Nuclear Free Local Authorities
briefing

Date: 31st August 2011 **No.88**

Subject: NFLA submission to the Weightman nuclear safety review final report

i. Background to briefing

This briefing provides the submission of the Nuclear Free Local Authorities (NFLA) for consideration by the Chief UK Nuclear Inspector, Dr Mike Weightman, and his team in the Office of Nuclear Regulation (ONR) considering the implications of the Fukushima disaster in eastern Japan on the UK nuclear industry and its nuclear safety regime. The response follows on from an earlier NFLA submission given to the ONR prior to its interim report and the involvement of the NFLA Secretary in the first meeting of the ONR NGO (non governmental organisations) dialogue meeting in London on 5th July 2011.

NFLA member councils and interested groups can still send in submissions to the review using the email address: FukushimaONRReport@hse.gsi.gov.uk**.** The final report is expected sometime towards the end of September.

ii. Introduction

The 'Weightman' interim and final reports arise out of the terrible events in eastern Japan and the widespread damage, reactor meltdown and radiation leaks from facilities at the Fukushima Daiichi nuclear site in north east Japan.

The UK Secretary of State for Energy and Climate Change, Chris Huhne, formally asked the UK Chief Nuclear Inspector, Mike Weightman, to produce an interim report in May 2011 and a final report in September 2011 to consider all the implications of this incident on the UK nuclear safety regime. Dr Weightman also chaired a fact-finding International Atomic Energy Authority (IAEA) mission to the Fukushima plant and a preliminary study of the disaster.

The UK interim report was published on the 18th May 2011 and can be downloaded from the following weblink: http://www.hse.gov.uk/nuclear/fukushima/interim-report.htm.

In reading the NFLA's submission, which is attached below, it is useful to have also read NFLA Policy Briefing 83, dated 1st June 2011, which gives an overview of the Fukushima disaster and the NFLA's subsequent actions. It can be downloaded from the following weblink: http://www.nuclearpolicy.info/docs/briefings/A197_(NB83)_Fukushima_and_Weightman_review.pdf.

NFLA - THE LOCAL GOVERNMENT VOICE ON NUCLEAR ISSUES

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ONR NUCLEAR SAFETY REPORT ON THE IMPLICATIONS OF THE FUKUSHIMA DAIICHI INCIDENT – SUBMISSION BY THE NUCLEAR FREE LOCAL AUTHORITIES IN ADVANCE OF THE FINAL REPORT

To Mike Weightman, Chief UK Nuclear Inspector,

We would like to bring to your attention a submission from the UK and Ireland Nuclear Free Local Authorities (NFLA) for consideration prior to the publication of your final nuclear safety report following the Fukushima incident. This also follows the recent stakeholder meeting which the ONR organised on July 5th with nuclear concerned groups, at which the NFLA Secretary attended.

In reiterating its main point made prior to the publication of the interim report, the NFLA would like to again 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 as radiation hotspots continue to be found. Indeed, as noted below in section 2, some new evidence in 'The Independent' suggests a potentially different scenario could have taken place at Fukushima due to faulty pipework.

As was noted in the ONR NGO dialogue meeting a number of international nuclear organisations, such as the International Convention on Nuclear Safety, are not making specific recommendations until mid 2012 at the earliest (1). A number of other important pieces of research are also only just beginning to be conducted, which your inquiry report will not be able to look at. The NFLA therefore asks the ONR to keep a watching brief on all Fukushima related reports and findings and advise Government and the nuclear industry, enforcing where appropriate, when necessary changes to nuclear safety policy and regulations are required. We suggest that you publish a statement of intent to this respect and an outline work programme in your final report.

This response considers some of the points made in your interim nuclear safety report on the implications of the Fukushima incident for the UK nuclear industry and puts forward a number of specific issues around nuclear engineering, nuclear emergency planning, health issues and radiation in the environment.

1. General comments on the interim review report

1.1 One of the NFLA's consistent concerns with this entire process is that it does not look at the Fukushima incident in its totality – as a full independent public inquiry would do – but narrows it down to particularly concentrate on nuclear safety and nuclear engineering matters, and some related issues. Though these are highly important issues and this review is therefore welcome, issues around the damage of the incident on the marine environment, human and animal health, the ethics of nuclear new build following this incident, the financial implications of the disaster, and implications on nuclear liability insurance and MOX fuel use – particularly given the decision by the NDA to close down the Sellafield MOX plant – need to be considered in much greater detail.

1.2 Related to this point, and an issue robustly discussed with you by the NFLA Secretary and other NGOs at the meeting on the 5th July, is the incongruence between the conclusions and the recommendations in the report, along with the public comments you made at the press conference on your interim report. As the NFLA noted in its media release (2), attached as Appendix 1, the recommendations outline a number of very serious issues that need to be resolved by Government, the NDA and the nuclear industry. The conclusions, and your public comments at the time (3), rather gave a reassuring message that there was little to actually worry about in terms of existing civil nuclear reactors or new nuclear reactors arising from the Fukushima incident. To nuclear concerned groups this gave a general feeling of complacency with the report. The NFLA believes that this incongruence should be completely avoided in the final report and an objective, impartial tone should be adopted throughout the report.

1.3 In its initial comments made prior to the interim report, the NFLA made the point that independent consultants should be considered for inclusion in a technical advisory panel for the review (4). At the meeting on the 5th July you noted that an offer to independent advisors was still in place, which we very much welcome and we hope such representatives are

incorporated into the review process prior to the publication of the final report. However, the NFLA would still like to make the point that an invitation should have gone out to nuclear concerned groups and to specialist independent consultants at the outset to be directly involved in the production of the interim and final reports as a matter of course. The NFLA is pleased that involvement of independent parties in the newly established ONR structure is being considered. The NFLA would recommend this is progressed further and with more vigour by the ONR as part of its 'Transformation Programme' and work on openness and transparency. This would give nuclear concerned groups such as the NFLA confidence in the independence of ONR from the Government and the nuclear industry. In the future this should become a formalised arrangement in the ONR's general operations.

1.4 The NFLA was concerned that a number of submissions to the interim review were placed on the ONR website and then taken off, for apparent reasons of security (5). The NFLA believes wholeheartedly in the need for openness and transparency across the whole nuclear sector and sees this as a concerning development. A robust protocol on information disclosure by ONR needs to be put in place, based on a presumption that as much information as possible will be made public and that only legally sensitive details will be redacted.

2. Nuclear engineering issues

The NFLA Secretary welcomed the presentation you gave to the NGO meeting on the 5th July, gave an overview of your visit as the Head of an IAEA delegation to the Fukushima disaster zone.

The NFLA supports the points which have been made by independent nuclear engineering consultant John Large around the Fukushima incident in various reports and encourages the ONR Team developing the final report to consider all these reports in detail (6).

Of particular interest to the NFLA are comments made by John Large for Greenpeace International (7), around the parallel IAEA review of the Fukushima incident, which you chaired, which are summarised here:

- The IAEA implied that all instrumentation was lost at the arrival of the tsunami. However, a Tepco (Tokyo Electric Power Company) statement on the 15th May contradicted this information by stating that Reactor 1's instrumentation recorded information for at least 13 hours after the tsunami wave hit the plant.
- The IAEA statement stated that there were no means to cool the reactor units, but again fuel core temperature records were available for 2.5 hours following the tsunami.
- Tepco had not adequately controlled the radiation leak risk in the first week of the disaster, and the Japanese safety regulator did not seriously challenge it. Two months after the disaster Tepco finally admitted that the fuel unit of reactor 1 had completely melted and slumped to the bottom of the reactor protection vessel. This has major implications for the extent of emergency evacuation, which the IAEA report does not go into any detail on.
- The IAEA makes no comment on the delays in the Japanese Government's declaration of the most severe incident category and its notifying of this to nearby countries, as it is obliged to do.
- There appears to be a growing level of evidence that the earthquake created substantial damage to pipework and equipment prior to the tsunami hitting it. The IAEA (and by that token the ONR) should be investigating this information in greater detail than the summary outlines. Further information on this is noted below.
- The IAEA statement on the 'road-map' to full recovery of the site is remarkably up-beat and overly optimistic.
- The IAEA only indirectly outlines a number of critical flaws in the nuclear regulatory approach. Natural hazards were underestimated whilst plant and safety design needs to be applied to extreme, low frequency events. This should apply to the worldwide review of nuclear power plants and not be cursory in nature.
- Tepco, rather than the regulator, appeared to have been allowed to assume the lead role from the onset.

The NFLA would like the final report to consider all these related issues in the production of its final report. In particular, we would like the report to consider the deficiencies in the regulatory approach adopted by the Japanese nuclear industry, given the similarities between nuclear regulatory regimes around the world. We appreciate that this will be a difficult and sensitive issue given that it could be seen as ONR passing judgement on its own approach to regulation, and this may be an area where ONR might wish to commission an assessment by independent experts. However, this issue must not be side-stepped, and unsupported assertions that the regulatory approach used in the UK is sound will not be acceptable.

As an example of the need to review regulatory approaches, an issue that a number of independent nuclear engineering and technical experts have noted in detail relates to potential faults with the 'probabilistic risk assessment' model used by nuclear regulatory agencies in the likes of Japan, France, UK and USA.

As M.V. Ramana has commented on the 2007 Japanese earthquake (8):

"Probabilistic risk assessment models do not account for unexpected failure modes during many accidents. At Japan's Kashiwazaki Kariwa reactors, for example, after the 2007 Chuetsu earthquake some radioactive materials escaped into the sea when ground subsidence pulled underground electric cables downward and created an opening in the reactor's basement wall. As a Tokyo Electric Power Company official remarked then, 'It was beyond our imagination that a space could be made in the hole on the outer wall for the electric cables.' "

Ramana goes on to note (9): "If there is one weakness of the probabilistic risk assessment method that has been emphatically demonstrated at Fukushima, it is the difficulty of modelling common-cause or common-mode failures. From most reports it seems clear that a single event, the tsunami, resulted in a number of failures that set the stage for the accidents. These failures included the loss of offsite electrical power to the reactor complex, the loss of oil tanks and replacement fuel for diesel generators, the flooding of the electrical switchyard, and perhaps damage to the inlets that brought in cooling water from the ocean. As a result, even though there were multiple ways of removing heat from the core, all of them failed."

The NFLA believes the final ONR nuclear safety report should concentrate on the perceived weakness with the probabilistic risk assessment model and comment on the need for a complete reconsideration and overhaul of the same models used for the UK civil nuclear reactor programme. Such comments were made in detail by a number of representatives at the ONR NGO dialogue and in the specific presentation made at the meeting by John Busby.

This issue concerns the NFLA particularly as it has been claimed by Areva and Westinghouse that both the EPR and the AP1000 new reactor designs are safe using the probabilistic risk model and using 'multiple systems' of contingency measures to allay reactor failure and meltdown. However, Rahman notes (and John Large has made similar points at the June Nuclear Consulting Group Westminster seminar) (10):

"Fukushima also demonstrated one of the perverse impacts of using multiple systems to ensure greater levels of safety: Redundancy can sometimes make things worse. At Fukushima, as with most reactors around the world, zirconium cladding surrounded and protected the fuel. But when the cooling systems stopped working, the zirconium cladding overheated. Hot zirconium interacted with water or steam, producing hydrogen gas. When this hydrogen came into contact with air in the containment building, it caused an explosion that reportedly damaged the suppression pool beneath the reactor, another protective system. In other words, in complex systems such as nuclear reactors, redundancy may have unexpected and negative consequences for safety, as scholars including Charles Perrow and especially Scott Sagan have pointed out in the past."

In other words, severe accidents at nuclear plants have historically had different origins, progressions and impacts. The next nuclear accident will probably be quite different from the Fukushima disaster. There are no reliable tools to predict how the next accident will occur and constructing new reactors using more modern 'safer' designs based on probabilistic risk assessment models that predict lower

accident frequencies is not a guarantee of no future accident. The ONR need to seriously consider this conclusion from Rahman in their final report:

"The lesson from the Fukushima, Chernobyl, and Three Mile Island accidents are simply that nuclear power comes with the inevitability of catastrophic accidents. While these may not be frequent in an absolute sense, there are good reasons to believe that they will be far more frequent than quantitative tools such as probabilistic risk assessments predict. Any discussion about the future of nuclear power ought to start with that realisation."

Just prior to submitting this response the NFLA was made aware of an article in the August 17th edition of 'The Independent', which is attached as Appendix 3. The newspaper has interviewed a number of workers at the Fukushima plant who make serious allegations that critical external piping was not repaired around a week prior to the disaster, despite a request to do so by the nuclear safety regulator. According to the report, the piping cracked when the earthquake took place and radiation alarms also were heard, both before the tsunami wave occurred. If this is the case it has a major implication on both the ONR report and the IAEA preliminary report which suggested a combination of the earthquake and the tsunami were the principle causes of the explosions and reactor meltdown. The NFLA requests that this matter is considered urgently and all findings incorporated into the final report, particularly if they have an impact on the conclusions and recommendations to the ONR report.

3. Safety of the EPR design

At present the ONR and the Environment Agency are conducting a detailed Generic Design Assessment (GDA) with Areva and Westinghouse over their EPR and AP-1000 designs. Westinghouse has recently announced a delay on the assessment of the AP-1000 design, pending an investment review. At the ONR NGO dialogue meeting it was confirmed by Kevin Allars that he anticipated that the assessment of the EPR would be completed by the end of 2012.

The NFLA would like therefore to bring to the ONR's attention a detailed report conducted by Dr Helmut Hirsch for Greenpeace International on the safety of the EPR design following the issues arising out of the Fukushima disaster. It is the understanding of the NFLA that Greenpeace UK will formally submit the report to ONR for its consideration prior to the final report. The NFLA agrees with Greenpeace and NIRS that Dr Hirsch's assessment needs to be thoroughly considered by the ONR before production of the final nuclear safety report and within the parallel GDA process. Hirsch's main conclusion is that the (11) "…standard of the EPR is generally lower, or at best, equal to that of the German Generation 2 Konvoi plants, which have already been in operation for more than 20 years."

The report makes a number of detailed conclusions around the areas of station blackout and spent fuel storage pool design and cooling including (12):

- The designers of the EPR, Areva, have failed to systematically design against a sustained loss of power to cooling systems. Furthermore, the EPR's two additional back-up generators are insufficient to power most of the systems required for a safe cold shutdown.
- The EPR design assumes that grid power or primary diesel generators would be restored in 24 hours, but in Fukushima a blackout lasted 11 days.
- If such an event occurred in an EPR facility there would be no ability to cool water below 100 degrees Celsius and achieve stable shutdown. There would also be no power to pump water into the reactor coolant system, critical to prevent meltdown.
- There would also be no operable boron injection system to keep the nuclear chain reaction from restarting and no power to cool spent fuel pools. There would also be no hydrogen recombiners or igniters on the fuel building to prevent explosions.

In Hirsch's assessment of the EPR design put forward by Areva to the ONR, the company has actually weakened the safeguards compared to the German Konvoi designs of the 1980s, a predecessor of the EPR.

The changes include:

- A reduced number of back-up generators.
- The back-up diesel generators need to be manually started, which may increase the risk of operator error.

- A reduced number of safety systems and functions that can be powered by back-up diesel generators compared to the Konvoi reactors. The EPR secondary diesel generators cannot power the cooling of water in the reactor below 100 degrees Celsius to achieve stable cold shutdown; they cannot assist in the injection of water into the reactor coolant system; nor in boron injection into the reactor coolant system and nor in spent fuel cooling (whether in the basic design and the US EPR design).
- The design omits aircraft-proofing of the diesel generator building.
- The design has removed a back-up cooling system for the spent fuel pond (again in the basic design and the US EPR design).

The NFLA believes it is important for Dr Hirsch's report to be thoroughly considered by the ONR before production of the final report and that it is also considered in the parallel GDA process.

4. Marine and airborne pollution issues

The NFLA has been discussing the implications of the Fukushima incident with the independent marine pollution specialist Tim Deere-Jones, who has provided us with a detailed analysis of the marine and airborne environment issues from the Fukushima incident.

To follow shortly.

5. Nuclear emergency planning issues

Your interim report made a number of specific recommendations on nuclear emergency planning:

R2. 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.

R3. 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.

R4. 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.

R6. 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.

R10. 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.

R17. 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.

R20. 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.

R24. 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.

The NFLA believe more detail should be given on the steps needed to address all of these issues, and where possible an action plan should be presented.

Given that there are so many recommendations on nuclear emergency planning issues, and that the Government is also conducting its own review of such issues as a response to the interim report, the NFLA has initiated a questionnaire of nuclear emergency planning of local authority and fire authority emergency planning units across England, Scotland and Wales. Unfortunately, due to the summer holiday season we do not expect the results of the questionnaire to be quite ready before publication of your final report, but we plan to share these results with the ONR and the UK Government when they are complete. The questionnaire is attached as Appendix 2.

The rationale behind the questionnaire for the NFLA comes as a result of a previous questionnaire on nuclear weapons convoys and two NFLA seminars on nuclear emergency planning (footnote).

The previous questionnaire and the seminars have shown a general lack of knowledge of the UK Nuclear Emergency Planning Liaison Group, particularly amongst local authority emergency planning officers who do not have fixed nuclear sites in their area. There is also a general lack of specific exercises and training on nuclear emergency planning for such local authority EPU's.

A criticism that has already been made by a number of groups to the recent July dialogue meeting - with the DECC Office for Nuclear Development and the Energy Minister Charles Hendry - is that much of the emergency planning review will not be discussed in the public sphere. The NFLA understands the sensitivity of nuclear emergency planning with national security but, as it has maintained consistently, it believes that independent figures should be allowed to take part in such a review, security checked if required. The NFLA also believes the Emergency Planning Society Professional Working Groups on CBRN, on Environmental Risk, on Health and on Human Aspects should also be consulted within this review as valuable and experienced professionals who would provide specific expertise around the various emergency planning issues that the Fukushima incident raises. Likewise, the Business Continuity Institute should also be brought into a review.

The NFLA questionnaire brings out a number of other nuclear emergency planning issues, which need to be considered by the ONR for the final report, such as:

- The extent of the evacuation zone for a major nuclear accident and all the logistical, technical and scientific issues that arise from a large area having to be evacuated for a long, possibly permanent, amount of time. Why does the ONR's recommended evacuation distance remain so limited compared to the 20kms (and up to 32kms) of the Fukushima incident and the recommendations of the American and French nuclear regulators that it should be up to 50 miles?
- As the May 2011 NFLA media release pointed out (Appendix 1), the interim report stated 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. How then can this justify the interim report's 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"? The NFLA expects the final report to have considered this clear incongruence in some detail and make a much more robust conclusion to that in the interim report.
- Again, as the NFLA noted in its initial comments to the ONR's interim report, 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. The Fukushima incident clearly shows the need for evacuation plans to be fully revisited, particularly in the light of expanded sites through a nuclear new build programme. The NFLA would like a more detailed answer to this issue to be considered for the final report.

- The need for robust mutual aid and central government support agreements is required to ensure a framework is in place for the huge demands that such an incident would place on the emergency services and the public authorities. Under the Civil Contingencies Act, local authorities would be expected to take the lead in all recovery work, but the substantial cuts to local government services, including the merging of a number of emergency planning units, would make this an immensely difficult, if not impossible, task. The financial implications of Fukushima are staggering. The independent Japan Centre for Economic Research has 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 (footnote).
- There is also a clear need to consider the scientific and technical assistance that would be required to the emergency services and the public authorities dealing with such an incident. An emergency planning review needs to outline how such expertise is to be organised and ensure public safety lies at the centre of an emergency response.
- Taking a broader view, ONR needs to develop a more robust policy on siting, evacuation, and emergency planning issues. The Boundary Hall planning inquiry on issues relating to development within emergency planning zones at the Atomic Weapons Establishment Aldermaston has exposed weaknesses in the approach adopted to date and has also highlighted the lack of understanding of these issues by non-specialist decision makers at both the local and national levels. A clear statement of ONR policy is needed which will address the potential loopholes created by the Boundary Hall decision and present ONR policy in a single accessible document.

6. Other issues from the interim report

ONR's interim report discusses the implications of the Fukushima accident for the civil nuclear industry but makes no mention of the UK's defence nuclear programme, and in particular the Naval Nuclear Propulsion Programme. This is a significant omission, as the risks associated with naval nuclear reactors are arguably greater than those associated with civil nuclear reactors. The final report should explain what action is being taken to review the defence nuclear programme in the light of the Fukushima accident and make it clear that a report on unclassified issues arising from such a review will be made public.

The NFLA Secretariat also submits with this response its June 2011 briefing on Fukushima and the ONR nuclear safety review, including its 'minimum demands' document agreed with over 30 nuclear concerned groups. The NFLA hopes these will again be considered and responded to in reference to the final report.

7. Conclusions

The NFLA has welcomed the opportunity to submit its views and its concerns following the tragic Fukushima incident to the ONR review. As noted above, the NFLA shared the view of many nuclear concerned groups that the interim report was detailed and useful, but complacent in a number of key areas. It has been very disappointed how the report has been used by the UK Government and the nuclear industry as justification for a new nuclear build programme. The NFLA fundamentally believes the Fukushima incident should halt all developments of new nuclear reactors until the body of evidence on this disaster is more complete, particularly give that the incident is still ongoing and the radiation spikes remain worryingly high. In that respect, the NFLA hopes the ONR can be more careful in their comments on publication of the final report than they were with the interim report.

The NFLA believes that the ONR report has been helpful to understanding the implications of the Fukushima incident, but it has not been comprehensive. The fact that Germany, Switzerland, Italy and probably Japan are moving away from nuclear power as a result of their own reports into the Fukushima incident is an indication of the paradigm shift in the debate on nuclear safety. The NFLA has mentioned a number of issues that need to be considered carefully by the ONR prior to its final

report, and it expects many other groups and independent consultants to have done likewise. The NFLA hopes nuclear safety culture can be improved for the existing nuclear legacy and that the final report should not be seen as the precursor for a new 'nuclear renaissance'.

Submitted by the NFLA Secretary on behalf of the Nuclear Free Local Authorities on 31st August 2011.

8. References:

(1) Bloomberg, 14th April 2011: http://www.bloomberg.com/news/2011-4-14/nuclear-regulators-delay-study-of-fukushima-lessons-until-2012.html
(2) NFLA media release, 23rd May 2011:
http://www.nuclearpolicy.info/docs/news/NFLA_PR_ONR_Interim_Review.pdf
(3) ibid.
(4) NFLA initial reports on the ONR nuclear safety review, 14th April 2011:
http://www.nuclearpolicy.info/docs/news/NFLA_response_to_Weightman_review.pdf
(5) The Guardian, 25th May 2011 (all documents on Rob Edwards's website):
See: http://www.robedwards.com/2011/05/uk-reactors-face-fukushima-like-risks-warn-industry-experts.html
(6) See John Large's website for all reference documents: http://www.largeassociates.com/PapersReports.htm
(7) Large and Associate Consulting Engineers: 'Review of the IAEA Preliminary Summary of its Fact-finding expert mission to Japan of 24th May – 1st June 2011. Report for Greenpeace International, 6th June 2011
(8) M.V. Ramana: 'Beyond our imagination – Fukushima and problems of assessing risk', Bulletin of Atomic Scientists, 19th April 2011. http://www.thebulletin.org/web-edition/features/beyond-our-imagination-fukushima-and-the-problem-of-assessing-risk
(9) ibid.
(10) ibid.
(11) H.Hirsch, A.Y.Indradiningrat and T. Wienisch: 'Selected aspects of the EPR design in light of the Fukushima incident', June 2011, report for Greenpeace International.
http://www.greenpeace.org/france/PageFiles/266521/EPR_Report_Greenpeace.fr.pdf
(12) ibid as quoted in NIRS summary report: 'Vulnerability of the EPR to a Fukushima like incident', June 3rd 2011, http://www.nirs.org/reactorwatch/newreactors/eprfukushima_summary.pdf

Tim DJ's references

Then final references on nuclear emergency planning.
(tbc) NFLA Policy Briefing 74, Safety and emergency planning of nuclear weapons transportation convoys, 15th June 2010. http://www.nuclearpolicy.info/docs/briefings/A189_(NB74)_Nuclear_weapons_transportation.pdf
Presentations from the NFLA English Forum seminar in Manchester and the NFLA Scottish Forum seminar in Glasgow on nuclear emergency planning are available on request from the NFLA Secretariat.
(tbc) These figures are contained in the NFLA Policy Briefing attached with this submission.

Appendix 1

NFLA media release following publication of the Weightman interim report

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.

Footnotes can be found on the NFLA website, where this media release is located.

Appendix 2

Fukushima article in 'The Independent' and NFLA's published letter in the newspaper

The explosive truth behind Fukushima's meltdown - By David McNeill in Tokyo and Jake Adelstein, Wed *17 Aug 2011, The Independent*

It is one of the mysteries of Japan's ongoing nuclear crisis: How much damage did the 11 March earthquake inflict on the Fukushima Daiichi reactors before the tsunami hit?

The stakes are high: if the earthquake structurally compromised the plant and the safety of its nuclear fuel, then every similar reactor in Japan may have to be shut down. With almost all of Japan's 54 reactors either offline (in the case of 35) or scheduled for shutdown by next April, the issue of structural safety looms over any discussion about restarting them.

Plant operator Tokyo Electric Power Co (Tepco) and Japan's government are hardly reliable adjudicators in this controversy. "There has been no meltdown," government spokesman Yukio Edano repeated in the days after 11 March. "It was an unforeseeable disaster," Tepco's then president Masataka Shimizu famously and improbably said later. Five months since the disaster, we now know that meltdown was already occurring as Mr Edano spoke. And far from being unforeseeable, the disaster had been repeatedly forewarned by industry critics.

Throughout the months of lies and misinformation, one story has stuck: it was the earthquake that knocked out the plant's electric power, halting cooling to its six reactors. The tsunami then washed out the plant's back-up generators 40 minutes later, shutting down all cooling and starting the chain of events that would cause the world's first triple meltdown.

But what if recirculation pipes and cooling pipes burst after the earthquake – before the tidal wave reached the facilities; before the electricity went out? This would surprise few people familiar with the 40-year-old reactor one, the grandfather of the nuclear reactors still operating in Japan.

Problems with the fractured, deteriorating, poorly repaired pipes and the cooling system had been pointed out for years. In September 2002, Tepco admitted covering up data about cracks in critical circulation pipes. In their analysis of the cover-up, The Citizen's Nuclear Information Centre writes: "The records that were covered up had to do with cracks in parts of the reactor known as recirculation pipes. These pipes are there to siphon off heat from the reactor. If these pipes were to fracture, it would result in a serious accident in which coolant leaks out."

On 2 March, nine days before the meltdown, government watchdog the Nuclear Industrial Safety Agency (NISA) warned Tepco on its failure to inspect critical pieces of equipment at the plant, including recirculation pumps. Tepco was ordered to make the inspections, perform repairs if needed and report to NISA on 2 June. It does not appear, as of now, that the report has been filed.

The Independent has spoken to several workers at the plant who recite the same story: serious damage, to piping and at least one of the reactors, occurred ***before*** the tsunami hit. All have requested anonymity because they are still working at or connected with the stricken plant. Worker A, a maintenance engineer who was at the Fukushima complex on the day of the disaster, recalls hissing, leaking pipes.

"I personally saw pipes that had come apart and I assume that there were many more that had been broken throughout the plant. There's no doubt that the earthquake did a lot of damage inside the plant... I also saw that part of the wall of the turbine building for reactor one had come away. That crack might have affected the reactor."

The reactor walls are quite fragile, he notes: "If the walls are too rigid, they can crack under the slightest pressure from inside so they have to be breakable because if the pressure is kept inside... it can damage the equipment inside so it needs to be allowed to escape. It's designed to give during a crisis, if not it could be worse – that might be shocking to others, but to us it's common sense." Worker B, a technician in his late 30s who was also on site at the time of the earthquake, recalls: "It felt like the earthquake hit in two waves, the first impact was so intense you could see the building shaking, the pipes buckling, and within minutes I saw pipes bursting. Some fell off the wall...

"Someone yelled that we all needed to evacuate. But I was severely alarmed because as I was leaving I was told and I could see that several pipes had cracked open, including what I believe were cold water supply pipes. That would mean that coolant couldn't get to the reactor core. If you can't sufficiently get the coolant to the core, it melts down. You don't have to have to be a nuclear scientist to figure that out." As he was heading to his car,

he could see that the walls of the reactor one building had started to collapse. "There were holes in them. In the first few minutes, no one was thinking about a tsunami. We were thinking about survival."

The suspicion that the earthquake caused severe damage to the reactors is strengthened by reports that radiation leaked from the plant minutes later. The Bloomberg news agency has reported that a radiation alarm went off about a mile from the plant at 3.29pm, ***before*** the tsunami hit.

The reason for official reluctance to admit that the earthquake did direct structural damage to reactor one is obvious. Katsunobu Onda, author of Tepco: The Dark Empire, explains it this way: A government or industry admission "raises suspicions about the safety of every reactor they run. They are using a number of antiquated reactors that have the same systematic problems, the same wear and tear on the piping." Earthquakes, of course, are commonplace in Japan.

Mitsuhiko Tanaka, a former nuclear plant designer, describes what occurred on 11 March as a loss-of-coolant accident. "The data that Tepco has made public shows a huge loss of coolant within the first few hours of the earthquake. It can't be accounted for by the loss of electrical power. There was already so much damage to the cooling system that a meltdown was inevitable long before the tsunami came."

He says the released data shows that at 2.52pm, just after the quake, the emergency circulation equipment of both the A and B systems automatically started up. "This only happens when there is a loss of coolant." Between 3.04 and 3.11pm, the water sprayer inside the containment vessel was turned on. Mr Tanaka says that it is an emergency measure only done when other cooling systems have failed. By the time the tsunami arrived and knocked out all the electrical systems, at about 3.37pm, the plant was already on its way to melting down.

Kei Sugaoka, who conducted on-site inspections at the plant and was the first to blow the whistle on Tepco's data tampering, says he was not surprised by what happened. In a letter to the Japanese government, dated 28 June 2000, he warned that Tepco continued to operate a severely damaged steam dryer in the plant 10 years after he pointed out the problem. The government sat on the warning for two years.

"I always thought it was just a matter of time," he says of the disaster. "This is one of those times in my life when I'm not happy I was right."

During his research, Mr Onda spoke with several engineers who worked at the Tepco plants. One told him that often piping would not match up to the blueprints. In that case, the only solution was to use heavy machinery to pull the pipes close enough together to weld them shut. Inspection of piping was often cursory and the backs of the pipes, which were hard to reach, were often ignored. Repair jobs were rushed; no one wanted to be exposed to nuclear radiation longer than necessary.

Mr Onda adds: "When I first visited the Fukushima Power Plant it was a web of pipes. Pipes on the wall, on the ceiling, on the ground. You'd have to walk over them, duck under them – sometimes you'd bump your head on them. The pipes, which regulate the heat of the reactor and carry coolant are the veins and arteries of a nuclear power plant; the core is the heart. If the pipes burst, vital components don't reach the heart and thus you have a heart attack, in nuclear terms: meltdown. In simpler terms, you can't cool a reactor core if the pipes carrying the coolant and regulating the heat rupture – it doesn't get to the core."

Tooru Hasuike, a Tepco employee from 1977 until 2009 and former general safety manager of the Fukushima plant, says: "The emergency plans for a nuclear disaster at the Fukushima plant had no mention of using seawater to cool the core. To pump seawater into the core is to destroy the reactor. The only reason you'd do that is no other water or coolant was available."

Before dawn on 12 March, the water levels at the reactor began to plummet and the radiation began rising. The Tepco press release published just past 4am that day states: "The pressure within the containment vessel is high but stable." There was one note buried in the release that many people missed: "The emergency water circulation system was cooling the steam within the core; it has ceased to function."

At 9.51pm, under the chief executive's orders, the inside of the reactor building was declared a no-entry zone. At around 11pm, radiation levels for the inside of the turbine building, which was next door to reactor reached levels of 0.5 to 1.2 mSv per hour. In other words, the meltdown was already underway. At those levels, if you spent 20 minutes exposed to those radiation levels you would exceed the five-year limit for a nuclear reactor worker in Japan.

Sometime between 4 and 6am, on 12 March, Masao Yoshida, the plant manager decided it was time to pump seawater into the reactor core and notified Tepco. Seawater was not pumped in until hours after a hydrogen explosion occurred, at roughly 8pm. By then, it was probably already too late.

Later that month, Tepco went some way toward admitting at least some of these claims in a report called "Reactor Core Status of Fukushima Daiichi Nuclear Power Station Unit One". The report said there was pre-tsunami damage to key facilities, including pipes.

"This means that assurances from the industry in Japan and overseas that the reactors were robust is now blown apart," said Shaun Burnie, an independent nuclear waste consultant who works with Greenpeace. "It raises fundamental questions on all reactors in high seismic risk areas."

As Mr Burnie points out, Tepco also admitted massive fuel melt 16 hours after loss of coolant, and seven or eight hours before the explosion in Unit One. "Since they must have known all this, their decision to flood with massive water volumes would guarantee massive additional contamination – including leaks to the ocean."

No one knows how much damage was done to the plant by the earthquake, or if this damage alone would account for the meltdown. But certainly Tepco's data and eyewitness testimony indicates that the damage was significant.

As Mr Hasuike says: "Tepco and the government of Japan have provided many explanations. They don't make sense. The one thing they haven't provided is the truth. It's time they did.

Independent Letters, published 18th August 2011

Nuclear alarm from Japan

I read with much interest and alarm your excellently researched study on what may actually have happened at the Fukushima nuclear facility in March ("The explosive truth behind Fukushima's meltdown", 17 August).

The possibility that critical circulation plants split as a result of the earthquake and were damaged before the tsunami wave struck would seem to contradict the comments made in the IAEA's initial findings and the UK's Chief Nuclear Inspector's interim report on nuclear safety.

Covering up records is not a new issue in the nuclear industry, and to hear that the Tokyo Electric Power Company had not done essential repairs, as requested by the nuclear regulator, and radiation alarms were going off shortly after the earthquake hit and before the tsunami, gives credence to the view that the full truth on this tragic incident has not yet been established.

I urge the UK Chief Nuclear Inspector, Mike Weightman, to take these reports very seriously and incorporate consideration of them in his final nuclear safety report to the Government. The report should also be delayed until more is known of these reports from Japan, while all the approvals being given to EDF for a new reactor at Hinkley Point C should also be suspended.

There are some very awkward truths from your report into what really happened at Fukushima. They must be heeded in the UK or we could be the next ones to pay the price.

Bailie George Regan, Chair, UK and Ireland Nuclear Free Local Authorities, Manchester

Appendix 3

NFLA questionnaire to Councils / Fire Authorities on nuclear emergency planning

Q1. Do you have a fixed civil nuclear reactor or a military nuclear facility in your area, or within 30 miles of your boundary?

Q2. Are you aware of the following nuclear emergency planning arrangements, and do you have plans for them? Have they been tested in the last 12 months?

a) REPPIR YES / NO Tested in last 12 months? YES / NO

b) LAESI guidelines on nuclear weapons convoys Y/N Tested? Y/N / Not applicable

c) CBRN plans Y/N/ Not applicable Tested? Y/N

d) RIMNET and NAIR tests Y/N Tested? Y/N

e) Fixed nuclear site evacuation plans Y/N Live test? Y/N Tabletop test? Y/N

f) Other nuclear emergency plans – please specify:

Q3. Are you aware of the Nuclear Emergency Planning Liaison Group (NEPLG)?

Q4. Do you know who represents local government on the NEPLG and are you aware of the guidance they provide to local government and fire authorities on nuclear emergency planning?

Q5. Were you aware of the recommendations on nuclear emergency planning from the ONR (HSE) interim review on the Fukushima incident?

Q6. Is your authority, or your Local Resilience Forum, planning to make any submissions to the final Weightman nuclear safety report or to the UK Government's review of nuclear emergency planning?

Q7. The Fukushima disaster led to the evacuation of an area of 20 kilometres (12 miles) and up to 32 kilometres (19.2 miles) to cover some outlying towns that the Japanese authorities were particularly concerned about. The French and US nuclear regulators suggested the evacuation zone should have been even larger – as much as 50 miles. This is considerably higher than current evacuation zones for UK civil nuclear reactors and is likely to take in Councils that do not have fixed nuclear sites in their area. Do you think UK nuclear evacuation zone plans should be increased to the Fukushima evacuation zone size than the present smaller zones in current plans? Please explain why.

Q8. It is highly possible that the host local authority for all UK civil nuclear reactors and military nuclear sites would be overwhelmed with the emergency response to a Fukushima type disaster. Mutual aid with neighbouring authorities across the region is likely. Will you be adjusting your Community Risk Registers and / or altering your present emergency plans to take account of this type of incident? And, if you are an Emergency Planning Unit in an outlying area, do you require additional training of key personnel for such an eventuality?

Q9. The Weightman interim nuclear safety report has noted the need for a review of UK emergency planning to deal with a prolonged incident like Fukushima, which may take as much as a year to become fully under control. Have you put in place reviews to consider how your local authority would deal with the recovery phase to such a prolonged incident if it had occurred in the UK?

Q10. NFLA seminars and reports, and the Scottish Parliament's report on nuclear weapons convoys, have suggested that there is a lack of specific knowledge and training on nuclear emergency planning matters in Councils that do not have specific civil or military nuclear sites in their area. Do you think, following the Fukushima incident, there is a need for national nuclear emergency planning training for all local authorities in the UK? Please feel free to add any comments to substantiate your answer.

Q11. How do you think Local and Fire Authority Emergency Planning Unit's can remain open and transparent to the public on nuclear emergency planning matters whilst not infringing issues of local and national security?

Q12. At NFLA seminars mention has been made about the large amount of equipment and open space that would be required in establishing decontamination facilities for cleaning the civilian population in the event of radiation exposure from a nuclear accident or a malicious attack. Other countries, like Sweden, have been considering the development of a public information campaign to educate the public on what to do in the event of a radiation exposure in terms of removing clothing and thoroughly cleaning the body. Do you think such a public information programme is feasible and more effective than a large-scale emergency decontamination operation? Please explain your comments.

Q13. All UK civil / military nuclear facilities are near the sea or a river. Following the Fukushima incident, have you reviewed your flood plans in reference to the flooding of a civil nuclear reactor or military nuclear facility and its effects on the marine environment?

Q14. Do you have sufficient technical and scientific expertise for radiation emergencies available to you at short notice? How are you bringing scientific and technical expertise into emergency planning decision-making in the event of a major radiation emergency?