justification: radioactive waste; economic; site

EN010012 ExA Deadline 10 Comment

Application by NNB Generation Company (SZC) Limited for an Order Granting Development Consent for the Sizewell C New Nuclear Power Station

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D10.1 Equality of Arms: asymmetrical representation resource capacity

D10.1.1 Throughout the six-month Examination schedule, lack of requisite resource capacity has significantly hampered ability to give proper consideration to the full set of documentation submitted by the Applicant, Statutory Consultees and Non-Statutory Consultees. As Lay IP, engagement with in-depth issues has consequently been very limited and partial, as indicated in REP2-320 para.D2.1.2.

D10.1.2 Constraint disadvantage is illustrated in ever accumulating documentation, beginning with the Application Acceptance stage and continuing subsequently under nine serial Examination Deadlines to date. According to the Examination Library (updated 01.10.2021), the tally of documents submitted by the Applicant alone stood at 1,400. Submissions from all other IPs, including statutory consultees, probably also add up to a similar number.

D10.1.3 Anyhow, having just recently managed limited time to catch up on a handful of Examination documents, the observations in this Comment relate to rather partial consideration of the following submissions: APP-591, REP2-108, REP2-449, REP3-046, REP3-133, REP7-226, REP8-116 and RR-0499, respectively.

D10.1.4 Regrettably, the PINS webpage for the Sizewell Application lacks an obvious full text search tool to enable direct content interrogation of all listed Examination documents. Access to such functionality is crucial for facilitating ready location of any response on any particular issue in all documents under the webpage. Preclusion is not without consequence for unresourced lay IPs.

Lacking requisite capacity subsequent to the Deadline 3 Comment, for instance, the PINS webpage has not been amenable to ascertaining which document actually contains the Applicant's specific response (if any) to issues in REP3-106 (for example).

D10.2 Justification issues

D10.2.1 Radioactive waste production: no defensible justification

D10.2.1.1 Observations that follow supplement the justification issues outlined in the proposition under section D2.2 in REP2-320. The issues reasonably fall to be considered important and relevant to the ExA's recommendations into a determination of the DCO Application for SZC.

D10.2.1.2 The Applicant's argument is that paragraph 2.11.4 in the 2011 EN-6 continues not only to authorise but to preclude as well the ExA from considering the production of new additional highly radioactive waste. However, it appears it may now be possible for the ExA to consider this matter despite paragraph 2.11.4.

a. For nuclear new build deployable after 2025, the clarification provided in the 2021 Consultation Draft EN-1 regarding the continuing status of EN-6 is relevant.

b. That the 2011 EN-6 has no effect in the determination of the SZC DCO Application is relevant.

c. That the twin EPRs (among the largest reactors in UK, equivalent to the combined power capacity of the first 16 Magnox reactors) would generate significantly large inventories of new additional radioactive waste is relevant.

d. That the Government's track record on persistent failure since at least the 1970s to deliver assured safe geological disposal, is materially important and relevant.

e. Compliance with the conditional test under the 1976 RCEP Recommendation 27 remains relevant and of paramount importance (section D2.2.2 in REP2-320, referring).

D10.2.1.3 The primary basis of the proposition in REP2-320 is grounded in Recommendation 27 of the 1976 Report of the Royal Commission on Environmental Pollution (RCEP), as supplemented with Dr Allan Duncan's Letter to The Times newspaper (published 19.09.2020). In a response under ExQ1 R.1.13 in REP3-046, the Applicant neither rebuts the proposition as such nor engages directly with it. The Applicant asserts instead,

> "the UK Government has made a clear commitment to large-scale new nuclear".

The Applicant's response falls back on the following points drawn from EN-6 paragraph 2.11.4:

a. the Government "has powers under the Environmental Permitting Regulations to ensure adequate disposal facilities are in place";

b. "Spent Fuel Repositories are currently undergoing design and construction in Finland and Sweden, along with several other countries";

c. "Geological Disposal Facilities are a tried and tested technology";

d. SZC "will have secure financing arrangements in place to meet the full costs of decommissioning once the power plant ceases generation"; and,

e. that, meanwhile, on-site facilities for the interim storage of Intermediate Level Waste and Spent Fuel can be designed, constructed, commissioned, operated and decommissioned with due consideration of any potential internal and external hazards, including flooding.

These points are considered in turn, below.

D10.2.1.4 But first, a preamble. RCEP Recommendation 27 (section D2.2.2 in REP2-320) urges caution against proceeding with a large programme of nuclear new build in the absence of demonstrative proof beyond reasonable doubt that the proposed permanent disposal method (geological disposal) has been shown to environmentally safely contain radionuclides for the indefinite future. The caution concerns a defined end point at the back end of the nuclear fuel cycle. The caution appears capable of engaging planning considerations in respect of the SZC DCO Application, for at least the following reasons.

a. Paragraph 2.11.4 in EN-6 remains arguably qualified by the conditional terms of Recommendation 27. Existence of robust legislative and regulatory systems in the UK could not constitute demonstration of proof of containment beyond reasonable doubt for the indefinite future.

b. The RCEP caution continues to speak to the prevailing unsettled science on deep geology. The behaviour and fate of assemblages of extremely long lived highly radioactive radionuclides, following emplacement in a deep geological repository, remains poorly understood, with significant uncertainties.

c. The caution captures the Applicant's proposal to generate and accumulate significantly large inventories of new additional highly radioactive waste in Interim Spent Fuel Stores (ISFS) and Intermediate Level Waste Interim Stores (ILW IS), under the cover of EN-6 para.2.11.4.

d. The continuing generation and stockpiling of radioactive waste, in the face of prevailing unavailability of an RCEP compliant GDF means deliberately shunting off the radioactive waste disposal problems to future generations.

e. Demonstration of containment beyond reasonable doubt for the indefinite future is of paramount importance. In turn, it commands its own time frame.

e. And, to the extent EN-6 would appear apparently downgraded from a source of Government policy to a source of information, assessments and statements in respect of projects deployable after 2025 (paras 9.2.1.3 and 9.2.2.1, respectively, in REP9-035 referring), the ExA would arguably no longer appear precluded from considering the generation and accumulation on-site of significantly large inventories of new additional spent nuclear fuel and intermediate level radioactive waste. Radioactive waste from SZC would inflate the existing large stockpiled inventories in the UK, awaiting permanent disposal in an unknown GDF at an unknown location at an uncertain future date.

D10.2.1.5 Regarding the Applicant's first point: the Government "has powers under the Environmental Permitting Regulations to ensure adequate disposal facilities are in place".

The Applicant appears shy of recognising the Government's track record to date. The ExA would no doubt be mindful that the UK Government has failed to establish, let alone operate, even a rock characterisation facility anywhere in the UK: an essential precursor to determining site suitability for locating a potential Geological Disposal Facility (GDF). Instead, production and accumulation of highly radioactive waste (including spent nuclear fuel) has been allowed to proceed unhindered since the 1950s from at least 33 civil power reactors (18 Magnox reactors, 14 Advanced Gas cooled Reactors, and one Pressurised Water Reactor). Whatever the Government's putative power under the Environmental Permitting Regulations, it has clearly proven dysfunctional: no rock characterisation facility means effectively no potential GDF either.

a. In 1976, when the RCEP cautioned against commencing any new large construction programme for nuclear power stations, there were 18 Magnox reactors operating in the UK, with combined electricity generating capacity of around 3.9 GW[1]. By then, construction work had already commenced on the next large programme of 14 Advanced Gas cooled Reactors (AGRs), with a generating capacity of around 7.8 GW altogether (double the Magnox capacity).

[1] Source: International Atomic Energy Agency. Available at: https://pris.iaea.org/pris/CountryStatistics/CountryDetails.aspx?current=GB

b. In comparison, Hinkley C has a generating capacity 3.4GW (currently under construction). If SZC is given the go ahead, it would add a further 3.3GW new nuclear capacity, in the face of absence of a permanent environmentally safe disposal solution compliant with the 1976 RCEP conditional test for generating additional new radioactive waste. SZC would not be an insignificant generator of radioactive waste.

c. Furthermore, according to *The Sunday Times* newspaper, the Government is reportedly considering at least 6 large nuclear reactors (at least 3 GW each) as well as 20 mini reactors (450 MW each), by 2050[2]. That would potentially mean additional 27 GW of new radioactive waste producing reactors with no RCEP compliant permanent disposal solution in sight. In comparison, the current 14 AGRs and the Sizewell B PWR have a combined capacity of around 8.9 GW.

d. In this context, it appears important and relevant to take fully into account the evidence that an assured RCEP compliant environmentally safe permanent disposal method has yet to be demonstrated. Nor is there unequivocal assurance of likely realisation of an RCEP compliant solution within the operating lifespan the SZC DCO proposal. For details on the 1976 RCEP Recommendation 27, please see section D2.2.2 in REP2-320.

D10.2.1.6 Regarding the second point: “Spent Fuel Repositories are currently undergoing design and construction in Finland and Sweden, along with several other countries”.

The Applicant concedes therein that an established operating GDF for high level radioactive waste and spent nuclear fuel does not exist anywhere in the world. By definition, the designing and construction stages neither demonstrate nor discharge the conditional test under the RCEP Recommendation 27.

D10.2.1.7 Consider, next, the third point: Geological Disposal Facilities are a tried and tested technology.

That is incorrect in respect of high level radioactive waste and spent nuclear fuel in particular. Even when eventually constructed and operational, the GDFs would still be a long way from satisfying the RCEP conditional test. Namely, demonstration of containment beyond reasonable doubt for the indefinite future.

a. Once produced, highly dangerous long lived radioactive isotopes and radionuclides warrant permanent disposal in a manner that ensures environmentally safe containment, immobilisation and isolation from ground surface biospheres, for up to 250,000 years into the future[3] (applying a radiation safety rule of thumb of ten half-lives for Plutonium-239: it has a half life of 24,400 years).

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2 Wheeler C, Shipman T & Hellen N (2021) Energy panic ushers in ‘new nuclear age’. *The Sunday Times*, 26 September 2021.

3 Ceramic Zircon (a class of mineral based ceramics) has long been considered the most robust crystalline structure developed to date for immobilising plutonium and other actinides (such as americium and curium) present in nuclear wastes. However, the structural durability of zircon ceramics has turned out to be extremely short lived as compared with the hazardous half-life of the radionuclides. Under constant bombardment of alpha-particles, even zircon crystals turn leaky and are prone to disintegration. According to Farnan, Cho & Weber [(2007: 190-193) *Quantification of actinide alpha-radiation damage in minerals and ceramics. Nature* 445, 11.01.2007], alpha particles from the decaying radionuclides can cause such severe damage to the crystalline structure of the zircon ceramic that plutonium starts leaching out after only 210 years and the entire plutonium-zircon ceramic:

> “would be amorphous after only 1,400 years in a geological repository (desired immobilization timescales are of the order of 250,000 years).”

From the perspective of a 25-year time span between successive generations of modern humans, that is the equivalent of up to 9,600 future generations. By way of comparison, *homo sapiens* as a species have existed on the planet Earth for only about 8,000 generations to date. A “mitochondrial Eve” is considered to have emerged in East Africa, from preceding hominins, around 200,000 to 150,000 years ago (see: Jones D [2014: 80], *Going Global, The Human Story*, New Scientist The Collection, Issue 4, Reed Business Information Ltd., London). The *Neanderthals*, on the other hand, first emerged 230,000 years ago (*ibid*: p14), namely 9,200 generations ago. In other words, had the Neanderthals at the time invented nuclear reactor technologies and consigned the resulting high level radioactive waste and spent nuclear fuel inventories to deep geological disposal, modern humans would quite likely chance upon those radioactive nuclear waste dumps from time to time, strewn across southern/central Europe and the Near East!

b. However, that doesn't quite represent a full picture. For example, Plutonium-242 has a half life of 387,000 years[4], implying a need for immobilisation over periods of up to 4 million years into the future.

c. Had such radioactive wastes been created by humanity's ancestors 240,000 years ago, current generations of *Homo Sapiens* would still be at risk from that legacy. Likewise, the proposed operating lifespan of 60-76 years for SZC entails the prospect of locking distant future generations into inherent legacy risk from its high level radioactive waste and spent nuclear fuel inventories despite burial in geologic repository.

d. In terms of risk burden for future generations, the ExA would no doubt be mindful of intrinsic uncertainties on whether the radioactive waste would remain immobilised, and environmentally safely and permanently isolated from the biosphere for the next 240,000 years. In that regard, results from Finland and Sweden may begin characterising the uncertainties more and more firmly with each passing century. Until then, geological disposal of radioactive waste remains an uncertain "safe" solution. Recall the RCEP test: containment beyond reasonable doubt for the indefinite future.

e. Even permanent disposal of conventional hazardous substances and toxic waste has a chequered history of springing rather unsavoury and unexpected surprises decades later, giving rise to significant threats to the environment and human health. Likewise, there is no knowing what nasty radioactive surprises might spring up, centuries or millennia down the line. When might the first inklings indicate whether geologic disposal of radioactive waste is proving a "tried and tested technology"? There could be only one rational answer to that question: how long is a piece of string? There appears little if any appreciation of epochal time scales inherent to permanent disposal of highly radioactive waste. The Applicant's seemingly casual assessment of geologic disposal would appear misguided at present. With great respect, Sweden and Finland are currently nowhere near establishing environmental safety of geo-disposal of highly radioactive waste beyond reasonable doubt for the indefinite future.

f. There appears scant recognition as well of differing geo-biological-chemical-hydrological-physical characteristics of differing sites across different countries and differing geographies. These characteristics are crucial to assessment of site suitability for high degree of containment and immobilisation of complex assemblages of very long lived radionuclides.

D10.2.1.8 Moving on to the fourth point: SZC "will have secure financing arrangements in place to meet the full costs of decommissioning once the power plant ceases generation".

The assertion conceals an important financial burden on future generations. The full costs of decommissioning the plant does not equate to meeting the full costs of geological disposal.

a. In the first instance, the Government requires the Applicant to pay a "full share" of the costs of decommissioning the reactors and on-site interim storage facilities for radioactive waste. However, a full share does not translate into the Applicant meeting even those costs in full. See as well para.D10.2.3.2, below, regarding the conclusions of the National Audit Office (NAO).

b. Secondly, taking an optimistic view, even if a GDF became available and capable of accommodating the SZC higher activity radioactive waste inventories from approximately 2145 onward (see ONR response to ExQ1 R.1.24, in REP3-046), the full costs of that eventual endeavour simply cannot be ascertained at present. It would be foolhardy to conjecture. The Applicant could not possibly put in place a full provision. In that respect, future generations of taxpayers are inextricably locked into almost perpetual bailouts for the SZC radioactive waste.

D10.2.1.9 Regarding the final fifth point: on-site facilities for the interim storage of Intermediate Level Waste and Spent Fuel can be designed, constructed, commissioned, operated and

[4] Table 6, in: RCEP (1976) Nuclear Power and the Environment. Royal Commission on Environmental Pollution, Chairman Sir Brian Flowers. Sixth Report. Cmnd 6618. HMSO.

decommissioned with due consideration of any potential internal and external hazards, including flooding.

It is not readily apparent to what extent beyond design basis events involving extreme coastal weather, storm surges and tidal flooding have been modelled for the site. "Any potential internal and external hazards, including flooding" (emphasis added) could reasonably be expected to include full details on all beyond design basis events considered by the Applicant. What are those assessments?

D10.2.1.10 Separately, RR-0499 highlights an additional ground on which the SZC DCO proposal seemingly fails justification. Namely, a legacy of radioactive waste at the front end of the nuclear fuel cycle. RR-0499 refers to:

> "… the in-situ environmental impact on communities where uranium is mined and milled …"

D10.2.1.11 In summary, justification for the SZC DCO proposal arguably fails on the grounds of indefensible production and accumulation of new additional radioactive waste. In particular,

a. in the evident absence of demonstration beyond reasonable doubt that the waste could be contained safely inside a GDF for the indefinite future; and,

b. in the evident absence of a fully functioning contemporary GDF.

D10.2.2 The logic of additional radioactive waste: substitution for additional carbon emissions

D10.2.2.1 The justification for the SZC DCO Application implicitly seeks to solve one problem (additional carbon emissions) by creating another problem (additional radioactive waste). The Applicant argues EN-6 paragraph 2.11.4 not only authorises that solution, but also precludes the ExA from considering the production and accumulation of new additional highly radioactive waste by the DCO project: see para.D10.2.1.2, above. An environmentally safe permanent disposal method neither exists currently nor appears practicably realisable during the DCO project's operating lifespan: see as well para.D10.2.1.5.d, above.

D10.2.2.2 The Applicant's posited solution for mitigating one long term risk from anthropogenic climate change ends up compounding a different longer term risk from anthropogenic radioactive waste. That, in effect, is what a Grant of DCO for SZC would imply.

D10.2.2.3 These observations supplement para.D3.6.4.2 in REP3-106.

D10.2.3 The economic case: highly questionable justification

D10.2.3.1 The economic justification for the Applicant's DCO proposal would appear highly questionable, if not undermined significantly, in light of the following considerations. The considerations appear important and relevant to a determination of the Application for a Grant of DCO for SZC. These observations supplement paras D3.4.3, D3.4.5 and D3.6.2.3.3, respectively, in REP3-106.

a. As noted in para. D10.2.1.8.b, above, even if a GDF became available and capable of accommodating the SZC higher activity radioactive waste inventories around 2145 onward, the full cost of that eventual endeavour is at present simply not amenable to meaningful estimation. The eventual full cost burden falls inextricably on future taxpayers long after the end of reactor decommissioning. Paying a "full share" of the costs of reactor decommissioning and interim storage of radioactive waste does not equate to the Applicant meeting even these costs in full: the NAO conclusion under para.D10.2.3.2, below, referring. Is that not by itself a fundamental injustice across future generations? The injustice is clearly rooted in the choice the Secretary of State makes on behalf of current generations.

b In any case, the Applicant has conceded implicitly it is not financially viable to construct the SZC DCO project without the Government agreeing to bankroll it under a Regulated Asset Base (RAB) mechanism. Moreover, as revealed by TASC in REP3-133 (ExQ1 CA.1.25 under section 7), the Applicant admittedly has no Plan B should negotiations on RAB come to grief. The admission arguably suffices to knock out the economic case for Sizewell C.

c. Moreover, the Applicant is clearly enthusiastic for a RAB funding mechanism precisely because under RAB the construction cost risks are expressly transferred from the Applicant, shareholders and any private sector investors on to UK electricity bill payers. In that regard, it is noted the Applicant provides no justification for not polling electricity bill payers on risk transfer, despite convening numerous public consultations on the project. However neat a solution, reliance on RAB funding serves nevertheless to confirm lack of robust economic justification for the Applicant's private sector infrastructure project.

d. TASC has highlighted deficiency concerning a number of other financial metrics. These appear capable of casting further doubt on the economic case. The metrics include:

(i) the very real additional costs likely from multiple adaptive approaches to sea defences (ExQ1 CA.1.28 and CA.1.29, under section 7 in REP3-133). In the first instance during the generating station's operating lifespan and, thereafter, over the subsequent period up to at least 2145 (and, possibly up to 2190 if not longer); and,

(ii) the rising cost of construction materials (REP7-226), under global and local supply chains.

e. According to REP2-449 (a report from Development Economics commissioned by the Stop Sizewell C IP), not only is the Applicant's economic case based on over-optimistic assumptions regarding the likely extent of local procurement, it remains questionable as well in respect of:

> "potential displacement impacts on other local businesses, both through competition for skills and labour, the potential deterrent effect on tourists and the loss of their expenditure throughout the tourism economy, and the potential negative effects of traffic congestion on the operational efficiency of local businesses." [para.1.17, referring]

D10.2.3.2 The findings of the National Audit Office (NAO), in their 2016 Report on Nuclear Power in the UK[5], bear directly on the Applicant's claim regarding full cost provision for decommissioning. The externalities identified in the NAO Report constitute material disbenefit. These remain important and relevant considerations for the ExA as well as the Secretary of State.

a. According to the NAO in para.20,

> "The government will be liable for any decommissioning costs above the amount",

set aside by the Applicant under the statutory Funded Decommissioning Programme, including contingency. This externality cost constitutes an unquantifiable burden on future taxpayers.

b. In the fourth bullet point under para.2.11, the NAO stated:

> "The disposal of nuclear waste poses particular challenges and is expensive. Spent nuclear fuel remains radioactive for millennia and it is not yet possible to guarantee complete decontamination."

c. In the final bullet point under para.2.11, the NAO concluded:

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5 NAO (2016) Nuclear power in the UK. Report by the Comptroller and Auditor General. National Audit Office, 12 July 2016. HC 511. Available at: https://www.nao.org.uk/wp-content/uploads/2016/07/Nuclear-power-in-the-UK.pdf

> "The costs to decommission nuclear power stations are very high relative to other low-carbon technologies. These costs are generally far in the future and therefore uncertain."

d. As explained by the NAO in para.2.14, the UK Government/taxpayer assumes the liability for management and disposal of spent nuclear fuel and intermediate-level radioactive waste from the operator of a nuclear power station, under unique Waste Transfer Contracts, in return for a fee from the respective operator. Nevertheless,

> "the Department will incur a liability if the total fees are less than the actual costs. It states this risk is 'very low'."

Even so, the risk for taxpayers could not be ruled as negligible. It is real risk, considering that:

- the wait for final disposal in a GDF could run beyond 2145, perhaps even 2190, into distant futures;
- a GDF may incur construction cost overruns in consequence of site geological or geohydrological conditions, or engineering or other factors;
- a GDF may need to remain open for 100 or more years; and,
- a GDF may warrant early closure on environmental or safety grounds, perhaps necessitating further extended interim storage (may be in new facilities), while construction proceeded on an alternative GDF elsewhere.

These very long term unpredictable externalities amount to significant costs of nuclear generated electricity, falling decisively on future generations. The costs effectively constitute an extremely long reach lock-in, transferring unpredictable and currently intrinsically unfathomable infrastructure costs to future taxpayers.

e. The NAO identified other externality costs of nuclear generated electricity compared with other low carbon energy technologies. These fall under two categories: risk to consumers and risk to taxpayers.

(i) According to the NAO, the UK Government's relevant Department (BEIS) grants considerably longer term power purchase contracts (CfDs) for electricity supply from new nuclear power stations than from other low-carbon technologies. The NAO informs in para.19 the result is a longer lock-in for electricity consumers who pay a high billing premium for nuclear generated electricity. That,

> "increases the risk that they do not benefit as much from any long-term changes, such as technological advances that reduce the cost of other low-carbon sources."

Moreover, according to the NAO para.3.12:

> "The costs of the Department's interventions to ensure enough new generating capacity is built will ultimately be passed onto consumers' bills. If the Department fails to assess the cumulative impact on bills of its policies there is a risk of financial hardship for consumers, or the need for unplanned taxpayer support."

f. In addition, Treasury guarantees are provided by the UK Government for any bonds issued by the developer (the Applicant) in order to finance the construction of a new nuclear power station. Though designed to be repayable by the developer's shareholders, taxpayers run the risk of shareholders being unable to repay. In that case, a call on the Government's guarantee means the funds required would be drawn from the national budget (NAO para.20), with knock-on welfare impacts for the UK population.

g. Furthermore, according to the NAO's para.3.20 (final bullet point),

> "International and UK law requires nuclear operators to hold insurance or other security to meet claims in the event of a nuclear accident at their site. However, this only covers the first 1,200 million euros of costs in the event of an incident. Costs over and above that amount would have to be met by the taxpayer."

However low the risk of severe nuclear accident at the proposed SZC DCO Nuclear Generation Station, the potential cost risk for taxpayers is clearly not negligible. It remains real risk.

D10.3 Site selection

D10.3.1 These observations supplement section D3.5.1 in REP3-106.

D10.3.2 In REP2-108[6], responding to ExQ1, the Applicant refers back to APP-591 (8.4 Planning Statement Appendix 8.4A Site Selection Report) as the definitive statement on site selection. The Applicant's argument that policies in the 2011 EN-1 and the 2011 EN-6 automatically continue to apply to the SZC DCO Application appear questionable, as clarified in the 2021 Consultation Draft EN-1. For nuclear new build deployable after 2025, the 2021 Draft EN-1 indicates that EN-6 stands downgraded from a source of Government Policy to a source of information, assessments and statements which may or may not continue to be important and relevant for those projects (see para.D9.2.1.3 in REP9-035). To that extent, arguably, all site parameters (including alternatives) would reasonably warrant reassessment from first principles, in order to establish afresh site suitability and preference for the Sizewell site.

D10.3.3 According to the ONR, responding to ExQ1 R.1.14 (REP3-046, referring),

> "(ii) ONR expects the Applicant to adequately demonstrate that the sea defences will protect against the design basis coastal flood, which includes climate change, throughout the lifetime of the plant. …"

> "(iii) … For nuclear site licensing, most closely tied to DCO in terms of timescales, ONR expects the Applicant to demonstrate that the SZC site can be adequately protected against the design basis sea level; this includes the future effects of climate change on wave and tide height as well as the static sea level. …"

Similarly, the ONR response to ExQ1 R.1.18 in REP3-046 informs:

> "… The expectations for design/construction of facilities used to store spent fuel or ILW with respect to flooding do not differ from the nuclear facilities on the wider site, in that the stores should be able to withstand flooding conditions up to and including the design basis event (see ONR Safety Assessment Principle (SAP) EHA.12 Flooding). …"

These licensing comments give rise to a question for the Applicant. Namely, what beyond design scenarios have been considered in particular and what measures are proposed to ensure adequate protection against those events? In case the answer is negative, might the ExA respectfully consider an appropriate recommendation? A similar issue arises in relation to any extension of the plant's planned lifespan of 60 years (ONR response to ExQ1 R.1.15, in REP3-046, referring).

D10.3.4 The Environment Agency informs under R.1.25 (in REP3-046), for example, that flood risk impacts of climate change have been modelled up to 2190, for ongoing storage of ILW and spent fuel. It is not readily apparent whether the Applicant has given consideration to any

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[6] Chapter 5: Appendix 5A Legal and policy requirements relating to the assessment of alternatives. In: 9.11 Responses to the Examining Authority's First Written Questions (ExQ1) - Volume 3 - Appendices Part 1 of 7.

particular beyond design scenario between 2100 and 2190, and the implication. Again, perhaps the ExA might respectfully consider an appropriate recommendation.

D10.3.5 Likewise, the Applicant's response to ExQ3 R.3.4 in REP8-116 mentions design flexibility in the proposed sea defence. In particular, the possibility of raising the crest height if necessary at a later date. Has the Applicant considered crest height parameters under beyond design basis coastal and marine events, up to 2100 in the first instance and subsequently up to 2190? What are the beyond design scenarios for the sea defence?

D10.4 Transcripts of Oral Hearings

D10.4.1 To the extent the DCO Examination Hearings are important and relevant, it follows the transcripts could reasonably be expected to be faithful to the video recordings. Transcripts, like video recordings, constitute official proceedings of the Examination. Both categories of Examination records must be seen to be equally accurate and reliable, on equal footing, and command equal weight. In that regard, it is somewhat disconcerting to be informed (see the Examination Library, as updated 01.10.2021) that although each transcript,

> "is intended to assist Interested Parties, it is not verbatim. The content is produced using artificial intelligence voice to text and is unedited. The video recording remains as the primary record of the event."

D10.4.2 With respect, the caveat defeats the procedural purpose. If a transcript is intended to assist IPs, it has to be a free standing primary document in its own right. It has to be reliable and accurate. Warning IPs that only the video recordings constitute "the primary record" renders the available transcripts defective as a source of official proceedings. Perhaps PINS might respectfully consider the extent to which such an approach,

a. comprises procedural unfairness; and,

b. may potentially discriminate against IPs unable to access video recordings.

D10.5 The PINS SZC webpage: lack of built-in full text search tool

D10.5.1 Lack of full text search functionality under the PINS webpage for the Sizewell Application constitutes a barrier to interrogating the full contents of all Examination documents under consideration. For unresourced lay IPs, lacking requisite capacity to read through the entire documentation set, the preclusion renders it difficult to ascertain which document contains submissions on specific points on any issue of interest.

D10.5.2 The deficiency perpetuates ignorance not only on what has already been stated on a particular point in any number of submissions, but on the full range of perspectives as well on a particular point. Unresourced lay IPs are thus significantly disadvantaged in putting together appropriate responses. As estimated in para.D10.1.2 hereof, there were probably in excess of 2,500 documents in total under consideration by the time of the 10th Deadline.

D10.5.3 Perhaps PINS might respectfully consider rectifying such a significant deficiency under future Examinations.

J Chanay
12.10.2021