daiichi 1 civil nuclear reactor was constructed by the Tokyo Electric Power Company (TEPCO) and commenced electrical production on March 26, 1971. It lies in a 860 acre site (3.5kms) in the towns of Okuma and Futaba in the Futaba district of the Fukushima prefecture (3). The plant consists of six boiling water reactors (BWRs). These light water reactors drove electric generators with a capacity of 4.7 Gigawatts of electricity, making it one of the top 15 largest nuclear power stations in the world (4).

The reactors for Units 1, 2, and 6 were supplied by US company General Electric, those for Units 3 and 5 by Toshiba, and Unit 4 by Hitachi. All six reactors were designed by General Electric (5). Since September 2010, Unit 3 has been partially fuelled by a small fraction (6%) of mixed-oxide (MOX) fuel (6), rather than the low enriched uranium (LEU) used in the other reactors Units 1–5 (7).

The Fukushima 1 Unit 1 reactor was initially scheduled for shutdown in early 2011. However, in February 2011, the Japanese Nuclear Safety Commission granted an extension of ten years for the continued operation of the reactor. (8)

4. What happened at Fukushima?

On March 11th, following the huge earthquake, a record tsunami wave hit the north east coast of Japan. The existing risk assessment models for earthquake damage and tsunamis at Fukushima had a worst case scenario of a wave of 6.1 metres hitting the reactor's outer sea protection walls, for which it was built to withstand. It appears that a 14 metre wave (9) hit the plant and it seriously damaged large parts of the outer structures of 4 of the 6 reactors at Fukushima. Dramatic photographs taken by Tokyo Electric Power Company staff showing the wave hitting the plant are available on the BBC website (10).

The key chronological damage to the four reactors was as follows (11):

- On March 12th an explosion ripped off the roof of Reactor 1.
- On March 14th an explosion damaged the outer building of Reactor 3, creating a possible radiation leak.
- On March 15th an explosion damaged the outer building of Reactor 2, creating a possible radiation leak.
- On March 15th and 16th, significant fires damage the outer buildings of Reactor 4.

To understand what happened to the reactors and why radiation has leaked out of them, it is important to explain the process of damage –

- a) Each nuclear reactor at the Fukushima plant heats water into steam. The steam turns the turbines generating electricity. After the earthquake, the nuclear control rods automatically activated in order to stop dangerous nuclear reactions and shut down the reactors safely.
- b) However, the cooling systems in the reactors failed due to the devastating effects of the tsunami, damaging key power supplies. This lack of power meant that the water stopped circulating around the reactor and instead heated up to boiling point, creating steam. This led to the fuel rods getting hotter and reacting with the steam, creating dangerous levels of hydrogen gas.
- c) The Fukushima plant engineers sought to vent the steam outside each pressure vessel, but the hydrogen gas exploded, further damaging the buildings and the reactors.

- d) In order to seek to try to prevent catastrophic meltdown of the reactors, the plant engineers decided to swamp the reactors with seawater as a form of emergency coolant – at this point completely preventing any possible re-use of the reactors. Boric acid was also injected into the reactors to reduce the chance of further nuclear reactions.
- e) Initial deepest concern lay with Reactor 2, as it was feared the explosion had damaged its suppression chamber – a water-filled structure which helps condense steam and prevent nuclear reactions. If the suppression chamber was breached it may allow steam containing radioactive substances to escape continuously.
- f) The fires at Reactor 4 complicated the emergency response as they led to the storage pools becoming perilously close to running out of water. The whole reason for the storage pools is to cool the nuclear fuel and prevent nuclear reactions and explosions.
- g) By the 17th March, the increasingly desperate response of plant managers and the Japanese Government authorities led to military helicopters being despatched to drop large amounts of water on Reactors 3 and 4. The attempt was to replenish the water in these reactor storage ponds which contained spent fuel rods (12).
- h) To bring the situation under fuller control, power needed to be restored to the plant's cooling systems. This would allow for water pumps to bring the nuclear fuel back to safer temperatures. This took the plant authorities much longer than anticipated. It is expected the work to make the damaged reactors fully safe will continue until at least the end of 2011, with many associated problems, such as what to do with contaminated water and melted fuel rods, still to be tackled. In fact it has now been reported that stabilizing the reactors by the end of the year may prove to be impossible (13)
- i) Further problems at the damaged Fukushima reactors have continued right up to the date of this briefing. Serious tropical storms on May 30th have complicated the emergency response again, while the whole Japanese nuclear sector has had to go under a detailed safety review to calculate if its 54 reactors can withstand further earthquakes and tsunamis of this magnitude.

The conclusions of an interim IAEA report, which have been leaked to the BBC, were that the key fault of the disaster was the underestimation of the tsunami wave. A major earthquake fault line lies just off the north east coast of Japan, but the 6m sea wall at Fukushima was completely inadequate to deal with a 14m tsunami wave. This underestimation has led to the Japanese Government having to close 37 of its 54 reactors for full safety audits. The interim report also suggested that the Japanese Nuclear Safety Agency had to be made more independent, as currently it is part of the Industry Ministry, which promotes nuclear power (14).

5. **Radioactive contamination, emergency response and safety issues**

It has to be acknowledged that the effects of the earthquake and the tsunami were devastating to a huge area of north east Japan and required one of the greatest emergency responses in the country's peacetime history. The Fukushima reactor accident significantly complicated the emergency response and exacerbated and stretched all public bodies and the Japanese Government to levels which would have been unsustainable for many other countries.

After some initial hesitation, a 20kms (12 miles) evacuation zone was established by the Japanese Government a few hours after the reactor accident, with 90,000 people requiring evacuation to temporary rest centres. People in the area 20 – 30kms, which involved a further 140,000 people, were encouraged to stay indoors. US nuclear regulators though were recommending an evacuation zone of up to 80kms. A number of foreign embassies were also recommending their own citizens to evacuate such distances (15).

A skeleton crew of around 50 staff (with a rota system this figure rises to around 250 staff) dealt with the incident itself. These plant and contractor staff became labelled as the 'Fukushima 50' by the world's media, amidst reports of the harmful effects of radiation exposure on their bodies. A small number of staff have been admitted to hospital throughout the first few weeks of the emergency response due to excessive radiation exposure.

It took a number of weeks to gain some semblance of control on the incident, with emergency responders and local authorities also badly affected by the widespread infrastructure damage and loss of life in the region. Large amounts of radioactively contaminated water have been discharged into the Pacific Ocean from the damaged reactors, contaminating the water to as much as 1850 times the safe, legal limit (16). Japan's geographical position and prevailing westerly winds has been helpful in dispersing some of this water but the long-term damage to the marine environment and fishing is likely to be substantial. A Greenpeace International field team have taken detailed marine environment samples and have reported seaweed contamination at over 50 times higher than international safety limits (17). They have also found that contamination has spread over a wide area of the north east coast and is accumulating in sea life, not dispersing in the way the Japanese Government and authorities have confidently asserted.

Marine samples showed lower than expected levels of caesium but much higher levels of iodine, which suggests that contaminated water from the Fukushima reactors is continually leaking out, given the short half-life of iodine. Samples of fish and shellfish caught in the local area calculated levels of radioactive contamination higher than international food safety limits (18).

Airborne emissions at the plant have also been at dangerous levels. This has significantly complicated the emergency repairs at the site, as workers have been permitted to remain on site for only very short periods. Radioactive particles at very low levels have been found in East Asia, Pacific Islands like Hawaii, across North America and as far as northern Europe. Radiation monitors have picked up very small radioactive particle concentrations originating from Fukushima in places like Iceland, Dublin, Glasgow and Oxford.

As recently as May 10th TEPCO officials told the foreign media that, though they had hoped to bring airborne radiation levels down to 1 millisievert per hour, it was nowhere near that level. It confirmed levels have ranged from 10 millisieverts an hour to as much as 700 millisieverts an hour at the plant - this latter figure is almost three times the 250 millisieverts maximum level workers are allowed to be exposed to in one year.

According to TEPCO's stabilisation and clean-up plan, its aim is to bring the plant to a cold shutdown in less than nine months. There are around 70,000 tons of radioactive water accumulated in the turbine basements and outside trenches associated with reactors 1, 2, and 3 to deal with. The pooled water near reactor No. 2 is of real concern – it has been designated as highly radioactive. Presently TEPCO is transferring contaminated water to a central wastewater treatment facility on the site to await decontamination facilities. TEPCO is working with the French company Areva and the American nuclear waste management company Kurion to achieve this. Areva uses a co-precipitation method where chemical agents are injected into the water to isolate radioactive isotopes like iodine and caesium, which can be separated for removal (19). Kurion then use a vitrification process that turns the radioactive materials into compacted glass for storage (20).

Concerns over food and milk contamination in the local area emerged early. On the 19th March, the IAEA confirmed that in areas as far as 46 kms from the plant levels of the radioactive isotope iodine 131 were found in milk and spinach 15 times the safe level suitable for infants. Though iodine 131 is short-lived real concerns remain over caesium 137 in the soil, as this is much longer-lasting. People evacuated from the area were issued with iodine tablets for some time following the incident (21).

Though issues around wider contamination will take time to assess, on the 31st May Japanese TV company NHK had reported that TEPCO's soil analysis at three sites 500 metres from the Fukushima plant found strontium-90 levels of 480 becquerels. This is 100 times higher than the maximum reading recorded in Fukushima prefecture following atmospheric nuclear tests conducted during the Cold War. Inhaling such materials can lead to accumulation in the bones

and increases the risks of cancer. Strontium-90 has a half-life of around 29 years. Levels of 2,800 becquerels of strontium-90, which has a half-life of around 50 days have also been detected (22).

As well as public authorities having to deal with the multitude of issues surrounding radioactive contamination, emergency responders and local authorities also face huge problems with dealing with such large numbers of evacuees around the site. Whereas a slow process of site clearing and restoration can occur outside the evacuation zone, no restoration work can occur in much of the Fukushima prefecture and beyond. Temporary rest centres and reception areas remain open some 3 months after the incident, and signs that the incident will not be under complete control until well into the new year makes it impossible to reduce the evacuated area and allow people to consider returning home. The psychological damage and fear of radiation has also seen a large-scale internal migration as many people move to live with family and friends in other parts of Japan. The logistical issues facing Japanese authorities are immense and likely to continue for some considerable time. Whether the evacuation zone can be reduced, or whether it becomes a 'no-go' area as occurred around the Chernobyl disaster site, will only be determined over time, but the latter is quite likely.

According to Nuclear Engineering International, Japan's emergency response to the Fukushima accident took place in one of 20 off-site centres (spread across Japan), which are close to nuclear facilities. The centre provides a central point for information, incident analysis and emergency planning organisation and direction. In the IAEA's interim report, praise is given to the Japanese Government's emergency response, but it does advocate that a 'hardened' emergency response centre would be needed in Japan to deal with future nuclear-related accidents (23).

There are many other logistical issues that will have to be dealt with in both taking complete control of the current incident, and in the short, medium and long-term recovery of this huge incident. It is a clear reminder of the many extra complexities that occur with a nuclear-related disaster, compared to other natural disasters.

6. **International response to the implications of Fukushima**

The Fukushima incident has sent shockwaves around the world on a number of fronts. These include the actual possibility of other countries being directly affected and contaminated by the accidents – Russia, China, South Korea, Hawaii and the United States have taken a close interest in the incident and, as far away as Europe, increased radiation monitoring regimes have been established since the 11th March.

The wider political and economic impact of the incident has had a significant effect on the international stage. Countries with existing nuclear facilities have all initiated nuclear safety reviews on civil nuclear reactors. Countries where seismic activity is particularly high have closed a number of reactors pending full safety audits – as noted above Japan has closed all but 17 of its 54 reactors. Those countries which were also actively considering developing new nuclear reactors, or extending the life of existing reactors have also had to review such plans, as public concern and fear challenges what had been called the 'nuclear renaissance'. It is also acknowledged that the financial cost and insurance costs for existing and new nuclear reactors is bound to go up.

The cost of the Fukushima incident on the Japanese economy alone shows the real worries around the economic costs of this disaster. Japanese state broadcaster NHK reported on the 1st June that the Japan Centre for Economic Research calculated that the clean-up of Fukushima will cost \$250bn (£150bn) over the next 10 years. The figure includes \$54 billion to buy up all land within 20kms of the plant, \$8 billion to deal with compensation claims and between \$9bn and \$188bn to scrap the reactors (depending on how many reactors beside Fukushima 1 remain closed). The Centre suggested \$71 billion could come from freezing research and development projects linked to the nuclear fuel cycle and \$150 billion from TEPCO's and the Government's reserve funds. Such figures would significantly damage any

industrialised economy and early figures suggest the Japanese economy has gone back into recession. Close trading partners to Japan, such as Australia, are also seeing contractions in economic growth from the reduced trade with Japan (24).

In Europe, a protracted discussion has taken place on developing 'stress tests' on all the existing nuclear reactors within the EU area. These were agreed in late May but did not include any reference to withstanding a terrorist attack. Older nuclear reactors – in the UK this may include Wylfa, Oldbury and Hinkley Point B – may be susceptible to earlier closure as a result of the stress tests, which will be undertaken over the next few months (25).

The political ramifications of the incident have also been huge and divergent. In countries which had committed to develop new nuclear facilities – like France, UK, Finland, perhaps China and the USA – national governments have instigated safety reviews but remain publicly committed to developing new nuclear facilities, even though public surveys have shown polarisation in views. In countries which have been more sceptical of building new reactors there has been a dramatic shift away from nuclear – Germany has committed to phasing out all its civil nuclear facilities by 2022 and Switzerland by 2034. Italy has abandoned a referendum on new build amidst fears that it would be heavily defeated and a number of other countries have put moratoriums on new build (26). And countries which have never developed nuclear facilities have become more emboldened in this view – on the 25th May Austria announced the development of a European nuclear free countries coalition to strengthen its opposition to nuclear power. The coalition included the Republic of Ireland, Latvia, Denmark, Malta, Liechtenstein, Greece, Portugal, Estonia, Cyprus and Luxembourg. The group discussed the possibility of a nuclear-free Europe, nuclear safety and sustainable energy systems. During the meeting, a joint declaration was adopted, which includes the requirement of robust EU-wide stress tests, as well as encouraging moves to promote the increased use of renewable energy (27).

The impact on national and international debate over future energy policy, climate change mitigation, energy efficiency and developing a renewable energy revolution are all strongly impacted by the Fukushima incident, and are key parts of this wider debate.

7. The ONR HSE Weightman nuclear safety review

The UK Government's response to the Fukushima incident was to immediately request that the Chief Nuclear Inspector, Dr Mike Weightman, conduct a detailed review of nuclear safety in UK nuclear facilities to determine whether the issues that led to the Fukushima disaster, and its response, require any changes to the safety regime. In parallel, all UK civil nuclear facilities, including Sellafield – following some pressure from the Irish Government (28) – would undertake the EU's 'stress test' programme.

Dr Weightman was asked by the Government to prepare an interim report by mid May of initial issues and a final report by mid September. The Government announced a delay in submitting to Parliament its national policy statement on nuclear energy generation. The Health and Safety Executive also announced its final report on the 'Generic Design Assessment' for the two proposed nuclear new build designs would also be delayed to incorporate any relevant outcomes from Dr Weightman's final report.

The interim report was published on the 18th May and included 11 conclusions and 26 recommendations (29). These are attached as Appendix 1 of this briefing. Dr Weightman's interim assessment at the launch of his report stated that he found no specific need to curtail the operations of UK nuclear facilities but that a number of lessons could be learnt around emergency response, nuclear engineering, nuclear safety and associated issues.

Dr Weightman was asked to lead an IAEA delegation to Japan to discuss with the Japanese Government and nuclear regulators the Fukushima incident, and further more detailed analysis is ongoing. Dr Weightman will also meet interested parties around the UK to discuss nuclear safety and his final review. The NFLA Secretariat has been invited to such a meeting on the 5th

July in London with a number of other nuclear concerned groups. Submissions to the review were also welcomed.

8. **NFLA's response to the Fukushima incident**

The NFLA has taken a leading and highly active role in the post Fukushima debate, both in informing its members, producing media releases and a large number of letters to the media and co-ordinating wider joint approaches in order to influence the discussion with the UK and Irish Governments and contribute directly to Dr Weightman's review.

The NFLA has particularly led discussion with other nuclear-concerned groups to develop a series of 'minimum demands' that need to be raised with Government, the nuclear regulators and nuclear industry. A list of 8 key demands was agreed upon and was sent to the UK Energy Minister Chris Huhne, to Dr Weightman and to the Nuclear Decommissioning Authority (30). These are attached below as Appendix 2. The document was also formally tabled and discussed at the UK Department of Energy and Climate Change's (DECC) quarterly engagement meeting with nuclear concerned groups, at which Lord Marland and officials from the Office for Nuclear Development and regulators were in attendance. A robust discussion took place and a detailed response was provided to the letter by Chris Huhne. An agreed joint response to this letter has been developed and will be sent shortly and discussed at the next DECC / NGO dialogue meeting – this will be covered in a follow-up NFLA Policy Briefing which will be issued following the 5th July meeting with Dr Weightman and other officials.

The NFLA has also sent its initial series of issues to Dr Weightman prior to the publication of his interim report to outline its particular concerns and seek a full consideration of them (31). This report is attached as Appendix 3 of this briefing. A more detailed response will be submitted following the 5th July meeting.

The NFLA was disappointed with the Weightman interim review. It found an incongruence between the conclusions to the report, which suggested a largely 'clean bill of health' and the recommendations, which outline a significant and extensive amount of work required by the UK nuclear industry around emergency planning, response to flooding incidents, site and plant safety and developing openness and transparency with the general public. The NFLA has also consistently raised its concerns with this review, and directly with the UK Government, over the narrow scope of the review and many issues which are not being specifically considered. These particularly relate to the health issues around the incident, the lack of enforcement on the nuclear industry to implement recommendations and wider concerns over emergency planning and emergency response (32). These are all outlined in the NFLA media release which is attached as Appendix 4 of this briefing. They also form a large basis of the joint follow-up letter to Chris Huhne and Dr Weightman from the NFLA and other nuclear concerned groups.

The NFLA has also contacted the new Irish Environment and Energy Ministers, Phil Hogan and Pat Rabbitte, to request they use their influence in raising their own concerns robustly to the UK Government. Meetings between the NFLA All Ireland Forum Co-chairs and the Ministers have been requested.

Finally, the NFLA has been co-operating with the Nuclear Consulting Group and the 'No Need for Nuclear' group to develop two Westminster seminars for MPs, nuclear regulators and interested parties to provide an independent assessment of the key issues of concern post-Fukushima. The first of these will take place on the 14th June in the House of Commons Committee Room 8 and will be chaired by Sir Jonathan Porritt (33). Speakers include Nuclear Engineering Consultant, Dr John Large; founding Director of E3G and Visiting Professor at Imperial and University College London, Tom Burke; the Director of the Association for the Conservation of Energy, Dr Andrew Warren; the Professor of Energy Policy at Greenwich University, Steve Thomas; and NCG Facilitator, Dr Paul Dorfman. The seminar is fully supported by a cross-party panel of MPs.

A follow-up seminar will be held prior to the Weightman final report and regional seminars in Bristol, London, Lancaster and Norwich are also being planned. Similar NFLA seminars are also being considered for the Scottish Parliament, Welsh Assembly, Northern Ireland Assembly and the Dail.

9. **Conclusions and further actions**

The Fukushima incident is the most serious incident affecting the nuclear industry since the Chernobyl disaster. It is already having, and will continue to have, a profound influence on the national and international debate over nuclear safety, new nuclear build, radioactive waste management and the renewable energy alternative.

The NFLA is taking an extensive role in being a part of this debate in the UK and Ireland. Further actions for it and member authorities include:

- Taking a continued and active role in responding to the Weightman review and to the UK and Irish Governments.
- Developing NFLA National Forum events around the post Fukushima debate and co-operate with other groups on similar events, such as the NCG Westminster and regional seminars; lobbying MPs, nuclear regulators, the nuclear industry and relevant nuclear concerned groups.
- Seeking to develop seminars on post-Fukushima issues and effects on wider energy policy at the Scottish Parliament, Welsh Assembly, Northern Ireland Assembly and the Dail.
- NFLA member councils should take a role in this debate by participating at relevant meetings and passing resolutions of concern following the Fukushima incident.
- Non member councils should seek to join the NFLA to receive more detailed information on the key nuclear policy issues and take an active role in the current nuclear safety and wider energy use debate.
- Developing on-going links with like-minded nuclear concerned groups in the UK and overseas and share resources and expertise to educate the general public of the wide number of concerns that remain following the Fukushima incident.
- Developing research reports showing that there are alternatives to nuclear power by the development of a renewable energy mix, microgeneration and energy efficiency. This includes advocating examples of best practice around the UK and Ireland, often inspired and led by Local Authorities. An initial report on how Scotland does not need recourse to new nuclear build for its energy needs can be found on the NFLA website, and updated and similar reports will be developed shortly for England, Ireland and Wales.

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- (11) A simple Adobe Flash diagram of the key elements of the Fukushima disaster can be downloaded from the BBC News website: <http://bbc.co.uk/news/world-asia-pacific-13511797>
- (12) According to Asahi, Prime Minister Kan ordered the airforce to do the helicopter dumping because President Obama was threatening to tell all US citizens to leave Japan on March 17. Members of the Kan administration realized that dumping water from a helicopter would have almost no effect on cooling the reactor. But "There was a need to demonstrate before the phone conversation with Obama that 'Japan was serious.'"
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- (18) Full details of Greenpeace International's Fukushima monitoring can be found at: <http://www.greenpeace.org/international/en/campaigns/nuclear/safety/accidents/Fukushima-nuclear-disaster/Radiation-field-team/#data>
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Weightman interim nuclear safety review report
Initial conclusions and recommendations
(Taken from <http://www.hse.gov.uk/nuclear/fukushima/interim-report.htm>)

11 conclusions are made in the report:

1. In considering the direct causes of the Fukushima accident we see no reason for curtailing the operation of nuclear power plants or other nuclear facilities in the UK. Once further work is completed and proposed improvements will be considered and implemented on a case by case basis, in line with our normal regulatory approach.
2. In response to the Fukushima accident, the UK nuclear power industry has reacted responsibly and appropriately displaying leadership for safety and a strong safety culture in its response to date.
3. The Government's intention to take forward proposals to create the Office for Nuclear Regulation, with the posts and responsibilities of the Chief Inspector in statute, should enhance confidence in the UK's nuclear regulatory regime to more effectively face the challenges of the future.
4. To date, the consideration of the known circumstances of the Fukushima accident has not revealed any gaps in the scope or depth of the Safety Assessment principles for nuclear facilities in the UK.
5. Our consideration of the events in Japan, and the possible lessons for the UK; has not revealed any significant weaknesses in the UK nuclear licensing regime.
6. Flooding risks are unlikely to prevent construction of new nuclear power stations at potential development sites in the UK over the next few years. For sites with a flooding risk, detailed consideration may require changes to plant layout and the provision of particular protection against flooding.
7. There is no need to change the present siting strategies for new nuclear power stations in the UK.
8. There is no need to depart from a multi-plant site concept given the design measures in new reactors being considered for deployment in the UK and adequate demonstration in design and operational safety cases.
9. The UK's gas-cooled reactors have lower power densities and larger thermal capacities than water-cooled reactors which with natural cooling capabilities give longer timescales for remedial action. Additionally, they have a lesser need for venting on loss of cooling and do not produce concentrations of hydrogen from fuel cladding overheating.
10. There is no evidence to suggest that the presence of MOX fuel in Reactor Unit 3 significantly contributed to the health impact of the accident on or off the site.
11. With more information there is likely to be considerable scope for lessons to be learnt about human behaviour in severe accident conditions that will be useful in enhancing contingency arrangements and training in the UK for such events.

26 interim recommendations are made:

General -

1. The Government should approach IAEA, in cooperation with others, to ensure that improved arrangements are in place for the dissemination of timely authoritative information relevant to a nuclear incident anywhere in the world.
2. 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 cultural, social and organisational differences.
3. 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.
4. Both the UK nuclear industry and ONR should consider ways of enhancing the drive to more open, transparent and trusted communications, and relationships with the public and other stakeholders.

Relevant to the Regulator –

5. 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.
6. 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.
7. 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.

Relevant to the Nuclear Industry –

8. 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 extreme circumstances.
9. Once further relevant information becomes available, the UK nuclear industry should review the lessons learnt from the comparison of the events at Fukushima-1 (Fukushima Dai-ichi) and Fukushima -2 (Fukushima Dai-ni) sites.
10. 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 site-specific flood-risk assessments as part of their periodic safety review programme, and for any new reactors. This should include sea-level protection.
11. 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.
12. 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.
13. 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.
14. 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 pools themselves.
15. 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.
16. 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.
17. 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.
18. The UK nuclear industry review any need for the provision of additional, diverse means of providing of robust sufficiently long-term independent electrical supplies on sites, reflecting the loss of availability of off-site electrical supplies under severe conditions.
19. 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.
20. 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.
21. 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.

22. The UK nuclear industry should review the on-site provision of emergency control, instrumentation and communications in light of the circumstances of the Fukushima accident including long timescales, widespread on and off-site disruption, and the environment on-site associated with a severe accident.
23. The UK nuclear industry, in conjunction with other organisations as necessary, should review the robustness of necessary off-site communications for severe accident involving widespread disruption.
24. 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 into account of the impact of using contractors for some aspects on-site such as maintenance and their possible response.
25. 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.
26. A response to the various recommendations should be made available within one month of it being published. These should include appropriate plans for addressing the recommendations. Any responses provided will be compiled on the ONR website.

Joint statement of demands from the NFLA and NGO's following the Fukushima reactor incident on the UK Government, UK nuclear regulators and the UK nuclear industry

24th March 2011

In the light of the tragic events in Japan in recent weeks, and with particular reference to the crippling of the nuclear plants at Fukushima; the UK and Ireland Nuclear Free Local Authorities, the undersigned NGOs (non governmental organisations), and individuals who have an interest and long-held concerns about nuclear safety* make the following demands on the government, the nuclear industry, its trade bodies, government agencies and regulators on the review of, and input to, official processes on key areas of the new nuclear build programme in the UK. All the groups mentioned below are opposed to the development of a UK nuclear new build programme.

1. **The recently announced review being carried out by the Health and Safety Executive's (HSE) Nuclear Directorate (ND) must:**
 - be carried out with a presumption of disclosure of all information: any information which, for security or commercial confidentiality reasons cannot be disclosed, must be accompanied by a full explanation of the reasons for confidentiality and subject to a challenge process;
 - include non-industry personnel on the review body;
 - include independent respondents and consider involving groups from the undersigned;
 - include a full review of the GDA process and the complete governance regime of the nuclear industry in the UK, given the failings identified in Japan;
 - ensure that spent fuel stores and other relevant facilities such as reprocessing plants are included in its remit.

2. **The HSE's 'exclusions' arrangement in the GDA process and those arrangements such as deferring issue resolution in order to artificially meet the nuclear new build timetable must be abandoned.** *All outstanding issues relating to the engineering, technical and waste management aspects of new build should be demonstrably dealt with in a sequential, transparent and open programme and with appropriate scrutiny, peer review and accessibility in the public domain. These processes cannot be left to be 'resolved' through the licensing process which will follow the GDA process as licensing is effectively a close-door system.*

3. **There should be NO public subsidies for nuclear new build as agreed in the UK Government's coalition agreement:** *The subsidies which have been identified in the "[Nuclear Subsidies](#)" report from the Energy Fair group (1), including limitations on liabilities for nuclear accidents, subsidies for the disposal of nuclear waste, and subsidies for the decommissioning of nuclear plants, should be withdrawn, without the transfer of financial risks from nuclear operators to taxpayers or members of the public. All the undersigned groups oppose a development of new nuclear build in the UK.*
 (1) http://www.energyfair.org.uk/actions/ec-complaint/nuclear_subsidies_feb_2011.pdf

4. **The health effects of low level radionuclide releases on land, to the environment by air emissions and into the marine environment need to be independently verified; with full and prompt publication of the COMARE 2011 report and its analysis of the German Government's KIKK report, and wider and detailed analysis made of the robustness and accuracy of the ICRP model and monitoring techniques of radiation discharges into the environment. The justification decision on new nuclear reactor designs should be reconsidered in reference of such a review:** *The issue of low level radiation impact upon which the justification process relies should be subject to a further and detailed review through a joint-fact-finding exercise involving, at the very least – a range of independent low level radiation experts and groups, stakeholder representatives from the nuclear industry, the Health Protection Agency, the European Committee on Radiation Risks and COMARE. Furthermore, as part of this review, independent specialists on low level radiation must also be called on to provide evidence to it.*

5. **UK Government Ministerial statements to the effect that there is confidence that arrangements for new build waste management will exist should cease or be required to be justified or qualified:** *in particular, government and / or appropriate authorities should be required to explain this statement of confidence in terms of:*

- a) *how and when it will satisfy itself that the generic and then site-specific technical and scientific issues relating to the long term safety of a repository are to be resolved;*
 - b) *how it intends to demonstrate that a popular mandate exists in the potential candidate area, West Cumbria, including the definition of the community it intends to consult, how it intends to consult them along with details of the content, scope and detail of the information it intends to publish in seeking such a mandate;*
 - c) *explain what it intends to do should the only potential candidate community currently available to it decides to withdraw;*
 - d) *providing a technical demonstration of the safety of long term storage of new build spent fuel, its encapsulation and future management of it;*
 - e) *how it intends to demonstrate that the nominated sites being built near sea level can be protected giving the potential for an increase in predicted sea levels as a result of the onset of climate change;*
 - f) *undertaking a new process as recommended by CoRWM1 into attitudes towards the management of spent fuel from new build, given that CoRWM1's focus was entirely on legacy waste.*
6. **The UK Government should commission an independent body of experts to undertake a security review of current and projected nuclear waste and spent fuel interim storage arrangements and report directly to government on the adequacy or otherwise of those arrangements in the light of the CoRWM1 report and its recommendations on this issue:** *In our collective view, the NDA review is inadequate. The independent body could be comprised of those experts used by CoRWM1 in its process and a call for evidence from others with specialist knowledge in this field should be made.*
7. **Before further steps are taken in respect of developing the programme for managing radioactive waste safely, the following issues should be resolved:**
- a. *The technical and scientific uncertainties regarding the safety of deep geological 'disposal' as identified in various official documents and as collated in the Nuclear Waste Advisory Associates' document, the Issues Register.*
 - b. *The definition of a 'community' in respect of the constituency to be consulted on as part of the voluntarism process for a deep geological repository.*
 - c. *The inventory for a national deep geological repository should be identified.*
 - d. *Should that inventory include waste from a national new build programme, the management and disposal of such waste should be subject to a separate and thorough-going review of safety, ethical and environmental considerations.*
 - e. *Full safety reviews need to be undertaken for the transportation of radioactive waste with extensive training provided for all appropriate staff in the emergency services, local authorities and the NHS.*
8. **The UK Government should abandon the option of using separated plutonium as Mox fuel for domestic or foreign use as fuel and instead investigate, through the establishing of a review body involving appropriately qualified experts the best means of dispositioning the plutonium:** *this should be drawn from work already carried out by the plutonium working group of the BNFL national nuclear dialogue and the NDA's Materials Issues Group. A stakeholder dialogue event to discuss the options for the safe management of weapons-grade plutonium and MOX fuel should be established as soon as possible.*

This statement of minimum demands has been fully endorsed by leading representatives of the following organisations:

- UK and Ireland Nuclear Free Local Authorities
- Friends of the Earth UK
- CND and a number of its constituent local groups
- Nuclear Consulting Group
- Nuclear Information Service
- Energy Fair Group
- Kick Nuclear Group
- Low Level Radiation Campaign
- Low Level Radiation and Health Conference
- Chernobyl Children's Project (UK)
- Oxfordshire Peace Campaign
- Peace Moves Coalition Cornwall
- Child Victims of War Group
- Concerned individuals working in the nuclear policy field
- Communities Opposed to New Nuclear Energy Development (CONNED) members:
- Communities Against Nuclear Expansion (CANE)
- Stop Hinkley Group
- South West Against Nuclear (SWAN)
- South Wales Anti-Nuclear Alliance
- Cumbrians Opposed to a Radioactive Environment (CORE)
- Radiation Free Lakeland
- Heysham Anti-Nuclear Alliance
- Pobl Atal Wylfa B / People Against Wylfa B
- Shut Down Sizewell Group
- Blackwater Against New Nuclear Group
- Bradwell for Renewable Energy
- Shepperdine Against Nuclear Energy
- Kent Against a Radioactive Environment (KARE)

NFLA initial assessment of issues for the Weightman review to consider

14th April 2011

Emailed to: FukushimaONRRReport@hse.gsi.gov.uk

Dear Dr Weightman,

ISSUES TO CONSIDER IN UK NUCLEAR SAFETY REVIEW FOLLOWING THE FUKUSHIMA DAIICHI INCIDENT – SUBMISSION BY THE NUCLEAR FREE LOCAL AUTHORITIES

I would like to bring to your attention a submission from the UK and Ireland Nuclear Free Local Authorities (NFLA) of the main issues it feels that you should consider for the nuclear safety review following the Fukushima nuclear incident in Japan. The NFLA will make a more considered response prior to the interim review. It should be noted that the NFLA Secretary is planning to take part in the proposed meeting which the NII is organising with nuclear concerned groups on the 5th July at your Bootle offices.

The NFLA would like to record its concern about the speed, length and scope of this inquiry. The Fukushima incident is still ongoing, and it is likely to continue to be ongoing for some months to come. Being asked to respond within such a short period after this incident occurred, and whilst the Fukushima incident is still developing, does not provide opportunity for organisations like ours to be able to gauge all the views of our member authorities.

The NFLA also remains concerned that the speed of this inquiry may have much more to do with ensuring that the UK new nuclear build programme is not put off track too much rather than to get to the heart of all the key detailed and complicated issues that the Fukushima incident raises for UK nuclear safety. The NFLA is also disappointed that the UK Energy Minister Chris Huhne and the UK Government did not determine the remit of your inquiry, and that you are therefore restricted yourself to strictly narrow technical terms, not allowing for wider policy issues to be considered in any depth.

The NFLA has already submitted to you a detailed set of demands agreed by over 30 nuclear concerned groups following the Fukushima incidents. I attach these again as Appendix 1. They have also been sent to Chris Huhne and were discussed at the recent stakeholder dialogue meeting between DECC and nuclear concerned groups. The NFLA believes these demands should be thoroughly considered as part of the safety review, particularly points 1 and 2 of the document.

With all this in mind, I attach the NFLA's key issues for the inquiry in four subject areas – general issues, engineering issues, marine pollution concerns and emergency planning issues.

GENERAL ISSUES:

The NFLA would like to make a number of initial comments about the scope of the review and who will be involved within it.

- The comments made in this letter can only be seen as a provisional set of comments by the NFLA, given the extremely tight deadline. It may add extra points in future submissions.
- The NFLA asks the NII to fully and publicly explain - as soon as is possible - precisely what issues it considers should or will be covered from its perspective.
- The NFLA asks how the NII will take on board additional points of concern which stakeholders put forward and how these will be incorporated into the review e.g. will the NII review consider how emergency services work with nuclear plant operators in the event of an accident? Further issues like this are included in a preliminary list of points / questions for further consideration below.
- The NFLA note that for many organisations such as ours – and others including nuclear specialists, advisory bodies and regulators - a deadline for the interim review of mid May could be far too premature in terms of being able to submit substantive evidence. The NII should publicly acknowledge this point. The fact that the Fukushima incident may still get much worse than it currently has been reinforces this point.
- The NFLA asks how nominations to any panel of specialists will be made and who will make the final decision on who is on the panel.

ENGINEERING ISSUES:

The NFLA urges the NII to ensure that there are independent engineering specialists involved in the expert panel considering the failure of the Fukushima reactor cooling systems to withstand the earthquake and the tsunami.

With this being such a specialised field of research, the NFLA believes it is essential to bring knowledgeable independent analysts in to complement the NII's inspectors.

The NFLA strongly recommends the NII appoints (and pays appropriate expenses to) John Large of Large Consulting Engineers on to an expert panel as a respected nuclear safety engineer with the technical capability to assist the NII in providing an independent perspective on all the aspects of reactor failure and meltdown. John Large has provided the NFLA with excellent and detailed technical reports over our 30 year history and we are unaware of anyone else in this field that would provide the type of detailed information on this incident to the NII. He has already submitted a detailed report to the European Parliament on nuclear safety and the nuclear regulatory regime.

Other issues in this area that the NFLA would like to see the review consider –

- Why were the reactors unable to withstand the combination of an earthquake and a tsunami of this magnitude? Are UK reactors built any better?
- Why did the cooling systems fail and what implications does this have for UK civil and military reactors (in light of the MOD decision on new nuclear submarines and the existing nuclear powered submarine fleet)?
- What additional safety measures should now be added to existing UK reactors and the two proposed new build designs?
- The Fukushima reactor was designed to deal with a tsunami of 6.51 metres and on March 11th was hit by a 7 metre wave – are safety measures across the board on existing and proposed UK civil nuclear reactors adequate given the Japanese under-estimation of risk?
- The engineers at Fukushima were unable to stop large hydrogen explosions of the reactors. What learning points need to be considered for the UK nuclear programme?
- How do the HSE and Environment Agency 'Generic Design Assessment' take into account issues raised from the Fukushima incident with the AP1000 and EPR designs?
- The French nuclear regulator (ASN) President Andre-Claude Lecoste has been quoted in the French media that he "could not rule" out a moratorium on the third generation European Pressurised Reactor (EPR) nuclear power plant under construction at Flamanville in northern France. Mr Lacoste said the reactor, which is currently closed after a fatality in January 2011, would be "very compromised" and a moratorium may be required to consider all its safety issues. The NFLA would like to see the review discuss these concerns with the French nuclear regulators.
- In the same vein, American nuclear concerned groups have raised concerns over the safety of Westinghouse's AP1000 design. The NFLA believes the review has to consider issues from the Fukushima accident in reference to design concerns over the AP1000 and the EPR as a matter of urgency.
- Though the UK does not have seismic events like the Japanese earthquakes there have been two minor earthquakes in northern England in the last year. Radioactive materials also remain in this state for many thousands of years and it is not just short-term but long-term studies on seismic activity and tsunamis that need to be considered with the appropriate expert bodies.

MARINE POLLUTION ISSUES:

The NFLA has been discussing the implications of the Fukushima incident with the independent marine pollution specialist Tim Deere-Jones, who will provide us shortly with a detailed analysis of the marine environment issues from the Fukushima incident. The NFLA will submit this as part of its submission for the interim review. The discharging of radiation into the Pacific Ocean has been one of the most disturbing elements of this incident. His 9 initial issues are noted below.

1. *The NFLA reserves the right to submit additional commentary as and when facts/issues become clearer because of:*
 - low standard of accuracy and transparency of reporting;
 - confusion of chronology;
 - confusion of factual detail (mistakes);
 - inadequate number of parameters reported.
2. Assessing the Tsunami / Storm Surge risk for UK coastal reactors.
3. Loss of reactor coolant water and spent fuel storage pond containment:
 - why did this happen?
 - how might it have been prevented?
4. Post-containment breach radioactive pollution of the marine environment:
 - why did this happen?
 - how might it have been prevented?

5. *Use of improvised cooling water supplies to remedy loss of reactor coolant and spent fuel storage pond containment:*
 - *sources of water;*
 - *containment;*
 - *risk assessment.*
6. Post incident monitoring/analysis of seawater:
 - choice of isotopes to be monitored/analysed for;
 - choice of sites for monitoring/analysis;
 - choice of environmental media to be sampled for monitoring/analysis.
7. *Modelling the marine environmental potential distribution, behaviour and end-fate of radioactive pollution lost from reactors as a result of tsunami/storm surge events and improvised cooling activities:*
 - isotopic / nuclide data input;
 - water body movement input data;
 - sea state / meteorological conditions input data;
 - water column thermo-haline data, sedimentary data;
 - chronology / time lines.
8. Public health risk assessment:
 - marine external exposure pathways;
 - coastal zone terrestrial external exposure pathways;
 - marine seafood ingestion pathways;
 - terrestrial food ingestion pathways;
 - inhalation pathways.
9. *Commercial impact assessments (non nuclear).*

EMERGENCY PLANNING ISSUES:

A key additional issue in the Fukushima incident is the failure of the emergency plan to deal with the damage and subsequent problems. Serious issues also exist around the extent of the evacuation zone and the dangers being faced for emergency workers on site. All of these should be considered in reference to the UK's existing and new nuclear programme.

Clear issues of concern for the NFLA include:

- Given that nuclear materials can remain radioactive for thousands of years; do risk assessments on natural disasters affecting nuclear plants need completely revisiting?
- Even if the UK is in a low risk area for earthquakes and tsunamis, the potential for major widespread coastal flooding and terrorist attack remains high and must be re-evaluated following this incident.
- Why was the risk assessment for the reactor so woefully inadequate at assessing the potential for a 9.0 earthquake and 7 metre tsunami wave?
- There has been much debate over the adequacy of a 20km evacuation zone for Fukushima, with American and French nuclear regulators suggesting it is too small. There is also inconsistency in the size of initial evacuation zones – the UK has 1km, France has 5kms and the USA 10kms. Are the UK REPIIR (Radiation Emergency Planning and Public Information) Regulations therefore fit for purpose in the event of this type of accident occurring in the UK?
- Would the UK emergency services and local authorities be able to deal adequately with an emergency response of this magnitude, particularly given the serious cuts in staffing across all such authorities?
- Emergency evacuation plans were affected by serious damage to the transport infrastructure in eastern Japan. Some UK reactors would face serious problems in emergency evacuation due to lack of evacuation routes – Mersea Island near Bradwell and main routes off Anglesey with Wylfa are obvious examples. Does the Fukushima incident show the need for plans to be fully revisited, particularly in the light of nuclear new build?
- Are there adequate stocks of iodine tablets around the UK and how accessible are they to communities over 10kms away?
- Fukushima emphasised the possibility that a terrorist attack on the cooling systems, rather than on the main reactor, could be just as devastating. Do security plans around civil and military reactors need to be reconsidered following this incident?
- Given the health risks to the emergency workers courageously attempting to prevent a greater disaster taking place, what guidelines need to be put in place for worker health and safety on site? Fukushima has clearly suggested on site workers could be putting their own health and safety at great risk under pressure from the site owners, with the safety regulator seemingly acquiescent to this. The NFLA notes that workers have been paid much higher fees for working on site since the reactor accident.

- There has been considerable evidence that as many as 2,400 people remain in the evacuated area. Do UK emergency plans need to be reconsidered to ensure all vulnerable people would be evacuated following an incident of this magnitude in an existing civil nuclear reactor?

This long list of issues is just a summary from the NFLA of what it feels needs to be included in your review. The list is such that the NFLA believes that a considerably longer period of time should be provided to consider all the learning points from the Fukushima incident, which is still taking place. The NFLA has offered to take a full part in discussion on the incident and will seek to provide more detailed comments prior to the interim and final reports.

If you have issues of clarification with any part of this submission please contact the NFLA Secretary, Sean Morris, through the email address - s.morris4@manchester.gov.uk.

Yours sincerely,
Baillie George Regan
Chair of UK and Ireland Nuclear Free Local Authorities

NFLA media release on the Weightman review

NFLA Media Advisory - for immediate release, 23rd May 2011

NFLA response to Mike Weightman's interim nuclear safety review – bland reassurance when fundamental change is required

The Nuclear Free Local Authorities has highlighted a disturbing incongruence between the conclusions of the interim Weightman nuclear safety report on the implications of the Fukushima disaster for the UK nuclear industry, and its recommendations. (1) The conclusions largely gave the industry a clean bill of health – but the recommendations raise some important issues which are extensive, potentially very expensive and need to be implemented quickly. It is also disturbing that the regulator is putting the onus on the industry to say how it will implement the recommendations.

The interim review report arises as a result of the major damage to the Fukushima nuclear reactors – the worst nuclear accident since the Chernobyl disaster. A final report will be produced by Mike Weightman in mid September. The NFLA will be robustly participating in a stakeholder engagement event with the Office for Nuclear Regulation in July (2), whilst fully participating in a detailed Westminster seminar next month, where key independent expert speakers will put forward the urgent need for fundamental change in the UK nuclear industry (3).

The Weightman review outlines 11 interim conclusions and 25 interim recommendations. The conclusions of the report largely suggest the UK nuclear industry has already got its house in order, while suggesting that the issues raised by the Fukushima incident are unlikely to be replicated in the UK. Yet the recommendations in the report suggest that the nuclear industry needs to make a series of detailed reviews across many aspects of emergency response, with a real worry over flooding risk (hidden away in the appendices), and various other health and safety issues in a detailed plant and site review for each nuclear facility.

The conclusion on flooding risk is downplayed by Weightman to say the least. The report notes that there is: “potential for flooding to occur in the near vicinity of nuclear sites”, but goes on to say that the actual flooding risk is unknown “because the detailed specific likelihood and consequences of flooding have not been assessed” by the regulators. (4) How then can this justify the Weightman conclusion: “Flooding risks are unlikely to prevent construction of new nuclear power stations at potential development sites in the UK over the next few years”? (5) Is this bland reassurance when there is actually need for fundamental change?

The NFLA wishes to see the 25 recommendations of the interim report put in place urgently. The NFLA is though highly concerned that Mike Weightman is largely leaving the nuclear industry to decide what to do with these recommendations – the NFLA believes they have to be fully and consistently enforced with a full and detailed audit trail.

In the end, it is no surprise to the NFLA that the report makes the conclusions that it does, as Mike Weightman made it very clear from the outset that he did not envisage the review would identify significant changes in practice. Given that HSE ONR has been responsible for implementing the nuclear safety regime in the UK, and that this regime is the same in principle as the Japanese regime, it would be astonishing if there had been any other conclusion.

However, it is quite clear that the Fukushima emergency is still very much an ongoing incident, and that it is far too early to draw any meaningful conclusions from the accident. This is even acknowledged by the UK Government, which asked for the Weightman review to deliver interim findings (published on the 18th May) and a later, more considered report in mid September (which is probably still far too early for full lessons to be learnt from Fukushima). To this limited extent, the recommendations taken by the review are not unreasonable: flagging up several areas where more study is needed during the weeks ahead. The NFLA though is very disappointed with the numerous additional bland reassurances made by Mike Weightman and Government Ministers on UK nuclear safety given as part of the public launch to the report and, to a certain extent, in the narrative part of the report.

The NFLA also points out a number of areas of concern that the report has simply not looked at, due to its very narrow remit. Obvious examples include:

- Proper discussion over the extent of the evacuated area around Fukushima in reference to the UK. The zone has now been extended from 20kms to up to 30kms in Japan, but the USA nuclear regulator suggests it should be as much as 80kms. UK guidance in nuclear accidents is lower than both, but this key issue is not adequately considered in the review.
- A thorough analysis of the extensive and dangerous radioactive discharges from the Fukushima reactors into the sea, airborne and on land. Why has the UK Government not tasked the Health Protection

Agency, the Environment Agency or the Committee on Medical Aspects of Radiation in the Environment (COMARE) to undertake similar reports as the Weightman review?

- The major logistical issues for the emergency services and local authorities for dealing with mass evacuation of tens of thousands of people. Hopefully, the final report will include an analysis of this from the Nuclear Emergency Planning Liaison Group, but the NFLA also believes the Cabinet Office's Civil Contingencies Secretariat, the Emergency Planning Society and senior emergency service personnel should be brought in to consider this aspect of the review.
- The suggestion made in Mike Weightman's press conference and the Government's official response (6), that the Government can now effectively go ahead with approving the National Nuclear Energy Policy Statements and Site Sustainability Assessments before the final safety report has been published. There are serious issues around semi-urban site selection criteria, interim waste storage issues, the site access situation and above all flooding that need to be reassessed following Fukushima.
- Site specific vulnerabilities including the effects of climate change over a long period of time and intergenerational equity.
- The German nuclear safety review (and the suggestion for EU 'stress tests' on nuclear reactors) has considered the impact of a plane hitting a nuclear reactor. It concluded that none of its reactors could withstand large passenger airlines hitting it, whilst the 7 oldest nuclear reactors could not even withstand a light airplane crashing into its reactors. (7)

The NFLA notes that in Germany its Government has also instigated an 'Ethics Commission' to report on the nuclear issue, and the moral rights and wrongs of operating nuclear plants in Germany following Fukushima, as well as of importing nuclear power from its neighbours. (8) This has led the German Chancellor to state that **all** nuclear reactors in the country will be closed by 2021. The NFLA calls on the UK Government to instigate such a commission as well as bringing in other agencies to look at the health and environmental effects of the Fukushima incident.

NFLA Chair Bailie George Regan says:

"The NFLA believes Mike Weightman's interim report is a real missed opportunity. The NFLA has consistently said it is disappointed with the very narrow nature of this review, which it feels is being developed to ensure little actually has to be done. This then allows no great delay to the nuclear new build timetable – the real desire of Ministers which the regulator clearly does not want to significantly affect in my view. It is time for a much broader and open review before we make fundamental decisions on our future energy use following this disaster. Germany, Japan and many other countries are taking this form of action to Fukushima – it is about time we did the same. I don't want bland reassurances; I want a fundamental and critical analysis of the risks of nuclear power following Fukushima."

Ends

Further information: Sean Morris, NFLA Secretary 07771 930196.

Notes for editors:

(1) Health and Safety Executive / Office for Nuclear Regulation, Interim Safety Report of the UK Chief Nuclear Inspector, 18th May 2011, <http://www.hse.gov.uk/nuclear/fukushima/interim-report.htm>

(2) The ONR plans to meet with nuclear concerned groups at its offices in Bootle on 5th July.

(3) Nuclear Consulting Group Westminster seminar – 'Fukushima: Lessons Learned for New Nuclear Build' chaired by Sir Jonathan Porritt with speakers including Dr John Large, Professor Steve Thomas, Professor Tom Burke and Dr Paul Dorfman. House of Commons, Committee Room 8, 14th June. Supported by the Nuclear Free Local Authorities and the group 'No Need for Nuclear'.

[http://www.nuclearpolicy.info/docs/events/Fukushima Westminster Seminar flyer.pdf](http://www.nuclearpolicy.info/docs/events/Fukushima_Westminster_Seminar_flyer.pdf)

(4) Weightman interim review – Overall Conclusion 6.

(5) Weightman interim review – Appendix on flooding risks.

(6) DECC materials on interim nuclear safety report, 18th May 2011

http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/nuclear/nuclear.aspx

(7) Rob Edwards, The Guardian, 18th May 2011

<http://www.robedwards.com/2011/05/uk-nuclear-power-stations-at-risk-of-flooding.html>

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