**The Sizewell C Project Examination**

**Application by NNB Generation Company (SZC) Limited for an Order Granting Development Consent for The Sizewell C Project**

**Statement of Interest by Professor Andrew Blowers OBE in the Application for Development Consent for Sizewell C New Nuclear Power station**.

This statement of interest is submitted to the Examining Authority setting out broad reasons why the site is not 'potentially suitable' on grounds that it is unsustainable, unmanageable, unacceptable and unsuitable (attached). I attended the Open Floor Hearing 8 on 20 May, 2021 and my comments form the basis of this Written Representation as an Interested Party (No. 20026017).

***Interested Party***

I am Professor Andrew Blowers, BA, M.Litt., FRSA, OBE, Emeritus Professor of Social Sciences (Planning) at the Open University. Relevant experience includes:

- County Councillor, Bedfordshire 1973 – 2001, Chair of Environment Committee and member of County Councils Coalition on Radioactive Waste;
- Member of Government's Radioactive Waste Management Advisory Committee (RWMAC), 1991-2004;
- Member of Committee on Radioactive Waste Management (CoRWM) 2003-2007, when I drafted the final recommendations and also developed the policy on voluntarism for site selection for a Geological Disposal Facility (GDF); I was Chair of the following Working Groups: Principles WG; Ethics WG; WG on Implementation
- Stakeholder Reference Group of siting a Geological Disposal Facility
- Oversight Group on public engagement in new reactor designs
- Community Representation Working Group (CRWG)
- Non-Executive Director of UK Nuclear Industry Radioactive Waste Executive (NIREX), 2000-2004;
- Vice-Chair, Town and Country Planning Association, 1989-95
- Member, Nuclear Waste Advisory Associates since 2007
- presently Co-Chair of BEIS/NGO Nuclear Forum;
- Chair, Blackwater Against New Nuclear Group (BANNG).

I am the author of books and papers on nuclear issues especially geographical, social, political and ethical aspects. My recent book, *The Legacy of Nuclear Power* (Routledge, 2017) covers the issues I shall raise in this submission.

My objection to the proposal for a new nuclear power station at Sizewell can be summarised as follows:

I consider that physical and social conditions at the Sizewell site will become increasingly unpredictable to the point where they are unknowable. Proposals for defending the site against climate change and its effects will be, at best, short

term. In the longer run, and especially during the indefinite period of decommissioning and clean-up, it is impossible to provide unequivocal technical assurance of safety and security in the management of radioactive wastes, including spent fuel. There is the possibility of calamitous risks being passed on to generations in the far future. This may be acceptable to the developer and government, in which case they should say so. It is not acceptable to those, like me, who oppose this development. I believe it is technically improbable and ethically indefensible for the present generations who enjoy the (debatable) benefits to consign the costs to the future which has no voice and no interest in the present proposals.

Therefore, both on pragmatic and ethical grounds, I consider the Sizewell C proposals should be abandoned.

## 1. Objection to the project as a whole

The project should be judged as a whole, not just in its component parts. Government argues that the principle of need for nuclear power is a given and not, therefore, a matter for discussion at this Examination. It is also assumed that the choice of Sizewell as a site is a matter for Government policy and, therefore, out of scope.

I will return to the question of need later. On the question of choice of site, it is true that Sizewell was one of the eight sites designated in the NPS EN-6 for deployment by 2025. However, it is clear the Government's intention is to carry forward the sites listed in the current EN- 6 as the only sites capable of deployment by 2035, subject to 'those sites meeting the strategic criteria as well as demonstrating they are credible for deployment by 2035'. But, it is also the case that the NPS is out of date and under review. The Government was due to consult on a draft list of sites during Spring/Summer 2019 but has not yet done so although the review is anticipated for consultation later this year. Therefore, we are in limbo, at a stage where the Government is considering whether sites should continue to be listed on the basis of each site's assessment against updated strategic siting criteria and updates of their environmental assessments. While it is true that Government continues to give strong in-principle support, it has, so far, stopped short of re-designating the site. Although Sizewell's designation may continue until 2035, it may be that the criteria will be updated during the course of this Examination and can be taken into account. In any event, Sizewell has been designated as a site that is 'potentially suitable' when judged against the strategic criteria. Therefore, the Examining Authority is perfectly at liberty to dismiss the project as a whole on the grounds that it is unsuitable at this site. I would urge you to do so.

Overall, in terms of scale and location, the proposal for SZC is inappropriate. In previous consultation responses BANNG has commented on the impact of the project on its environment. SZC is on a confined site, hemmed in by proximity to SZB to the south, the Suffolk Coast and Heaths AONB and Leiston to the west, the Minsmere RSPB reserve immediately to the north and the North Sea on its

eastern side. The new power station would be a gross intrusion into the landscape and have devastating impacts on habitats, wetlands, and marine environment. There will be a largely negative impact on local communities, in terms of noise, traffic, construction and accommodation. SZC will transform a predominantly tranquil and beautiful area into a substantial industrial complex with consequences for community wellbeing. A nuclear complex also poses radioactive risks from routine operations, the possibility of accidental releases and the potentially catastrophic, if vanishingly small, risk of a major incident affecting a wide surrounding area. In that event it is difficult to conceive of emergency planning procedures being able to deal with the situation.

I do not intend to dwell further on these issues. In any case, these issues are the subject of many detailed and evidenced objections covering a myriad of specific impacts of the project on environments and community wellbeing.

But, I do wish to reiterate that the impact of the project as a whole should be considered as suitable grounds for rejection. There is a natural tendency, with a focus on the many components of the application – bypasses, housing development, habitat impact, mitigation measures and so on – to focus on the parts rather than the whole. Although each is important in its own right, there may be an underlying presumption that by appropriate means of adaptation or mitigation the project will ultimately gain approval. At the end of the day, it may be deemed acceptable to destroy specific landscapes, habitats and heritage provided that proposals observe the need for suitable compensation, remedial measures or the application of 'good design' that, in the words of the NPS, 'should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources…..matched by an appearance that demonstrates good aesthetic as far as possible' (NPS, EN-1, p.50). I would argue that such a piecemeal approach is not acceptable in so far as it may lead to an outcome that is wholly unacceptable. That is why I would claim that the project must be judged as a whole.

***An unviable and unsustainable proposal***

The fundamental objection to the project is that it is unviable and unsustainable. Its presumed contribution to carbon reduction will come at a high cost and too late to make more than a marginal contribution to the net zero carbon target of 2050 and could well have the effect of displacing cheaper, flexible and safer alternative forms of electricity production. But, if SZC is built, it would be committed to producing expensive power for sixty or so years, maintaining an inflexible component in the energy mix. And this unnecessary development - including long-term highly radioactive waste stores - will throughout its lifetime be on a fragile site that is increasingly vulnerable to the impacts of climate change. It is quite possible that the site will become unsustainable whatever measures of adaptation or mitigation are put in place. We simply do not know, indeed cannot know what may occur in the unknowable physical and societal conditions of the next century.

Therefore, it is entirely rational to consider SZC as unlikely to be part of the solution to climate change; rather it is likely to be its victim. I have elaborated this argument in a paper, '*Climate change – hubris or nemesis for nuclear power?*' (attached for reference) using the Sizewell and Bradwell sites as the empirical basis. I consider that it would be entirely reasonable for the Examining Authority to refuse development consent on the basis that the proposal is both unviable and unsustainable.

I intend to substantiate this argument by looking at SZC in the context of the management of radioactive wastes in the era of climate change. The safety of long-term management of radioactive waste tends to be based on assertions and assumptions in conditions of uncertainty, revealing policies and proposals that cannot be validated or justified. In such circumstances of paralysing uncertainty it is safest to assume that if the proposed development is unnecessary then it should not be undertaken. In any event it is necessary to give close examination and scrutiny of the issue.

## 2. SZC and Climate Change

### *The impact of SZC on climate change*

Whilst it is axiomatic that the need for new nuclear as a commitment of UK government policy is not the subject of this Examination, it is the case that the Examining Authority has questioned the contribution of SZC to the goal of net zero by 2050. In a series of questions to the Applicant the Authority asks how the claim that SZC has a 'significantly beneficial impact' on displacement of GHG emissions can be upheld when compared to the future mix of alternative generation, given that the first 6 years of operation from 2035 would be needed to offset emissions from construction (ExQ1: 21 April 2021, Climate Change and Resilience, CC 1.9). At best SZC will only provide a contribution from 2040 onwards equating to 3% of total sector emissions (APP-342 6.3, Vol. 2, Ch. 26 Climate Change) but that would be at the detriment of an equivalent benefit from alternative energy sources. While the detail is of interest, the principle that SZC may in the long term provide no benefit and could eventually prove an unwanted burden within the energy mix, indicates that SZC cannot be justified. If there is no benefit, then the costs and risks of sustaining the power station and its nuclear waste stores cannot be justified. This point appears to have been appreciated by the Examining Authority.

### *The impact of climate change on SZC: 1. operational phase until end of century*

Of much greater significance will be the impact of climate change on SZC. Under the Paris Accords of 2015 it is aimed to contain global warming to well below $2^{o}C$ and preferably as low as $1.5^{0}C$ above pre-industrial levels by the end of this century. Even if this is achieved, a global rise in sea-level of around 1 metre may occur, though estimates vary. If present trends continue, a level of $3^{0}C$ or even $4^{0}C$ is possible with concomitant sea-level rise (SLR), possibly in the region of 1.5

metres. One study that includes ice sheet contributions to SLR indicates that a high though by no means improbable global warming of $5^0$C could lead to a 2m. rise in sea-levels by 2100 (Bamber et al., 2019). The impacts of such rises in terms of flooding, storm surges and coastal processes are uncertain and, according to UKCP18, 'we don't yet know whether storm surges will become more severe, less severe or remain the same' (UKCP18, 2018, p.2). The point is that such changes are within the realm of possibility and the Environment Agency (EA) is urging that we prepare for a $2^0$C rise but plan for $4^0$C. But, it is unclear what the maximum credible SLR could be by the end of the century.

The EA's advice on the Sizewell site's suitability in the face of SLR and effects of climate change are provisional and equivocal. It makes the following statement in NPS EN-6:

'The Environment Agency has advised that it is reasonable to conclude that a nuclear power station within the site could potentially be protected against flood risks throughout its lifetime, including the potential effects of climate change, storm surge and tsunami, taking into account possible countermeasures' (pp. 173-4).

As early as 2009, the Institute of Mechanical Engineers, pointed out that coastal sites in East Anglia would need big investment to protect them against rising sea-levels 'or even abandonment/relocation' (Inst. Mech. Eng., 2009).

The countermeasures proposed for defending SZC against climate change impacts consist of a main platform 7.7m. Above Ordnance Datum (AOD), plus hard sea defences of 10.2m potentially rising to 14.2m. with a soft coastal defence feature. A process of monitoring is proposed with 'adaptive management' measures (such as increasing the height of defences) if necessary. It must be questioned whether these defensive measures will be proof against any eventuality or against deteriorating circumstances such as cliff and beach erosion or severe flooding or storm surges. And the impacts of the defences on coastal processes, erosion and flooding are also issues for careful consideration. It will be interesting to see if the EA will provide more definitive advice on site suitability once the revised siting criteria are published in the long- awaited review of the NPS on nuclear power. Even if the EA retains its qualified position, the Examining Authority will need to be satisfied that the defences are adequate. Even so, it must be seriously questioned whether a colossal infrastructure should be developed on such an inappropriate site on the vulnerable East Anglian shores.

### *The impact of climate change on SZC: 2. decommissioning and radioactive waste management phase, post-2100*

By the end of this century SZC should have ceased operating and will be entering its decommissioning phase. During the next century the main buildings, including the reactors, will be decommissioned. The reactor cores will presumably remain *in situ* in passive storage mode while the spent fuel and

other radioactive waste stores will remain on site until a GDF becomes available and the site can be finally cleaned up and cleared.

Plans for management and maintenance of the site during this inevitably long and indefinite period are extraordinarily vague, speculative and uncertain. In our view they are insubstantial and an insufficient basis on which to grant Development Consent. To the contrary, the lack of clear, robust and resilient proposals and plans for the management of radioactive wastes at Sizewell during the next century provides a sufficient reason for rejection of the project as a whole. There are four interlinked reasons for reaching this conclusion.

*1. Uncertainty of impacts of climate change*

Whatever actions are taken to counter global warming, it is inevitable that, as a result of continuing ocean warming and glacier melting, SLR will continue to rise beyond 2100. The study cited above suggests that with a $5^0$C warming it is possible that instabilities in the West and East Antarctic ice sheet, SLR of as much as 7.5 metres could engulf coastal regions across the world by 2200. Another estimate, emphasising the impact of warming oceans and atmosphere on ice melt, suggests 'an almost certain' rise of 20 to 30 feet in the next 200 years (Wanless, 2021). Other studies have emphasised the uncertainties of Antarctic ice sheet collapse and some suggest that it may occur within the relatively short time-scale of 200 years. There is considerable scientific research providing models emphasising various processes and interactions in the climate change system which demonstrate the complexity and the problems of estimating or predicting impacts. The point is that, beyond 2100, the uncertainties in modelling the rate of global warming, SLR and other impacts of climate change lead into the realm of indeterminacy. It may well be that action taken to reduce GHG emissions may restrain global warming and restrain the impacts going forward into the next century. But it would be prudent to plan for the more extreme, unlikely, but conceivable worst case scenarios.

*2. Inadequacy of management measures post-2100*

As conditions become more uncertain, so proposals for the management of decommissioning and radioactive wastes are increasingly insubstantial. The plans are predicated on the assumption that a GDF will become available at some point to dispose of the spent fuel and other highly active wastes stored on site. The strategy, in its almost convincing simplicity, is set out in the chapter on Spent Fuel and Radioactive Waste Management in the Application:

'The strategy for solid radioactive wastes is that these are to be disposed of as soon as reasonably practicable where a viable disposal route is available. High Level Radioactive Waste, ILW and spent fuel for which there are as yet no available disposal routes would be accumulated and safely stored on-site in compliance with the requirements of the Nuclear Site Licence, and Radioactive Substances Regulations environmental permit until a suitable disposal route or an alternative management route becomes available.' (App – 192 6.3 Vol.2 Ch. 7, p. 14).

Two issues are of concern here. The first is the length of time during which these dangerous wastes must be stored on site. According to the Application, spent fuel will be removed from the reactor and cooled for ten years in ponds before being placed in an Interim Spent Fuel Store (ISFS) and remain securely on site until space in a GDF becomes available. Although the proposal lacks detail and is rather provisional it is indicated that the ISFS 'would be designed such that it can store spent fuel for up to 120 years' (Ch. 7, p.39). If allowance is made for storage to commence ten years after first start-up (beginning in 2045, ten years after start up estimated 2035) the stores could be operational until well beyond the middle of the next century, somewhere around 2165.

The second issue is whether the method of management proposed will be robust and resilient. The Applicant seeks to provide assurance of the integrity of the storage system but it is impossible to be confident that the stores will be able to withstand the most severe impacts of climate change that might occur during the next century.

The Government maintains that it is satisfied that 'effective arrangements will exist to manage and dispose of the waste that will be produced from new nuclear power stations' (NPS EN-6, p.15). This is an assertion, not a revealed truth. Although the policy of geological disposal being the best available approach is the cornerstone of radioactive waste management policy, there remains the problem of establishing a scientifically robust safety case and a socially acceptable site. While progress is being made on both fronts, it cannot yet be established that suitable arrangements will exist. In any case, the priority for implementing the GDF will be the large volumes and radioactivity of legacy wastes, existing or arising. As CoRWM pointed out new build wastes will 'extend the time-scales for implementation, possibly for very long, but essentially unknowable, future periods' (CoRWM, 2007, p.15). It is, therefore, conceivable that a GDF will not become available, at least for new build wastes. Consequently, it is possible that spent fuel and other radioactive wastes will remain on site indefinitely in the unknowable but certainly deteriorating coastal conditions of the next century.

*3. Unforeseeable societal and institutional arrangements*

Proposals for managing radioactive wastes into the far future are not simply a matter of science and engineering, they require institutional continuity and a degree of societal stability. These conditions are contingent and dynamic, changing over time in the face of environmental, political, economic and social circumstances. It is possible to establish institutional arrangements which may survive for some time. In the case of radioactive waste management, future financing through FUP and FDP seeks to ensure adequate financial provision. Equally, the construction of stores can maintain the integrity of waste management for a considerable time. And, a policy of managed adaptation can give some reassurance of continuing monitoring and review. But, as time goes on, institutional continuity becomes compromised and management controls and commitment may become weakened. In the longer run, societal change may

also result in fewer resources, lower standards and shifting priorities leading to loss of institutional memory or increasing societal neglect.

It is impossible to foresee social arrangements in the far future. Therefore, we simply cannot know if the careful (or careless) plans for the safe management of radioactive waste management can be carried forward in anything like their present formulation, if at all. This leads to the fourth interlinked reason for rejecting the application.

*4. Risk to future generations*

The final of the four linked issues is ethical; it concerns the risks imposed on generations in the far future. Those generations will have little or no benefit from SZC but will bear the burdens of risk, cost and effort of continuing to manage the decommissioning and radioactive wastes on a site that will become increasingly vulnerable to flooding and the impacts of climate change on coastal processes. They may lack the resources, skills or organisational capacity to prevent the risks from radioactivity contaminating environments and affecting health and wellbeing over a wide area. We cannot foresee and they cannot tell us what will befall this gigantic piece of dangerous infrastructure on the Suffolk coast. This leaves two choices for the Examining Authority. One is to acknowledge the risks to the future but conclude, along with the Applicant and government policy, that the risks are manageable. Effectively this approach assumes some responsibility to the future but indicates that the future must be expected to take care of itself, using the information, resources and defences passed down the generations. This argument might be justified in terms of passing a small but manageable burden on the far future in order to ensure a larger benefit of nuclear power for the present and immediate future generations.

Or, it may be regarded as iniquitous and inequitable to pass on these burdens to future generations that have had no part in creating them and derive no material benefit from them. Therefore, on grounds of intergenerational equity it will be concluded that the burdens should not arise in the first place and, therefore, cannot be passed on. Such a conclusion might, of itself, be regarded as both a necessary and sufficient condition for the Examining Authority to reject the whole proposal.

This conclusion would be justified purely on ethical grounds. But, it is also a pragmatic choice. If, as evidence before the Examining Authority suggests, there is no future need for nuclear energy from SZC, then it follows that there can be no justification for imposing unnecessary burdens on the future.

Therefore, the proposal must be rejected.

## 3. Summary and Conclusions

The project should be assessed as a whole on whether the site is 'potentially suitable' for the deployment of a new nuclear power station.

It is considered to be wholly unsuitable on grounds of its massive scale and overall environmental impact.

Further, the project is unviable and unsustainable. It will be too late, too expensive and face too many uncertainties to enable an informed decision to permit development.

SZC will, at best, make a minimal contribution to achieving net zero carbon by 2050. Its contribution will be at the expense of cheaper, less risky renewable alternatives

During the period of operation up to the end of this century it must be questioned whether proposed defences and managed adaptation will be fully effective against the maximum credible scenario of climate change impacts of sea-level rise, storm surges and coastal processes.

In the period of decommissioning and storage of radioactive wastes on site during the next century, four interlinked processes strongly underline that the site is not potentially suitable for the deployment of a new nuclear power station:

- in conditions of increasing uncertainty it is impossible to foresee the potential impacts of climate change and consequences on the fragile Suffolk coast;

- it is doubtful whether management of radioactive wastes can be maintained indefinitely on a vulnerable site especially if the long-term solution of geological disposal does not materialise;

- there will be a need for institutional continuity to ensure the long-term safety and security of operating SZC; over the longer term, too, risks may increase with ageing plant and lack of societal stability;

- on grounds of intergenerational equity it is unethical and impractical to pass on burdens of risk, cost and effort to generations who derive no benefit from the activity.

For these reasons, it is concluded that the proposal for a new nuclear power station at Sizewell must be rejected as a whole on the grounds of its immense scale and environmental impact on a that site is unsustainable, unmanageable, unacceptable and unsuitable.

**Professor Andrew Blowers, OBE**
**Chair,**
**2 June, 2021**

***References***

J. Bamber, M. Oppenheimer, R. E. Kopp, W. P. Aspinall and R. M. Cooke: 'Ice sheet contributions to future se-level rise from structured expert judgement', Proceedings of the National Academy of Sciences of the USA, 2019, Vol.116(23), 1195-11200

Institute of Mechanical Engineers (2009) 'Climate change: adapting to the inevitable'

NPS EN-1, Overarching National Policy Statement for Energy (EN-1), June, 2011

NPS EN-6, National Policy Statement for Nuclear Power Generation (EN-6), June, 2011

UKCP18, Factsheet: Seal-level Rise and Storm Surge, Met Office Hadley Centre, 2018

Harold R. Wanless, 'Sea levels are going to rise by at least 20ft. We can do something about it', *The Guardian,* April 13, 2021

***Attached for Reference***

Sizewell C Statement of interest in Application for Development Consent for Sizewell C Nuclear Power Station

Andrew Blowers (2020) 'Climate change – hubris or nemesis for nuclear power?' *Town and Country Planning,* Vol. 89, No. 9/10, October, 339-344