Deadline 5: PINS Coastal Geomorphology Issue Specific Hearing Response – Bill Parker Interested Party Number 20026713

Dear Planning Inspectorate

I wish to support the Deadline 5 submissions made by the following Interested Parties:

- Stop Sizewell C
- TASC
- Mr Nick Scarr
- Mr Robin Sanders
- The National Trust
- Mr Paul Collins
- Ms Frances Crowe

At the Issue Specific Hearing I was asked to submit information with regard to inconsistences in evidence presented by Cefas. I comment on these below but the details are examined in the Deadline 5 submission by Mr Nick Scarr.

Further to the recent Coastal Geomorphology Issue Specific Hearing I wish to submit the following comments.

Summary of Response:

I have responded in the order the Issue Specific Hearing agenda was followed but prefaced it with some general observations. These include:

The continual changes in design and updating of analysis of coastline vulnerability makes it extremely difficult for all parties to be clear as to what the EDF proposal is and respond accordingly. Some information won't be available till deadline 7 which is simply unacceptable and no date at all was given for providing information on the ground improvement required, an essential element of the overall design.

A core issue is that the space between the sea to the east and the SSSI Sizewell Marshes to the west is too narrow to accommodate this specific nuclear power station design. The ExA should question why only one inappropriate design of nuclear station has been presented and where is the assessment of other more appropriate and suitably sized options.

As detailed below there are a number of critical questions that have not been satisfactorily answered and are fundamental to the sustainability of the long-term future of the location and the associated communities

There are so many outstanding issues and missing information that a further Issue Specific Hearing on Coastal Geomorphology is requested.

With regard to specific agenda items:

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Can potential coastal impacts be satisfactorily assessed?
A cohesive response is not possible until all the information and analysis is released. The analysis to date on the impact on the coast is based only until 2099 whereas ONR / EA states that sea defences should be in place for 160 years after construction.

I support the concerns of East Suffolk Council but there are other issues inc: The lack of accurate graphics / diagrams, the assessment of coastal stability is based on historic evidence but on a selective time scale, the applicant must base the proposal on the known science - not on selective evidence or diminishing the importance of evidence that doesn't support the proposal, conflict with the provisions of EN-1 and EN-6. In my view this must be resolved.

The Applicant has missing modelling in particular for; multiple storm scenarios, future coastal change the life time of the infrastructure, potentially inadequate modelling of shoreface-connected ridges.

The *assumption that 68% of SLR up to 2070 is* accounted for by extrapolation of historic trend rates and the assumption that shore wave climate will remain unchanged during the modelled period. Whilst UKCP18 projections of global climate change do not foresee near-future changes in wave climate, other subsequent studies (such as Grabemann and Weisse, 2018; Bonaduce et al., 2019) do predict changes.

The Applicant's assumptions regarding longshore transport are questionable particularly in the light of its intention to change the grading of part of the SCDF to much larger stone.

I would also question the reliance of the Applicant on the use of 'reasonably foreseeable" conditions and based on both short-term detailed information about the coast and on monitoring that does not safely mitigate against future challenges this development may face in future.

Additional information required?
The ExA requested and Applicant promised for Deadline 3 a detailed design of the HCDF including complete and detailed graphics / diagrams. This has not occurred. I support an independent expert assessment of the proposals. The outstanding and missing assessments and analysis need to be presented and clarification is sought as to why EDF consider it is reasonable and acceptable to disregard the impact of offshore geomorphology.

Update on details of the hard coastal sea defence feature (HCDF).
It is premature to comment as the Applicant has stated this is being changed.

The assessment principles adopted by the Applicant.
Clarification is required as to which assessment principles are being referred to.

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The implications for the Shoreline Management Plan (SMP)?

The ESC SMP policies are sound up to 2105. The policy for management beyond this date is unknown and a precautionary approach should be adopted.

It is unreasonable to assume the 5m bund currently in place is the SMP defence line. It is the 10m AOD sea defence. Therefore, in my opinion the proposal is to 'advance the line' and this requires a change in SMP.

Review of the potential impacts on coastal

I wish to highlight the inadequate consideration of shoreline change and the questionable assumptions underlying the Expert Geomorphological Analysis.

The Applicant is introducing new material into the environment, with no independent environmental assessment of its impact.

The Applicant has acknowledged that the HCDF cannot function effectively without the SCDF. I consider this is therefore an unsustainable and inadequate design with a high probability of failure to achieve its intended purpose over the design life. There is inadequate consideration of the dynamics of nearshore banks.

There are noticeable differences and inconsistencies in the approach to understanding the Sizewell-Dunwich banks and their impact on shoreline stability in the documentation pre- DCO, DCO application and post DCO application. These are detailed in the Deadline 5 submission from Mr Nick Scarr, Interested Party number 20025524. In my view the suggestion that they can now be ignored is an approach that is not supported by previous analysis and assessment of the coast by numerous experts.

Issues such as sandbank mobility and shoreline response are commented upon and referenced to academic papers.

I have no confidence that the Applicant has fully taken into account the potential failure of the Coralline Crag and the impact this may have on the coast. The Applicant, as noted above, has yet to define their methodology for 'ground improvement' that will a key element in determining how resilient this structure will be in the long term. It is critical that future generations are not left with a legacy of poor design and execution.

The restricted and constrained areas of interest and timescales (e.g. Zone of Influence) proposed by the Applicant reduces the management of potential liabilities of the Applicant. In my view this doesn't reflect on the true impact that this development will cause. I strongly support the feeling in the ISH that the Applicant includes a wider geographical range of locations in the monitoring and mitigation proposals.

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Comments have been made by Interested Parties and the Applicant on the importance of Minsmere Sluice but I contend that more information is necessary from the Applicant so that a full and complete analysis of its proposals can be undertaken / assessed.
This also applies to the permanent BLF**,** dredging platform etc.

As for Cumulative impacts my opinion is there needs to be a recognition that Sizewell Bay is a complex and dynamic environment. There is no *consideration of complex system behaviour and potential for* "emergent behaviour" from unrelated to immediate forcing mechanisms in the Applicant's submissions. There is a need to focus on the long term impacts taking account of integrated system elements of the design and response from the natural environment. They cannot be assessed and will not operate in isolation from one another. An independent expert assessment would provide greater reassurance that the issues have been addressed.

The HCDF is planned to undergo design adaptation to maintain nuclear safety against predicted sea level rises however I understand the proposal currently presented is subject to change to achieve that aim. I thus believe a detailed review would therefore be premature, however I have highlighted areas to be examined in future.

In regard to the resilience of the Proposed Development, taking account of climate change, there is no clarification on how coastline will develop in long term and the expected consequences both for SZC and the adjacent coastline. There will be permanent consequences and residual structures in perpetuity. How will this develop and impact the long term future of the coast has not been adequately addressed and I have seen no analysis of its long term stability from the Applicant.

For Mitigation and controls including the Coastal Processes Monitoring and Mitigation Plan (CPMMP) I only have proposals with regard to the Marine Technical Forum to make it more transparent and inclusive of the local communities it seeks to serve.

As for funding as there is as yet little supported information, I have made comments about issues that should be addressed.

Final Comment

I wish to elaborate my point with regard to CEFAS since Mr Philpott has unfortunately misinterpreted my position, and I possibly could have phrased better.

My point was not that I questioned Dr Dolphin, or anyone else from CEFAS, on their ability to interpret their duties correctly. The issue is of independence which Mr Philpott did not address.

I have clarified my comments as I believe it is important to understand how CEFAS can demonstrate that there is an appropriate breadth of expertise is available. This

is a huge project and the advice of these experts will impact our coastal waters for generations: once the power station is turned on, we can't switch it off, so we need to make sure we have the best scientific advice available.

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Full Response to Coastal Geomorphology Issue Specific Hearing

1. General observations
    a. The DCO process is, as I understand, designed to be a 'front loaded'. The approach taken by the Applicant on coastal geomorphology and sea defences is clearly not well thought out and is evolving through the DCO process. The continual changes in design and updating of analysis of coastline vulnerability is being undertaken either by design or poor planning. This makes it extremely difficult for all parties to be clear as to what the Applicant's proposal is and to analyse / assess its quality and suitability.

    b. The Applicant / Cefas have always known about the issues of the vulnerable coastline and, particular, the concerns of Interested Parties, regarding the location of the sea defences so close to the beach since at least the third EDF public consultation. Therefore, to be amending designs at this stage and with some information that won't be available till, or even after, deadline 7 is simply unacceptable.

    c. The proposal being presented by EDF for Sizewell C is principally a replication of the Hinkley Point C design. A core issue is that the space between the sea to the east and the SSSI Sizewell Marshes to the west is too narrow to accommodate this design without impacting on the marshes or the alignment of the coastal defences. The need to avoid the destruction of the SSSI pushes the seaward edge of the sea defences very close to the beach. Members of the ExA witnessed this on their site visit. It is also recognised in the Applicant's own risk assessment (APP-343) it states '*Recession of HCDF further landward than the current sea defence; making the HCDF a marine component with no initial exposure to waves*;'. The ExA should question why only one inappropriate design of nuclear station has been presented and where is the assessment of other more appropriate and suitably sized options.

    d. As detailed below there are a number of critical questions that have not been satisfactorily answered by the Applicant and therefore, in my opinion, the ExA must seriously consider refusing this application due to the current inadequate assessment and analysis of the impact on, and vulnerability of, the coastal location. These issues are not ones that can be dismissed through an IROPI as may be the case for other environmental concerns but are fundamental to the sustainability of the long-term future of the location and the associated communities.

    e. There are so many outstanding issues and missing information that a further Issue Specific Hearing on Coastal Geomorphology is requested.

2. **The assessment of the coastal impacts of the Proposed Development:**
   (a) Whether the potential coastal impacts of the Proposed Development can be satisfactorily assessed from the information submitted by the Applicant?
   - **a.** There is an inextricable inter-relationship between coastal processes and the proposals for sea defence design that means without the finalised detail of both from the Applicant it is not possible to assess the potential coastal impacts. It was highlighted that further information will be released for deadlines 5, 6 and 7. For some details no date has been set for release of information i.e. the 'ground improvement'. Until all the information is released it is not possible to form a reasoned and cohesive response.

   - **b.** Of the information that has been released the analysis of the impact on the coast is based only until 2099 (REP3-048). There have been a number of other future dates identified including 2140 by the Applicant however the ExA should be clear that the ONR / EA advice on Flooding and Coastal Management explicitly states that sea defences should be in place for 160 years after construction by the duty holder (EDF or subsequent owner) https://www.onr.org.uk/documents/2017/principles-for-flood-and-coastal-erosion-risk-management.pdf. Therefore, there should be no debate the sea defences and consequent impact on the coast must be considered to at least 2190 – based on the somewhat optimistic assumption of the completion of Sizewell C as 2030. This has not been done and therefore an assessment of its long term impact cannot be made.

   - **c.** Whilst I support the concerns expressed by East Suffolk Council as the Coast Protection Authority, there are a number of other issues that were not highlighted. This includes:
     i. The lack of accurate graphics / diagrams (not indicative / misleading) and missing cross sections in critical areas. (ref REP2-116 – fig 2-2 p4 – unreferenced location or measured depth of foreshore area)
     ii. The assessment of coastal stability is based on historic evidence but on a selective time scale, why is this (note 1736 – 1836 – 300m of erosion) ref Pye & Blott (APP-312)
     iii. The Applicant must base the proposal on the known science - not on selective evidence or diminishing the importance of evidence that doesn't support the proposal
     iv. The Applicant / Cefas own evidence to-date identifies it as being in conflict with the provisions of EN-1 and EN-6, this must be resolved. Refer to my comments made in previous submissions

(REP2-393)

d. The Applicant has to-date not resolved some of the missing modelling in particular for the following areas. The detail of this is covered in previously submitted submissions (REP2-449r) highlighted by Professors Jackson and Cooper from the University of Ulster. This includes:
    i. Modelling simulations, incorporating a range of multiple storm scenarios
    ii. UKCP18 provides indicative sea-level rise to 2200 and beyond. The Environment Agency's 2019 report SC150009 cites a median RCP 8.5 sea level for 2200 as 1.8 m (range 1.3 - 2.9 m). The equivalent figures for RCP 4.5 are 1.1 m (range 0.7 - 1.8m). Since the lifetime of the infrastructure is of this order, future coastal change up to that time ***must*** be considered.
    iii. Potentially inadequate modelling of shoreface-connected ridges which when "drowned" can reasonably be expected to lead to the coast undergoing dramatic changes in morphology.
    iv. The *assumption that 68% of SLR up to 2070 is accounted for by extrapolation of historic trend rates. (ref APP-312 TR311)*.
    v. *The in assumption that shore wave climate remains unchanged.* This is untenable given observations on adjacent sandbanks that show cyclic and episodic changes at decadal timescales. These inevitable changes will certainly alter the nearshore wave climate even if the offshore wave climate is unaltered.
    vi. Whilst UKCP18 projections of global climate change do not foresee near-future changes in wave climate, other subsequent studies (Grabemann and Weisse, 2018; Bonaduce et al., 2019) *do* predict changes, particularly an increase in the extreme significant wave heights. Other work (e.g. Pye and Blott, 2006, and cited in TR403, p. 23.) has attributed some historical changes in coastal behaviour directly to changes in wave climate. In my view it is reasonable in an era of global climate change that future changes can also be anticipated.
    vii. Assumptions regarding longshore transport are similarly questionable as even subtle variations in wave regime and/or bathymetry

e. *Use of 'reasonable foreseeable" conditions.*
This explicit exclusion of the impact of extreme meteorological events (wind, waves, storm surge, water set-up etc.) from a forecast looking 50 years ahead is extraordinary, as it is statistically probable that a high-magnitude, low-frequency event will occur in that time period. For instance, there is a 6.63% chance of a 1 in 50 year storm event occurring over a 50 year period. The probability of a 1 in 200 year storm over 50 years is 22.2%. The probability of a 1 in 100 yea event is 4.9%. An extreme event(s) could be sufficient to render elements of the planned infrastructure at risk. While it is likely of very low probability, the potential of tsunami impact should also be considered and the impact could be very severe. (ref REP2-228). In is normal in

risk assessment for engineered work to consider all very high impact situation even where the probability of an event is low.

f. Cefas on behalf of the Applicant highlighted their 'novel' approaches to monitoring and were reliant on:
   i. The Anglian monitoring programme which has detailed data of the East Anglian coastline for only the past 30 years.
   ii. New technologies such as X band radar
   iii. The analysis by the Environment Agency and others of the data provided

   It should also be noted that reliance on both short-term detailed information about the coast and on monitoring does not safely mitigate against future challenges this development may face in future.

(b) If not, what additional information would be required?

(a) A complete proposal from the Applicant which is detailed and clear and provides information on the areas of most concern / vulnerable.

(b) Complete and detailed graphics / diagrams that accurately reflect the detail on the ground and are not 'indicative'

(c) A truly independent expert assessment of the proposals that is well funded and has sufficient time to be able to analyse the detail of the coastal processes, coast and flood defence proposals.

(d) Missing assessments and analysis for example: The proposed treatment of ground conditioning, extreme event protection measures, coast and flood defence measures for the entire site,

(e) It is stated that "*for much of its operation*" (APP-312) the hard defences would have a natural or maintained beach frontage. This statement does not explain the circumstances under which no beach frontage might exist, nor their likely duration.

(f) Clarification on why does the Applicant think it is reasonable and acceptable to regard the offshore geomorphology including the Sizewell-Dunwich banks as an unchanging wave attenuating feature (REP2-393) ?

3. **Update on the additional details of the hard coastal sea defence feature (HCDF) design to be provided at Deadline 5**.

(a) Whilst it is notes that a revised version of the coast defences will be presented at Deadline 5 and therefore it is premature to comment, I would welcome the

delivery of a complete and consistent set of information.

(b) The details of how the HCDF integrated with the SSSI crossing, BLF and jetty proposals are outstanding. These are fundamental to the protection of both Sizewell C and the adjacent coastline.

(c) I am also looking for clarification on missing information such as the methodology on ground strengthening as highlighted by Cllr Robin Sanders in the Issue Specific Hearing on Coastal Geomorphology

(d) If the defences are eventually to be removed, clarification is required on the approach to any hazardous material would have to be considered.

(e) The assessment principles adopted by the Applicant.
Clarification is required as to which assessment principles are being referred to before further comment can be given.

3. The implications of the Proposed Development on the strategies for managing the coast as set out in the Shoreline Management Plan (SMP)?
(a) The SMP policy boundary between MIN 12.4 and 13.1

(a) The SMP policies are sound as they currently stand, up to the extent of the SMP period – ie 2105. The policy for management beyond this date is unknown and a precautionary approach must be taken in considering the implications beyond that date.

(b) The MIN 13.1 policy to 'Hold the Line to 2105', and whether the more seaward position of the HCDF and the SCDF for Sizewell C relative to the Sizewell A and B sites would be in conflict with the SMP.

a. Whilst the Defra definition on HtL is: maintaining or changing the standard of protection. *This policy should cover those situations where work or operations are carried out in front of the existing defences (such as beach recharge, rebuilding the toe of a structure, building offshore breakwaters and so on) to improve or maintain the standard of protection provided by the existing defence line.* However, in the case of Sizewell C it is unreasonable to assume the 5m bund currently in place is the current defence line. It is the 10m AOD sea defence which is currently set back in a contiguous line from Sizewell B. Therefore, the proposals (as currently exist) is to 'advance the line' to bring the main defence significantly eastwards. The Defra definition of Advance the line is '*by building new defences on the seaward side of the original defences. Using this policy should be limited to those policy units where significant land reclamation is considered'*.

b. In order to meet the Applicant's ambition of moving the main sea defence eastwards this requires a change in SMP policy. There is a clear process to do this that should have been undertaken through the Suffolk Coast Forum

before the DCO Application was made so that approval, or refusal, could be made by the stakeholder to the proposed or similar defence.

4. Potential impacts on coastal processes and geomorphology including those arising from the proposed HCDF and the soft coastal sea defence (SCDF) and the temporary and permanent beach landing facilities (BLFs) and associated activities:

(a) The potential for consequential adverse and/ or beneficial impacts on coastal processes arising from these features and activities.

(a) *Inadequate future timescale*. Consideration of shoreline change (and mitigation activities) in this report does not extend beyond 2099 (REP3-048) whereas the site requires protection until 100 years post-decommissioning (ca. 2200). Since the proposed work is intended as a permanent intervention, it will have implications for the coast in perpetuity.

(b) *Use of questionable assumptions underlying the Expert Geomorphological Analysis*. These relate to, *inter alia*, stability of the offshore Dunwich and Sizewell Banks, consistency of inshore wave climate, limited alongshore impact of the defence structures, explicit exclusion from consideration of high-magnitude/low frequency events and assumption of similar future shoreline sinuosity to the present. (REP2-449r) These include:

a. To adopt a future projection based on “reasonably foreseeable” conditions.
b. Sea level rise in the year 2070 would be 0.52 m relative to 1990 levels
c. The offshore wave climate remains unchanged which is unrealistic.
d. The inshore wave climate remains unchanged

(c) Potential protection of Minsmere. The item identified by the Applicant of a potential build up of sediment material at southern end of Minsmere is not guaranteed and if net sediment movement changes, then this could exacerbate erosion in the area. This aspect doesn’t appear to be considered

(d) Introduction of new material (Granite and cobbles) (Rep2-115) into the environment, no independent environmental assessment before being deployed. If it is considered inappropriate especially for the protected species in the area then it must not be used. Longshore drift will move material within and outside of the sub-cell and this also needs to be taken into consideration.

(e) The Applicant has acknowledged that the HCDF cannot function effectively without the SCDF and that without the protection, the HCDF may become exposed as soon as 2053. In my view this identifies that the HCDF is a design with an inherent risk of failure. It is assuming that the SCDF can and will be maintained indefinitely. An alternative design for both Sizewell C and the defences may create a more sustainable solution. In my view it is clear that the current solution is not sustainable.

(f) *Inadequate consideration of the dynamics of nearshore banks*. Significant surface morphological changes have been documented on adjacent banks and their relationship to shoreline behaviour has been shown to be complex. Their decadal scale behaviour and longer-term response to sea-level rise are crucial to predicting future shoreline configuration but these have not been sufficiently considered.

(f) Recognition that as the adjacent coastline erodes there will be a headland developing. Therefore, waves will have access to the flanks of the hard and soft defences and the hard defences could be outflanked, putting the landward infrastructure at risk. Edge effects of sea defence structures are well known and lead to enhanced erosion directly adjacent to hard structures (Morton, 1988). Griggs and Tait (1988), noted that rock armoured structures in California led to accelerated berm erosion and beach scour up to 150 m downdrift of the structure. (REP-449r)

(b) The vulnerability of the coastline to erosion with particular regard to the role played by the Sizewell-Dunwich banks and the Coralline Crag outcrop.

(a) There are noticeable differences and inconsistencies in the approach to understanding the Sizewell-Dunwich banks and their impact on shoreline stability in the documentation pre- DCO, DCO application and post DCO application. Whilst this has been examined in detail in the Deadline 5 submission from Mr Nick Scarr, Interested Party number 20025524 it can be summarised as follows:

a. Pre-DCO – EDF stated that the Dunwich bank is critically important to shoreline processes and is an indispensable wave relief feature.

b. In the DCO Application– the Applicant acknowledges stability problems in the Dunwich bank but claims three unsupported premises:

i. the banks will be maintained by sediment delivery from Northern cliff erosion;

ii. The Sizewell-Dunwich banks can be regarded as a permanent wave relief feature for modelling purposes and

iii this approach represents a worse-case conservative worse-case modelling so is the safe, responsible approach to modelling.

c. During the DCO question/response process – the Applicant now claims the further unsupportable premise that *the Dunwich bank is unimportant and has little effect on shoreline processes and offers no meaningful wave relief.*

b. The Applicant now claims that it can ignore the impact of the banks on the wave climate and are assuming offshore wave heights inshore, based on the 'Beast from the East' 2018 data. In view of the initial importance placed on the banks the Applicant's volte face is remarkable as it says now, they have no relevance on the coastal regime. Whilst the Beast from the East

was an important and recent event there is no evidence that this is a suitable benchmark for future high return period storm events. This rather unprecedented approach should be treated with extreme caution.

c. *Sandbank mobility and shoreline response.* Academic analysis (REP2-449r) recognises that the migration of the whole bank is probably unlikely, however *the possibility of surface morphological changes is high* (subtidal ridges are mobile). These could cause significant changes in wave conditions onshore. In examining the evidence, it appears to me to that evidence undermines the assumptions of the EGA when assessing future stability of the Dunwich and Sizewell banks and related impacts on the shoreline. The fact that the shoreline has exhibited dramatic reversals in shoreline behaviour (Pye and Blott, 2006) attests to the potentially strong influence of bank morphology. Equally, the statement that increased cliff erosion via bank lowering would lead to augmentation of the sediment volume and prolong the life of the soft coastal defences, is invalid; the locus of increased wave erosion could just as well be located at Sizewell C as on any cliffed coastline.

b. Resilience of the Coralline Crag

a. There is no confidence that the Applicant has taken into account the potential failure of Coralline Crag and the impact this may have. Whilst the Applicant identified that Coralline Crag has been a historic feature, it has failed to address future vulnerability to increased sea temps, acidification, increased storminess, potential catastrophic failures.

b. The Applicant acknowledges the different geology of the proposed Sizewell C site from the Sizewell A and B complex in the Sizewell C EIA Scoping Report, April 2014, and reports the following:

7.10.10 The land north of Sizewell B power station sits in a former river basin where the Crags and bedrock has been eroded and infilled…

Therefore, there is no resilience of natural materials for Sizewell C and its protection including for nuclear waste and spent fuel will entirely depend on man-made defences for the entirety of the life of the site. It will in effect be a man-made feature in perpetuity. The Applicant has yet to define its methodology for 'ground improvement' that will a key element in determining how resilient this structure will be in the long term. It is critical that future generations are not left with a legacy of poor design and execution.

(c) The spatial scale of the coastal processes assessment and whether the geomorphic context should be regarded as extending beyond Sizewell Bay?

a. The restricted and constrained areas of interested and timescales (e.g. Zone of Influence) may reduce the management of potential liabilities of the applicant however doesn't reflect on the true impact that this development will cause

b. Evidence of academics from the University of Ulster (REP2-449r) highlight the following:

- *Insufficient spatial scale.* The entire 70 km-long Suffolk coast and adjacent seabed comprises a single large-scale coastal system within which geomorphic changes are intimately interlinked. This spatial restriction flies in the face of current dogma regarding large scale coastal behaviour and system dynamics. Linked to this is, at best, a lack of acknowledgement and at worst a denial, of the long-range impacts (10s of km at century timescales) of both soft and hard coastal defences;

- *No shoreline accretion and sinuosity similar to present.*
  The reasons for long-term shoreline accretion dominated Sizewell's coastal change between 1836 and 1926 and the growth of the Sizewell-Dunwich Bank remain unclear. In coastal engineering and geomorphology it is known that changes in sinuosity are natural outcomes of the emergence of headlands and the subsequent development of very large-scale promontories and indentations. The accentuated shoreline planform promontories at Sizewell B and Minsmere outfall identified in TR 403, provides clear evidence of the possibility of cuspate features to form. This would lead to a major change in coastal plan form involving large areas of erosion and accretion and certainly negates the simple assumption of no change in sinuosity.

c. Defn of Zone of Influence – It may be useful to refer to the CIEEM Guidelines for ecological impact assessment in the UK and Ireland - Terrestrial, Freshwater, Coastal and Marine September 2018 Version 1.1 - Updated September 2019 – to help define the Zone of Influence.

d. These questions challenge the Applicant's proposal for a 3 km ZoI and the arguments put forward in the Issue Specific Hearing to include Benacre Cliffs to the North and the Orford ness point in the south would in my considered view be a more cohesive and sensible response.

(d) Whether other locations, such as Southwold, Thorpeness and Aldeburgh, should be included in the baseline monitoring and mitigation proposals?

a. I would support the extension of the baseline monitoring and mitigation proposals.

b. Reliance on others such as the Anglian Monitoring Group places an unfair burden on others and avoids the responsibility of the applicant to undertake due diligence. This is shifting the responsibility for monitoring onto others and externalising risk. This is unacceptable.

The potential impacts upon the Minsmere frontage, and the role of the Minsmere sluice.

a. Minsmere sluice is clearly an important coastal control feature and its role in coastal development should not be minimised as it "had a significant role in anchoring the shoreline immediately adjacent to the outfall structure by trapping shingle moving north and south during storms, resulting in the

formation of a promontory and accretion observed over c. 500 m of frontage" (APP-312 TR311, p 136),

b. There are two elements to the sluice, 1) impact on the coast and the role it plays in Shoreline Management Plan and 2) the ability to remove excess fresh water from Minsmere, Sizewell Marshes etc. These two attributes cannot be separated and must be considered as one entity.

c. I understand that there is a further report at deadline 7 (?). Therefore, no further comment can be made until this is released and examined.

(b) For the permanent BLF, during the construction phase, the impacts of any dredging, and the barge berthing platform.

a. The Applicant announced that this was being re-designed and therefore any analysis of its impact cannot be considered until this information with its accompanying analysis is available.

(c) Cumulative impacts.

a. When examining cumulative impacts there needs to be a recognition that Sizewell Bay is a complex and dynamic environment
b. I have found no evidence of the Applicant's giving *consideration of complex system behaviour* - i.e. beyond straightforward process-response geomorphology. Contemporary geomorphology knowledge recognises that system linkages and resulting feedbacks can lead to "emergent behaviour" unrelated to immediate forcing mechanisms.
c. There is a need to focus on the long-term impacts and with an integrated system elements of the design and response from the natural environment cannot operate in isolation
d. The consequential impacts of climate change such as sea level rise, increased storminess, reduced protection from Dunwich Sizewell banks may be recognised if not well understood but there are potentially other less well understood consequences (e.g. increased risk of Tsunami) – ref Prof. Bill McGuire but are a real and substantial risk.
e. An independent expert assessment would provide greater reassurance that the issues have been addressed.

5. The adequacy of the proposed climate change adaptation measures, and the resilience of the Proposed Development to ongoing and potential future coastal change during the Project's operational life and any decommissioning period including:

(a) The scope for the HCDF to undergo design adaptation to maintain nuclear safety against predicted sea level rises.

I understand the proposal as it currently stands (prior to Deadline 5) is subject to change. A detailed review would therefore be premature. However, on the revised design the following will be areas of interest:

a. Proposal to add rock – challenges of increasing toe depth in an easterly direction and defence height when erosion is bringing sea closer
b. Need to increase height indicates that the soft defence isn't working
c. Issues of use of concrete plus increased CO^2 emissions
d. How are the north / west and south defences managed / integrated to the main easterly defences?
e. Water will find weakest point (SSSI max increased to only 10.6m)
f. Recognition that SZC will become a nuclear island – safety issue
g. Impact of adaptation works – loss of access, landscape impact inc. loss of any vegetation that has developed since original build

(b) The resilience of the Proposed Development, taking account of climate change, in response to shoreline evolution and change scenarios over the anticipated site life.

a. There is no clarification on how the coastline will develop in long term and the expected consequences both for SZC and the adjacent coastline
b. It would be unrealistic to not expect the creation of a headland and the impact on coastal processes are unclear
c. There will be permanent consequences and residual structures in perpetuity. How will this develop and impact the long term future of the coast. No analysis of its stability of this has yet been forthcoming.

6. Mitigation and controls including the Coastal Processes Monitoring and Mitigation Plan (CPMMP):

(a) Draft DCO Requirement 2, and the Code of Construction Practice (CoCP), Part B, Section 12.

Clarification is sought as to how the 5m bund integrates into the entire sea defence strategy. If breached at Minsmere what stops water flooding behind the SZC 5m bund?

(b) Draft DCO Requirement 7A and the CPMMP.

No comment

(c) Draft DCO Requirement 12B.

No comment

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(d) Draft DCO Article 86.

No Comment

(e) Whether any additional requirements, including those relating to the Marine Technical Forum (MTF), the MAP, the BLF and funding arrangements would be necessary to address adverse physical changes to the coast?

a. Whilst the Marine Technical Forum is already operational it currently has no external scrutiny. Therefore, it would be useful to have the following built into its structure:
    a) no veto or agreement needed by EDF (or future site owners) on the decisions made
    b) It needs to have meaningful local community membership
    c) It must have independent expert input
    d) It must be open to public scrutiny
    e) It must have 'teeth' and access to funding
    f) It must not be limited to the ZoI but wider and also offshore
    g) Legal and robust

b. MAP – No comment

c. BLF – No comment until the final proposal is proposed

d. The funding
    No detail (other than bland assurances) has been seen on funding. Below are some key points that should be included in future discussions on funding:
    a) Future mitigation of adverse impacts on the coast should not fall on public purse.
    b) There will be adverse impacts and the assumption that funding will solve the problem is not sound, there needs to be stronger provision.
    c) A significant fund needs to be set up at the beginning and EDF / the owner must be required to increase if needed.
    d) Funds need to be sufficient to cover long term liabilities beyond the life of the site.

(f) Whether it would be necessary and reasonable to make provision in the draft DCO for the removal of the HCDF at decommissioning?

a. Clarity on how this could be achieved is sought before further comment.

Final Comment

I wish to elaborate my point with regard to CEFAS since Mr Philpott has unfortunately misinterpreted my position, and I possibly could have phrased better.

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My point was not that I questioned Dr Dolphin, or anyone else from CEFAS, on their ability to interpret their duties correctly. The issue is of independence which Mr Philpott did not address.

To help clarify my comments here are the results of an FoI request to Cefas is set out below:

Question	2018	2017	2016	2015	Comments
(1) A copy of the annual accounts of CEFAS for the past 4 years					(Cefas accounts are available in public domain from our website https://www.cefas.co.uk/)
(2) How much of CEFAS' income relates to work conducted in relation to nuclear power plant applications?	£4,636,208	£3,319,449	£4,866,887	£4,763,552	Please note that these figures relate to calendar years (Jan-Dec) but are broadly consistent with income for Cefas financial year (April-March).
(3) How much of CEFAS' expenditure relates to work conducted in relation to nuclear power plant applications.	£4,636,208	£3,319,449	£4,866,887	£4,763,552	Please note that our expenditure on these projects is equal to our income as we are reimbursed on a time and materials basis, having reflected fully absorbed costs in our rates.
(4) What proportion of that income in relation to (2) has been paid by third parties, including:					
a. EDF in relation to Hinkley Point C nuclear power station;	43.4%	78.4%	45.8%	34.0%	
b. EDF in relation to Sizewell C nuclear power station;	56.1%	21.6%	54.2%	66.0%	
c. Direct grant from the government and other public sources; and	0.0%	0.0%	0.0%	0.0%	
d. Other sources (please name those sources)	0.5%	0.0%	0.0%	0.0%	Refers to Bradwell Power Generation company, in relation to Bradwell B nuclear power station.
(5) What proportion of the expenditure in relation to (3) was spent on:					
a. Staff and management costs of CEFAS	83%	85%	83%	86%	Including costs for use of Cefas laboratories and equipment, project-related travel and subsistence etc.
b. External expenditure such as consultants' fees	17%	15%	17%	14%	Refers to costs for consultants and subcontractors e.g. for vessel hire for marine surveys etc.

This together with research into the Annual Accounts raises the following questions:

1) The depth of financial connection with CEFAS and EDF, examination of Cefas accounts identifies that EDF appears to fund approx. 20% of total funding and in excess of 50% of all private sector funding.
2) How little work was contracted to third parties (in excess of 80% of the work was conducted by CEFAS staff).

Inevitably, part of the DCO process will be judging the arguments between competing expertise, and of course there will be differing perspectives, that is the nature of science. The depth of expertise is therefore extremely important as it is a factor on how the ExA will evaluate contrary views. I stress it is not that those experts in CEFAS did not understand their role or answer questions to the best of their abilities, but given the huge variety of marine science disciplines required whether CEFAS is really independent in the context of drawing together the leading experts in the field from across UK scientific institutions?

As can be seen above, over 80% of the (significant amounts) of spending went to CEFAS staff. On a project of this scale and importance it would be expected for

there to be extensive collaboration between institutions to ensure that the advice was given on the basis of the best available science, that is why I posed the question how can we be sure that CEFAS contains all the expertise necessary?

I believe it is important to understand how CEFAS can demonstrate that there is an appropriate breadth of expertise is available. This is a huge project and the advice of these experts will impact our coastal waters for generations: once the power station is turned on, we can't switch it off, so we need to make sure we have the best scientific advice available.

Bill Parker

23/7/2021