

NFLA Policy Briefing No.211



Date: 11th February 2021

Subject: Joint NGO response to the House of Lords Risk Assessment and Risk Planning Select Committee inquiry considering the risks of a nuclear incident

1. Introduction and background to the Select Committee inquiry

The NFLA Secretariat has engaged with a number of other non-governmental groups (NGOs) who attend a nuclear policy stakeholder forum with the Office for Nuclear Regulation (ONR NGO Forum) to jointly respond to a House of Lords Risk Assessment and Risk Planning Select Committee inquiry. The Select Committee is considering “risk assessment and risk planning in the context of disruptive national hazards”. The scope of the inquiry can be found at this weblink: <https://committees.parliament.uk/call-for-evidence/339/risk-assessment-and-risk-planning/>

A central question for the Committee is how to ensure that the UK is as resilient to extreme risks and emergencies as possible. The Committee notes that the UK is at risk from a variety of events which could cause significant human, economic, environmental and infrastructure damage. The coronavirus pandemic has also led to renewed focus on risk planning and preparedness, and the importance of international co-operation. The Select Committee inquiry provides a key opportunity to scrutinise how well the UK public process assesses, categorises and plans for extreme risks, and how to ensure the country and the systems we rely on are as resilient as possible.

Whilst there will be a wide response to the 12 specific questions asking within this inquiry, the joint comments made by NGO members of the ONR NGO Forum is focusing on the risks that arise from the existing Sizewell B nuclear reactor and the proposed Sizewell C nuclear development. Both provide an excellent case study by which to look at the national response to risk assessment and risk planning. Sizewell B is the most recently built nuclear reactor in the UK, and will be the last of the current fleet of UK nuclear reactors to be decommissioned, whilst Sizewell C is about to be considered in a public inquiry by the National Planning Inspectorate, and remains a controversial, complicated and potentially expensive new development to be created.

The authors and the list of supporting groups this NFLA / NGO response can be found at the end of this Policy Briefing.

2. Financial and corporate risks from the Sizewell reactors

Sizewell B (SZB) was ordered by CEGB in 1987, having been approved by the Secretary of State following the extensive Layfield public enquiry. It first operated by Nuclear Electric in 1995, at a final cost believed to be 135% of budget. (1)

The principle of a further Nuclear Power programme was though contrary to the recommendations made to [an earlier Labour] government by the 1976 Flowers Royal Commission report, (2) in particular this specific recommendation on radioactive wastes :” There should be no commitment to a large programme of nuclear fission power until it has been demonstrated beyond reasonable doubt that a method exists to ensure the safe containment of long-lived, highly radioactive waste for the indefinite future (page181, paragraph 338).

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Lord Hinton, who led the build of the Sellafield site, and was the first head of the nationalised electricity supply industry (CEGB), told a Lords debate on the Flowers report “The Commission [Sixth Report of the Royal Commission on Environmental Pollution on Nuclear Power and the Environment (Cmnd.6618)] is right in criticising atomic energy organisations for being dilatory in devising safe methods of disposing of fission products.”(Lords Hansard, 22 December 1976, <https://api.parliament.uk/historic-hansard/lords/1976/dec/22/nuclear-power-and-the-environment>)

Subsequently the privatised Nuclear Electric was split off and was partially taken over by British Energy who took on the operation of the Sizewell PWR, all AGR reactors and one coal fired power station. Meanwhile, Nuclear Electric purchased a large tract of additional land around the Sizewell complex and claimed it would be only an environmental buffer. In due course British Energy was taken over by the French publicly owned firm EDF in 2008 and rebranded as EDF in 2010.

EDF are in debt in France to the tune of around 40 billion Euros and are currently trying to split off their nuclear division from their successful renewable energy division. EDF's French finances (3) are also hit by their failure to complete the pilot European Pressurised Water (EPR) reactor project at Flamanville, amidst difficulties with castings at its Le Creusot factory and a forced takeover of the reactor maker Areva (which was on the verge of financial collapse). The film “the Nuclear Trap” exposes the extensive financial problems of EDF France and the technical problems with the EPR reactor.

Added to these issues is the huge cost to EDF of completing the Hinkley Point C new nuclear reactor in Somerset, the refurbishing the French fleet of over 59 domestic nuclear reactors and the prospect of a huge nuclear decommissioning and radioactive waste management bill. Given these extensive financial challenges, EDF have publicly stated they would not build a Sizewell C reactor on their own and would require other financial arrangements to be made. The financing and proper allocation of liabilities for nuclear new build, spent fuel and decommissioning are highly complex and could lead to huge extra cost to the public purse over future years if the UK Government decides to fund part of the development. It should be noted that previous plans for up to 2 PWRs at Sizewell were abandoned in 1996 following an energy review, as was a plan for PWRs at Hinkley C.

3. Decommissioning costs and challenges

Currently the UK Nuclear Liabilities fund (4) holds around £9 billion specifically for EDF reactor decommissioning and spent fuel management for Sizewell B. There is however a UK shortfall in decommissioning finance of around £20billion, for which EDF is believed to be liable. A view held by UK Government BEIS officers that new build was essential to fund decommissioning is almost laughable to NGOs.(5) A number of the EDF UK AGR fleet will shortly cease operation further reducing EDF nuclear generation income.(3) Potentially the cost of managing the AGR spent fuel could be added to the NDA liabilities for decommissioning of Magnox and Dounreay and Sellafield.

4. Risk to the National Grid

The SZB station generally operates at 1200 megawatts but during the lockdown brought about by the Covid-19 pandemic in Spring 2020 it was decided by the National Grid that it should operate at half power on one of its two turbines. The request from the National Grid was made in order to avoid grid instability. Energy Ministers and the nuclear industry often refer to a need for firm baseload electricity which is unproven and contrary to the advice of the former Chief Executive of National Grid.

The main Sizewell 400kv grid lines could be carrying power from 3 wind farms, up to 4.4 GW from nuclear power and it also could link to a hypothetical offshore ring main or interconnectors. Risking major power cuts if there is damage to these gridlines, which cannot be protected from malicious acts or accident is a real possibility. Back-up power from the grid is needed for nuclear for longer term safety, alongside emergency diesel generation - all of this power was lost at Fukushima during the major accident that affected these Japanese reactors in 2011. The integrity of the National Grid would appear to merit a separate risk assessment.

Operation at half power is contrary to standing advice from Office of Nuclear Regulation as it risks damage to the reactor. The EPR reactor may not be able to run at half power as it only has one turbine. Operation of inflexible nuclear plant potentially conflicts with a smart electricity network dominated by far cheaper renewable generation from other operators, communities and individuals.

5. Flood risks now and into the future

Sizewell B and the redundant and defueled Sizewell A site are serviced by the public highway which is in flood zone 3. Following the Fukushima nuclear disaster, specific attention was paid to flood risk. Yet the proposed new Sizewell C site is partly in flood zone 3 and would probably require another site access for safety reasons. However, an access road was rejected by the previous Sizewell B Layfield Inquiry as being extremely damaging to the Suffolk Coast and Heaths AONB, SSSI and Ramsar sites. The nuclear industry admits that Sizewell C would require flood protection for up to 200 years in order to protect the storage of spent nuclear fuel. A proposed extension of the operational lifetime of Sizewell B will also have to consider the lifetime of storage of spent fuel. National policy EN6 (which is now out of date) still includes four sites prone to flood risk, three of which are on the North Sea Coast (Hartlepool, Sizewell and Bradwell).

6. Spent Fuel

Spent Magnox fuel for Sizewell A was wet stored and sent by rail to Sellafield for reprocessing. A final store for intermediate level radioactive waste is not yet available in the UK. A new process has begun but it could be many years before it comes to fruition and it remains a possibility it will not be successful.

Both Sizewell B and a notional Sizewell C would store spent nuclear fuel in dry casks in a conventionally constructed store which relies on passive cooling and which may be affected by climate change. No reprocessing of Sizewell B spent fuel was ever envisaged. The integrity of the dry cask is anticipated to be 25 years by the US manufacturer Holtec.

The UK's first Dry Fuel store (DFS) at Sizewell B was required due to fuel pond storage problems and was constructed in 2014 following a stringent ONR safety case and was built at the highest ground level on the Sizewell complex. Sizewell C could be constructed on a higher platform than Sizewell B, but would then be significantly lower than the SZB DFS. The DFS for SZC is envisaged to be built at the same platform height as the plant itself. If constructed SZC would have to be protected by sea defences up to 14 metres and sited nearer to the North Sea than anticipated for either Sizewell A or B, whilst leaving the surrounding area and SZB and SZA unprotected. A similar situation arises at HPC where flood risk to local villages has also been increased. EDF are on record as stating they do not accept liability for increased flood risk around Hinkley.

No details of how spent fuel will be removed from SZB, nor its final destination, have ever been provided. The liability for the cost of spent fuel management and final "disposal" is again a responsibility of EDF. (9) The liability for spent fuel and decommissioning for EPR is not yet clarified for SZC although it should be the responsibility of the investor/operator. The risk that high burn up spent fuel (7) will add to an already growing stockpile of spent fuel has not been addressed. Extremely concerning is this statement from ONR regarding long term storage included in the 415 outstanding assessment findings on the UK EPR - AF-UKEPR-RW-010:

"The licensee shall produce a safety report for the long-term storage of spent fuel. The report will contain information at least equivalent to that of a Preliminary Safety Case as defined in Guidance on the Purpose, Scope and Content of Nuclear Safety Cases."

If there has been no agreed study into long-term storage how can there be a fully funded Spent fuel and Decommissioning fund set aside prior to Site Licencing, or in place to advise a Final Investment Decision?

Similarly, the Magnox station Sizewell A owned by Nuclear Decommissioning Authority cannot be dismantled because of the highly radioactive core and the absence of a disposal option. Despite this the out of date EN6 (11) states: "Geological disposal of higher activity waste from new nuclear power stations is currently expected to be available for new build waste from around

2130". Clearly there is a major risk that a suitable disposal site will never be found. Disposal may not be an option thus adding considerably to the financial cost over future years.

7. Sellafield

Observations in reference to risk assessment and risk planning from Sellafield include:

7.1 Management of High-Level Radioactive Waste

Reprocessing at Sellafield has generated large quantities of High-Level Liquid radioactive waste. Concentrated Liquid HLW is stored in steel tanks on site prior to vitrification in glass blocks. It generates its own heat and so must be constantly cooled.

Risks relate to boiling and consequent atmospheric radioactive discharges due failure of the cooling system, and vulnerability to terrorist attack or accidental impact. The severity level could be catastrophic (Assessing the risk of terrorist attacks on nuclear facilities, Parliament Office of Science and Technology Report 222, July 2004).

7.2 Continued radioactive discharges to Irish Sea

The B205 Magnox Reprocessing Plant discharges radioactive substances to the Irish Sea – perhaps until 2028, yet continues to operate, contrary to the UK Government's commitment under OSPAR to bring discharges to zero by 2020.

The widespread contamination of the Irish Sea with Cs-137 and of the entire groundwater under the plant, the history of discharges thanks to reprocessing, the resulting controversy over the Seascale leukaemia clusters in the 1980s and the fact that the NDA are resuming their contamination of the Irish Sea by reprocessing the remaining Magnox fuel instead of dry storing it all remain of concern.

The consequences of adding to the alpha content in the Irish Sea through plutonium and uranium in the discharges is unknown but is clearly returning to shore as evidenced by the small particles of plutonium found in some of the public's vacuum cleaner bags in the 1980s and the Groundhog machines attempting - and largely failing – to clean up 'hot particles' on the beaches. If this inquiry is about risk, then the low-level radiation issue is entirely about that subject – it is full of unknowns about which the authorities are aware, but it has in recent years resulted in stonewalling by the public health regulators and the Committee on Medical Aspects of Radiation in the Environment (COMARE) in particular.

Currently there are proposals under consideration in West Cumbria to build:

- a coal mine under the Irish Sea, only a few km north of the Sellafield plant,
- an early policy process has begun to potentially host a deep underground radioactive waste repository (often known as a Geological Disposal Facility or GDF) for high and intermediate level nuclear waste into the Irish Sea up to 12 km from the West Cumbria coast.

In both cases, risks relate to increased levels of radioactivity in the marine environment due to

- continued discharges,
- dispersion due to disturbance, and
- in a severe case, from seismic events, which do occur in this region.

8. Fluvial flooding risk for Sizewell

The local fluvial catchment is very vulnerable to sea level rise and high rainfall. Risking a potential impact on the sewage works for the town of Leiston and a risk to public health.

9. Cooling water systems

The cooling water system on Sizewell B destroys fish and introduces heat and diluted chemicals to the fragile marine environment. Around 60% of the reactor thermal output goes back to the marine environment. The outflow of SZC is expected to be equivalent to that of the largest river systems like the Tweed, greater than the Thames, indicating a dramatic impact on Coastal process. The hugely powerful SZC or any other reactors would add significantly to this problem adding to the risk of harm to Red data book bird and marine species. The risk to the environment from 10-12 years of construction in a quiet and peaceful area cannot be mitigated and is contrary

to the 25 year Environment Plan.(10) Temperature rise of cooling waters reduces the efficiency of all Thermal plant including Nuclear which also has an upper limit 26 degrees beyond which the reactor cannot be operated.

Town water demand for a PWR is considerable in this area of water stress as declared by the Environment Agency. Demand and source of water for any SZC is unknown. Potential risk remains to currently licensed groundwater extraction by agriculture and RSPB Minsmere.

10. Emergency Planning

The detailed emergency planning zone (DEPZ) for Sizewell B declared by the operator and endorsed by the Suffolk County Council is 1.35 kms in radius. This is contrary to an International Atomic Energy Agency (IAEA) recommendation for a PWR which is 3-4 kms and to public comments made by UK Government BEIS officers (11) and a recommendation by the Office of Nuclear Regulation. (12) The town of Leiston, which is part of the Leiston-cum-Sizewell parish has a population of around 7,000. The current first stage emergency plan covers around just 200 residents. Continued housing growth in the Outer protection zone of up to 30 kms continues unabated without the necessary public consultation. The risks and consequences of nuclear accidents are generally underestimated and, as indicated at Fukushima, the contamination zone is far wider than can be conceivably covered by any emergency plan. Contamination is clearly an unknown depending on severity of accident, prevailing wind and weather patterns. The situation at Fukushima is still unresolved 9 years after the event.

Additional comments from a former emergency planner further emphasises this point as follows: "Such a small evacuation zone goes against the learning points that come out of the 2011 Fukushima disaster. The rural nature of the area around Sizewell B includes a limited road network. In the event of an accident or malicious attack on the Sizewell B reactor there is likely to be the potential for the local population to self-evacuate, clogging up those roads and preventing emergency service and Council ingress and egress to the site.

A larger DEPZ area would bring in more local people who could be pro-actively involved in a more controlled evacuation process amidst a greater level of understanding of the local emergency plan for the site. It is disappointing the Council has ignored the advice given by the IAEA, BEIS and ONR staff over the appropriate size of the emergency planning zone, particularly in excluding Leiston from this area. Emergency planning works much better with an educated local community aware of the risks and ready to take on board the advice of the emergency agencies, particularly for something as serious as a nuclear accident."

In France the authorities in a radius up to 20 kms around nuclear power stations have adopted the "I know what to do" principle and pre-distribute Potassium Iodate tablets and information to all residents.

11. Nuclear Regulation

Nuclear regulators are bound to work to support the industries they regulate by the Regulators Code. (13) This is contrary to EU Directive 2014/87 (14) Which demands wholly independent regulation. The EPR is being constructed at HPC despite 415 regulatory issues (known as Assessment findings) still remaining. The content of the assessment findings list (which can be made available) will no doubt lead to further risk issues.

There is also a risk that Regulators views are not fully taken into account during the planning process which limits debate to 6 months. Site licencing and other licences and permits may take 2 years to conclude meaning that the Secretary of State planning decision is not fully advised by regulators. This situation is made worse by developers changing plans and introducing late data during the planning process.

12. Radiation impacts

Continuing knowledge about the impacts of low-level radiation continue to accrue. What can we do with research findings which challenge the underpinning evidence used at the time the decision was made? In addition to those already known about it is now recognised that young children under the age of 5 living within 5 kms of nuclear installations are twice at risk of developing

leukaemias (KiKK study 2008); and women are much more susceptible to radiation impacts (BEIR VII, study 2007); and work by Mary Olson, 2010, presentation to Low Level Radiation and Health conference, Stirling University, July 2018. Females are more harmed by radiation, particularly when exposed as young girls than is predicted by use of Reference Man; the difference is as much as 10-fold. Since females have been ignored in regulatory analysis, this has resulted in systematic under-reporting of harm from ionizing radiation exposure in the global population.

KiKK, 2008, study, Germany: The main finding was an increased risk of leukemia in children less than five years of age with decreasing distance from a NPP. Kaatsch P, Spix C, Schulze-Rath R, Schmiedel S, and Blettner M, 2008. Leukaemia in young children in the vicinity of German nuclear power plants. *International Journal of Cancer* 122(4): 721-726.

(See Olson, Mary, 2019, Disproportionate impact of radiation and radiation regulation, Gender and Radiation Impact Project, Asheville, NC 28806, USA, *Interdisciplinary Science Reviews*, VOL. 44, NO. 2, 131–139; <https://doi.org/10.1080/03080188.2019.1603864>

Presentation at Low Level Radiation and Health Conference, University of Stirling, July 2018; Gender Matters in the Atomic Age, Mary Olson, US Nuclear Information + Resource Service, NIRS. <https://youtu.be/0IABP90CqQ4>).

This response has been developed by Mike Taylor and Pete Wilkinson for the group Together Against Sizewell C (TASC), 13th January 2021.

Additional Information was provided by Ruth Balogh, Dr. David Lowry, NFLA Secretary Sean Morris and Dr. Jill Sutcliffe.

The response was submitted on behalf of, and the approval of the following groups that attend the ONR NGO Forum and the BEIS NGO Forum:

Blackwater Against New Nuclear Group (BANNG); Parents Concerned About Hinkley (PCAH); Stop Hinkley; Cumbria Trust; Cumbrians Opposed to a Radioactive Environment (CORE); Ayrshire Radiation Monitoring Group (ARM); People Against Wylfa B (PAWB); West Cumbria and North Lakes Friends of the Earth; the Low Level Radiation and Health Conference; the Nuclear Consulting Group; Nuclear Free Local Authorities (NFLA); Nuclear Waste Advisory Associates (NWAA); the Low-Level Radiation Campaign (LLRC); Greenpeace; Radiation Free Lakeland; Friends of the Earth Nuclear Network; the Shut-down Sizewell Campaign; Together against Sizewell C (TASC); Stop Sizewell C / Theberton and Eastbridge Action Group on Sizewell, Highlands Against Nuclear Transport.

The response was sent in prior to the Select Committee deadline of January 28th, 2021.

13. References

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