



# Together Against Sizewell C

TOGETHER AGAINST SIZEWELL C (TASC) WRITTEN REPRESENTATION

SIZEWELL C PLANNING APPLICATION INQUIRY (IP no. 20026424)

## EMERGENCY PLANNING

**Summary:** This report was written by **Mike Taylor and Pete Wilkinson** and explores the ineffectiveness of the existing plans to deal with a radiological emergency at the Sizewell site, the additional complications posed by the building of a new twin-reactor development next to an operating reactor (Sizewell B) which will require a large on-site workforce of over 4,000, an increasing population in the town of Leiston and an inadequate road system unlikely to be capable of accommodating a mass evacuation.

April 2021

1. This document is submitted to the Planning Inspectorate in respect of **EMERGENCY PLANNING** arrangements for the evacuation of residents of Leiston and surrounding areas in the event of a major off-site release of radioactivity from the Sizewell site. It is our contention that the plans would be largely ineffective at protecting the population in that area as the assumption that thousands of residents could be evacuated from the area in time to avoid contamination is simply implausible. Moreover, the much hotter and more radioactive nature of the spent fuel which would be generated at the proposed Sizewell C plant would exacerbate an already precarious safety situation and lead to a more urgent need to undertake an evacuation. TASC believes that to build twin EPRs on the edge of a town of 5,500 inhabitants with more houses scheduled to be built and population density to be increased is irresponsible. The inadequacy of the emergency plan compounds the inadvisability of this unthinkable proposal.

### Accidents happen

2. Nuclear reactors generate huge amounts of heat and radioactivity within their cores as the uranium fuel rods undergo neutron bombardment to hasten the fission process. The radioactivity is contained inside a pressure vessel which is cooled, in the case of Sizewell B and the proposed Sizewell C, by water. In the event that the supply of coolant is interrupted or lost (known as a LOCA – loss of coolant accident), the core of the reactor will heat quickly and a breach of containment becomes a remote but potentially catastrophic possibility. Measures incorporated in the reactor are designed to ensure that a LOCA does not occur and, if it does, back-up measures restrict the consequences. Emergency cooling is provided in the event of a LOCA, for example. In extremis, should the core completely melt, a ‘China Syndrome’ event (in which the core melts its way through the reactor containment and continues to melt its way into

the earth ‘towards China’), is theoretically averted by the incorporation of a ‘core catcher’, ostensibly to prevent such an outcome. However, while the core catcher has yet to prove its effectiveness in an actual emergency, doubts have been cast on the effectiveness of the emergency cooling systems using water. In his book, ‘How Safe Is Nuclear Energy’<sup>1</sup>, Sir Alan Cottrell, FRS, argues that, ‘Water is only a good coolant so long as it remains liquid’, referring to the fact that as water enters the reactor core, the intense heat can immediately cause it to flash to steam. The author goes on to say, however, that, ‘Most, but not all, of independent experts have accepted that this (provision of emergency cooling water) provides an adequate level of safety.’ It is, nonetheless, disconcerting that this statement indicates that while most experts take comfort in the emergency cooling system, some clearly do not share that confidence.

3. Serious accidents at nuclear power stations are thankfully rare, although those of a less serious nature are more common than most would think. There have been 33 registered accidents<sup>2</sup> since 1952 although the actual number of all accidents including those which do not necessarily qualify for an International Nuclear and Radiological Event Scale (INES) allocation is thought to be far higher. Nuclear accidents such as those at Three Mile Island, Chernobyl and Fukushima have demonstrated the potential for nuclear plants to be at risk of ‘low probability, high consequence’ events and it is important to appreciate that all such major incidents have been the results of unforeseen circumstances – i.e. they are not preventable. The same will be true of the next nuclear accident.
4. The impact on human health of these accidents is subject to heated debate, claim and counter-claim for the simple reason that the effect on health from exposure to even very low levels of radioactivity remain unknown and is still, after more than 70 years, based on flawed information obtained from the examination of the Hiroshima and Nagasaki nuclear bomb survivors. The principle of ‘low dose, low health impact’ has long been discredited but remains the principle on which all exposure rates are based while the historic belief that ‘dose and risk’ are linked in a threshold linear manner have been shown to be false.
5. Emergency planning around nuclear plants only comes into focus should we assume that there is a possibility or likelihood of a significant leak or release of radioactivity through accident or malicious act and that we can predict the impact of such a release based on the presumption that the risk to health is of a ‘linear no threshold’ nature. In most nuclear site settings, a further assumption is that the more-often-than-not poor transport infrastructure normally found in remote sites they are situated for obvious reasons (i.e. the risk should be posed to a smaller number of people) will be nonetheless adequate to ensure the smooth evacuation of the threatened population.
6. The variables which impinge on accident scenarios involving nuclear plants are therefore many: the perceived safety of the operating reactor, the efficacy of the emergency measures to control nuclear events on site, the nature of any release from

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<sup>1</sup> <https://journals.sagepub.com/doi/10.1177/004711788200700316>

<sup>2</sup> <https://www.theguardian.com/news/datablog/2011/mar/14/nuclear-power-plant-accidents-list-rank>

the site, the volume of the radioactivity released, the radionuclides involved, the weather at the time of the release in terms of wind direction and deposition patterns, the size of the exposed population and the ability to evacuate that population. All such considerations are elements of a responsible and effective means of protecting host nuclear communities in an emergency plan. But the fact is that the way in which the plan is arrived at, the decision-making structure which supports it, the plan itself and the assumptions that underpin it, all have flaws and in the arena of public protection such a situation is unacceptable. The bald truth is that, in a major off-site release of radioactivity situation, the emergency plan for Sizewell and for most other nuclear facilities are not fit for purpose, if the purpose is to protect a vulnerable population from the effects of whole body and internal exposure to nuclear radioactivity: it is simply not possible to evacuate the existing population of the immediate area to safety without a high proportion of them suffering exposure to radiation.

### **The Sizewell situation:**

7. Sizewell is the only proposed new build site in the country which, if approved, will be constructed over a 12+ year period on a site occupied by an operating reactor (Sizewell B) and another undergoing the process of decommissioning (Sizewell A). Quite apart from the estimated 770 full time and contract workers on site at any time working at Sizewell B and the smaller number working on the A plant, housing projects in Leiston itself are burgeoning, increasing the number of people vulnerable to the effects of an accident. The additional 4 – 5,000 workers expected to be recruited for the construction phase of Sizewell C, should it go ahead, will almost double the number of people at risk for the duration of the 12+ years of building. The task of evacuating five thousand Leiston residents is already something that many believe is beyond the capabilities of the authorities: evacuating nearly double that number is an impossibility.
8. Sizewell B has a 1.35 km inner Detailed Emergency Planning zone (DEPZ) based on the EDF hazard report and endorsed by Suffolk County Council/ Suffolk Resilience forum<sup>3</sup> with an outer 3-4 kms DEPZ including Leiston. Only residents in the inner DEPZ are issued with stable iodine tablets designed to block iodine 131 from finding its way into the thyroid gland.
9. Both the International Atomic Energy Agency (IAEA) and the Department of Business Energy and Industrial Strategy (BEIS) recommend a DEPZ of 3-4 kms, which would include Leiston and Aldringham, both of which lie in the IP16 post code area as proposed in the Approved Code Of Practice guidance report, Radiation (Emergency Preparedness and Public Information) Regulations 2019 Approved Code of Practice and guidance<sup>4</sup>, to which it appears the current Sizewell emergency plan may not fully conform or is anomalous in the following ways:

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<sup>3</sup> [https://www.suffolkresilience.com/uploads/new\\_PUBLIC\\_-\\_SRF\\_Radiation\\_Emergency\\_Plan\\_-\\_Issue\\_4\\_-\\_Nov\\_2020\\_-\\_final.pdf](https://www.suffolkresilience.com/uploads/new_PUBLIC_-_SRF_Radiation_Emergency_Plan_-_Issue_4_-_Nov_2020_-_final.pdf)

<sup>4</sup> <http://www.onr.org.uk/documents/2020/reppir-2019-acop.pdf>

10. Planning for up to 30 kms Outline Planning Zone is believed to not have been publicly consulted on and nor has the mini DEPZ identified for immediately vulnerable people within the 30 kms OPZ.
11. Theberton, Eastbridge and Thorpeness are not included along with RSPB Minsmere, National Trust Dunwich and caravans and holiday chalets (i.e. structures which do not have sufficiently robust construction) within the 3-4kms zone.
12. Unlike Sizewell, Hinkley B has a DEPZ of 3.5kms. The supposedly less hazardous AGR/Magnox reactor therefore has a wider DEPZ than the Sizewell B PWR.
13. Sizewell B is the only site in the UK with a dedicated offsite Emergency Response Centre (ERC) 1km from site, equipped with emergency vehicles, shovels, pumps, all-terrain vehicles and links to offsite control of SZB potentially via satellite. The ERC was established as a result of the Japanese Earthquake programme response to the Fukushima disaster in 2011. The ERC was required, according to the authorities, because a major fault on a PWR has a 4 hour rectification window, compared to a 12 hours window for an AGR. However, the full deployability of personnel including Large Goods Vehicle licenced drivers and readiness of the Emergency Response Centre is not an ONR site licence condition. Does this also apply to the proposed SZC?
14. Have all Japanese Earthquake Response requirements for been SZB been carried out, including improved flood doors, and does this also apply to Sizewell C?
15. Will there be an increased flood risk to Sizewell B created by the raising of the Sizewell C site platform and disturbance of northern mound and other defence features related to SZB?
  - a. Suffolk County Council's Sizewell evacuation plan (VECTOS 2013<sup>5</sup>) did not allow for additional increased housing growth in Leiston. It also ignored housing growth on evacuation routes, particularly in nearby Saxmundham. The validity of this report has been checked with Suffolk Emergency Planner who confirms that the report was updated in 2020 and now includes consented development or planned developments within the Leiston Neighbourhood plan<sup>6</sup>. The report indicates that all emergency planning routes end at their respective junctions with the A12 such that the Park and Ride sites may conflict with speedy evacuation and relies on the A12 not being blocked or having excessive traffic. Previously, all development within an area up to 8kms from a nuclear power station was expected to be strictly controlled by the Health and Safety Executive (HSE). The Planning Authority appears to ignore this guidance, as was a letter sent from TASC to the Suffolk Coastal District Council (now East Suffolk Council) Local Plan review.
16. East Suffolk Council Planning Authority made comments to BEIS on the revised EN6 National Policy Statement (NPS) consultation. As members of New Nuclear Local Authority Group, their comments included "Demographics assessment: Some nominated NNB sites are located in or relatively near to populated areas. The BEIS consultation document does not seem clear that it will take account of planned growth in the areas surrounding sites nominated for NNB up to 2035. It is important that BEIS contact relevant combined/ local authorities in the areas surrounding NNB nominated sites to ensure that projected population growth is taken into account in the

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<sup>5</sup> <file:///E:/Documents/VECTOS%20report%20from%20SCC.pdf> The

<sup>6</sup> [Sizewell Evacuation Assessment - SZC Update 2020 VECTOS.pdf](#)

demographics assessment. In addition, we request that the demographic assessment is explained in plain English and Welsh so that people in affected areas can understand how relevant conclusions have been reached. Additionally, operating nuclear power stations will need to meet the demographic test throughout their lifetime. *We would not wish to see constraints on future growth resulting from new nuclear developments.* (Emphasis added).”

17. TASC attempts to determine the restraints which population growth in an area adjacent to a nuclear development confers on the authorities to impose has met with delayed responses to inquiries. When a response has finally been forthcoming from the ONR, it has proved to be largely indecipherable. The extract of a reply to a Freedom of Information request referenced below at <sup>7,8</sup> was offered to TASC as a response to its inquiry about the population concentration in an area which would be affected by a major off-site incident in terms of the number of homes being built in that area, the growth in population it represented, the ability to safely and quickly evacuate an increased number of people and to ensure that facilities for such an evacuation were demonstrably available. We attach a reference at the foot of the page in the hope that PINS can extricate the answer to this vitally important issue on which could hang the future wellbeing, safety and livelihoods of hundreds if not thousands of individuals.
18. Workers on SZC site and adjacent hostel accommodation would be subject to the existing SZB emergency plan and a peak workforce assumed to be in 2027 is accounted for in the updated VECTOS plan (Note that EDF are planning to increase the workforce at Hinkley to 8000 because of delays in the project).
19. Residents in the area around SZC development voice concern that if SZB has an incident leading to the subsequent evacuation of thousands of workers from SZC combined with those from SZB, the inadequate road systems that lead to the only trunk road, the A12, would rapidly be blocked with vehicles. Access to the site for the emergency services would be compromised as would egress for residents of Leiston and adjacent areas. A credible emergency plan for the overall site at the height of the build should be forthcoming.
20. Any SZC emergency plan only comes into force when fuel is loaded.
21. The Atomic Weapons Establishment (AWE) and West Berkshire court case against a housing developer regarding the extension to 3.16 km of the relevant DEPZ may be a precedent, raising concerns that prudence is over-ridden by the drive for profits<sup>9</sup>.

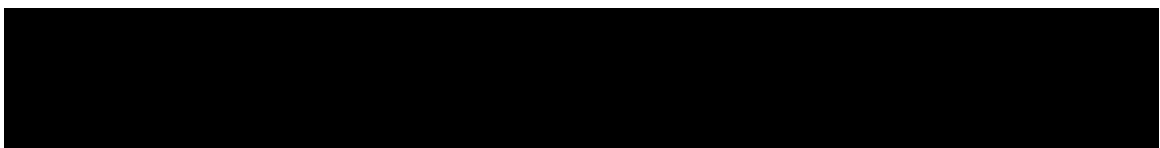
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<sup>7</sup> Extract from ONR reply to FOI is as follows: I can confirm that under Section 11 of the FOIA we do hold some of the information requested. Please find a response to each of your questions in turn below. 1. Demographics information, for example that used to determine the offsite emergency arrangements. The information you requested is available on the March 2018 update to the Residential Layer on the National Population Database <https://npdportal-hslab.hub.arcgis.com/>

<sup>8</sup> Reply from FOI cont'd: 2. Details of how to access the database can be found on the Health and Safety Executive Science and Research Centre <https://www.hsl.gov.uk/what-we-do/data-analytics/national-population-database>

3. This data is still suitable for use in the subsequent Sizewell C (SZC) assessment.

<sup>9</sup> [Council defeats legal challenge to introduction of detailed emergency planning zone around nuclear weapons site \(localgovernmentlawyer.co.uk\)](https://www.localgovernmentlawyer.co.uk/council-defeats-legal-challenge-to-introduction-of-detailed-emergency-planning-zone-around-nuclear-weapons-site/)



22. A major accident or malicious attack on Sizewell B resulting in a major off-site release of radioactivity would be catastrophic for the East Suffolk area and beyond. Such an incident focused on Sizewell C would be of greater consequence as the fuel in the EPR is designed to remain in the core for longer periods in order to increase the amount of heat generated and consequently the amount of electricity the plant produces. This longer 'burn up' time has the effect of reducing the volume of waste created but increases the heat and the radioactivity. More radioactivity in the core means a more significant impact as a consequence of an accidental or deliberate release.
23. In cases where a catastrophic release of radioactivity occurs, as happened at Fukushima or Chernobyl, the concept of DEPZs or Outline Planning Zones becomes entirely redundant, as does the availability of stable iodine tablets to ensure a protected thyroid gland in those exposed. Radioactivity in the form of a cloud would travel in the direction of the prevailing wind, settling out in a deposition pattern dictated by the weather, the time of year and other climatic conditions. Depending on the origin of the accident, the cloud would contain traces of most – if not all – of the 200 decay products of uranium, some of which become harmless in seconds, others which remain deadly to living organisms for weeks, months, years, decades or even millennia. Most of these nuclear by-products are harmful to health: it is widely accepted that 'there is no safe dose of radioactivity.'
24. Certain radionuclides seek out different organs in the body in a process called bio-accumulation. Radioactive material which emits alpha particulates – energetic but weak rays with long 'half-lives'<sup>10</sup> – are of particular concern since, if inhaled or ingested and not expelled by the body, they can transfer their energy to a small number or even a single cell and cause it to mutate. This process flies in the face of the principle of 'linear no threshold' which assumes linearity between dose and effect insofar as a tiny dose as represented by a miniscule alpha-emitting particle can have disproportionate effects on health. This phenomenon is still poorly understood and one which authority is reluctant to debate with its critics, but has a manifestation in the fact that, in the aftermath of many radiological exposure incidents – notably Chernobyl – the post-event health impacts from such events, from cancers to genetic malformations and other non-fatal effects, far exceed the cases predicted by the linear no threshold principle.
25. It is not only direct health impacts that are likely to accrue in the event of a major off-site release of radioactivity from a nuclear plant. Land will be contaminated, possibly for decades or longer. Homes may have to be evacuated and remain empty for similar periods of time. An accident could have serious and long-lasting socio-economic impacts which could cripple the working environment of a large swathe of East Suffolk.

## CONCLUSIONS

26. By comparison with other countries EMERGENCY PLANNING in the UK is considered inadequate, including in France where all residents living within 20 kms of a nuclear plant have access to Potassium Iodate tablets and agree to a policy which ensures that vulnerable communities and individuals "know what to do".

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<sup>10</sup> Half-life is the term given to the period of time it takes for half the radioactivity contained in a material to decay. Generally, it is accepted that ten 'half-lives' have to pass before a material can be declared as 'safe'.

27. Emergency plans to deal with a significant off-site nuclear incident are drawn up between the operator (EdF, who makes its own judgement of the ‘maximum credible accident’) the Office of Nuclear Regulation, which reviews the operator’s judgement, and the County Council which then sets the DEPZ boundaries. The emergency plan itself is universally recognised as a placatory more than an effective means of protecting people. The plan relies on assumptions about the conditions which would exist at a time of real anxiety, panic and frantic activity as people search out and recover their children at school, collect other family members and attempt to get out of the area. Roads – already inadequate for any other use than farm and holiday traffic – would quickly become gridlocked with just as many people coming into the area than those leaving. Chaos would reign. People would be exposed to radioactivity with unknown medium and long-term consequences.
28. In the aftermath of the Fukushima disaster, US nationals were instructed to observe a self-imposed 80kms exclusion zone from the stricken site.
29. Extract from NGOs submission to House of Lords risk committee.

### **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 International Atomic Energy Agency recommendation** for a PWR which is 3-4 kms **and contrary to BEIS officers recommendations** (5) and contrary to 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 200 residents. Continued housing growth in the Outer protection zone of up to 30 kms continues unabated without 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 emphasise 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 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 NPS have adopted the “I know what to do” principle and pre-distribute Potassium Iodate tablets and information to all residents.

