Response to REP8-096 9.13 Sizewell C Coastal Defence Design Report from EDF / Cefas by Bill Parker IP20026713

Dear Planning Inspectorate

Outlined below are my comments and observations with regard to the Deadline 8 document issued by EDF / Cefas with regard to the coastal defence design report [REP8-096]. I have grave concerns both whether this proposal is fit for purpose and whether the recent changes proposed will exacerbate the vulnerability of this site.

My main concerns regarding this document are as follows:

1) It is concerning that at this late stage that significant changes are being made to such a fundamental component of the proposed development at Sizewell C thus reducing the opportunity for scrutiny.

2) On page 4 – The term 'Underpinning' is used in the Figure 2-1 and 2-2 and in section 3.6.1. If the term underpinning is being used to imply ground re-enforcement, then this term doesn't appear in either [APP-184] or [APP-180] as referenced in the text. It is not clear what is being meant by this term.

3) Section 2.3.1 Design Parameters include a change in the design life structure to 2140 – 'to accommodate the change in fuel store strategy'. This raises the concern that the Coastal Defence Design Report is not compliant with the ES / ONR Principles for Flood and Coastal Erosion Risk Management Principles for Flood and Coastal Erosion (onr.org.uk) which states very clearly on page 10:

   "*Full life-time of the station – operational life, plus the time taken for the decommissioning and interim storage of spent fuel and waste, prior to disposal. Again, this should be specified and justified by the operator, but is generally understood to be 160 years.* "

   Even in the unlikely event Sizewell C was delivered by 2030 then this means that a viable coastal defence is required till 2190. At least 50 years after the coast defences design date, but in reality, with delivery more likely to be by 2040 then this will stretch till 2200. It is noted that EDF / Cefas continually to deliberately ignore this requirement which is unacceptable. Therefore, the design as outlined in this document is clearly not fit for purpose.

4) Section 2.3.2 – The statistical analysis identified referred to for 'extreme sea water level and surge' is not referenced for review and therefore must be questioned as to its validity.

5) Section 2.4.1 designated as 'design optimisation for September 2021' contains the following highlighted points:
   a. Reduction in width of the whole line of the HCDF…. by 5m, has this compromised the integrity and resilience of the design to reduce its footprint?

b. Pare-back of the HCDF by 15m at the permanent BLF/Northern Mound area. Does this therefore mean that the BLF has been extended (no mention of this in this document) and this north-eastern corner remains vulnerable to tidal surge (see later comments)

6) Figure 3-1 Sea Defence Layout again lacks interpretable detail of how this relates to the existing shoreline. If, it is assumed that the red line on the graphic is the existing Mean High Water Springs then it is clear still how close this structure is to the existing shore line and how vulnerable it is to future erosion esp. with the increasing impact of climate change.

7) I also note from Figure 3-1 how narrow the English coast path has become. The cross-section diagrams (Figure 3-5 – Permanent Sea Defence, Typical Cross-section… and Figure 3-12 – SCDF, Upper Maintained Profile and Initial Beach Recharge Profile) are indecipherable and are taken where the foot path appears to be at its widest. Clarity is sought as to how narrow this path actually is and what is its topography along its entire route to the east of the HCDF.

8) Temporary HCDF – In Fig 3-2 Temporary HCDF, Typical Cross section it appears that the structure will be only 3m above ground level. I would question if this is high enough to be confident that it provides adequate protection. It also functions as a shield to beach users from the haul road to the west of the defence. In view of the proximity, size of vehicles and scale of works being proposed I would question if this is sufficient?

9) The changes in topography, the timescales and sequence of activities makes the interpretation of Figure 3-3 – Temporary HCDF challenging. I am unable to determine if this is reasonable

10) Figure 3-5 Permanent Sea Defence, Typical Cross-section… I note that the General Cross Section (assumed to be mid-way along the structure ref Fig 3-1) is in grey (unlike the lower part of the diagram) which makes examination impossible. This is clearly deliberate by EDF / Cefas presumably to avoid detailed critique this is unacceptable at this stage of the process.

    What is clear is that the toe of the rock armour is only at +0.0 AOD and that isn't even the lowest point of the main defensive structure, the 6 to 10 tonne rock armour blocks. The lowest layer appears to be an undescribed smaller material layer. Questions on vulnerability to undermining remain especially as in para 3.10.10 there is a statement that:
    'numerical modelling of the beach storm response indicates that the toe of the HCDF would not be at risk of being undermined in a design basis of a 1:10,000yr storm event provided it is set at 0.0m or lower'
    It is noted that EDF / Cefas have identified that the SCDF is essential to ensure the

integrity of the HCDF. In view of Cefas already admitting to the very limited time period that modelling is useful (for as stated in [APP-311]) it would seem an unwise and false economy to have such shallow base to the HCDF on its construction.

11) The adaptive design will, however, require a deeper toe, engineered to a depth of -1.5 AOD some 10m eastward (seaward) of the existing hard defence toe.

Para 4.4.3 states with regard to the adaptive design:
'The embankment and toe would be extended outwards and downwards as part of the Adaptive Design implementation. These Works would include excavation within the beach/ SCDF to permit the extension and lowering of the HCDF toe, and the transport and placing of armour stone units to form the new revetment. Placement of the toe armour would be within the tidal zone.'

Therefore, are EDF / Cefas are proposing to dig deeper and more seaward of the existing HCDF for the adaptive design despite the need for the adaptive design only being required once the sea has encroached westward and has potential to compromise the integrity of the original sea defence. It also states that the 'toe armour would be within the tidal zone' This at best can only be described as poor practice and is presumably designed to save money on the initial build.
However confusingly in para 4.4.2 it states:

'*The core and associated foundations required to support the Adaptive Design would be installed as part of the initial Permanent Sea Defence construction and would not require further intrusive work at a later stage'*.

If this is the case then figure 3-20 (and other similar cross sections for the permanent HCDF such as A.3) are therefore wrong. This exemplifies the muddled and confused approach that EDF / Cefas has perhaps demonstrating that the approach to sea defences is both fragmented and ill considered.

If the proposal is to build the toe etc at a later stage would be both more difficult and more expensive to deliver.

12) I have some concerns at the basis of Design (section 3.4.5)
In the Design Parameter assumptions under all scenarios, Long Term Erosion is assumed to be 0 – 20m till 2140. In the 2010 Shoreline Management Plan (prior to 2018 UKCIP predictions) it states that over 100 years to 2105 the shoreline is likely to erode between 10 to 70m. (Page PDZ 4.9 Microsoft Word - PDZ4v9g post consultation_vFINAL.doc (suffolksmp2.org.uk)). Therefore, the assumption that the modelling would be based on an eroded profile only 20m landward of the proposed / existing profile cannot be assumed to be wildly optimistic and far from precautionary, especially as the defences need to be in place till 2140 according to

EDF / Cefas or in reality to 2190+. The area either side of the identified SCDF will have no protection and therefore Sizewell C will become an unsustainable headland.

In para 3.5.5 it states that the Permanent (presumably HCDF) toe level is set at 0.0m OD being 0.5m below the lowest predicted beach level following 1:10,000 year storm. This seems extraordinarily cavalier and arrogant to assume that modelling is that accurate that the entire integrity of the sea defence of a nuclear power station is based on 50cm depth of beach. It is clear from the history of the Suffolk coast significant and un-forecast changes in beaches can and do occur.

In addition, it is unclear as to what approach has been adopted for Sea Level Rise as UKCP goes to 2100 and not beyond. Have these figures been extrapolated beyond 2100 on the same trend or on an accelerating basis. For critical infrastructure this simply isn't good enough.

13) In section 3.6 SZB interface that the cross-section diagram on Figure 3-9 (P16) has no ground improvement under the core material fill identified unlike Figure 3-7 Permanent Sea Defence (P15). No explanation for how this will be achieved or where this ground improvement will be included or not included and any logic behind the decision. Clarity is sought about the detail which has so far not been forthcoming despite a request from the ExA [PD-046] question ref CG.3.10. Another inconsistency by the Applicant.

In section 3.6.2 it is claimed that the SCDF has 'sufficient volume to protect against 1:10,000 year storm.' This however is not open to scrutiny or the assumptions made clarified therefore this statement has to be treated with extreme caution.

Even in Cefas's own document TR545 [REP7-045] the modelling is based on a 1:20 (not 1:10,000) year storm, this is hardly an extreme scenario. Utilising a modest 1m surge Plymouth University cautions:

'However, under a 1-in-20 year storm from the NE at 2099 sea level and with storm surge, the highest swashes were predicted to reach the SCDF crest. Along the natural beach to the north of the SCDF, overtopping and potential breaching of the natural beach crest is predicted to occur under these storm conditions'

It is also worth noting that a 1:20 year event today has a 99.4% chance of happening in 100 years a 60.9% chance of 1:200 year event. Therefore, whilst the research undertaken in TR545 [REP7-045] is interesting but it provides little evidence for having confidence for understanding the impact of extreme events essential for long term critical infrastructure.

14) In section 3.7 the RSPB boundary is discussed along with Rights of Way in the area. However, the interface with the SSSI crossing is not clarified. The concern is the coast protection around the SSSI crossing on the northern, and western sides of the

site may compromise the integrity of the site and leave it vulnerable to flooding. This is serious omission and potentially in the longer term extremely vulnerable. (see SCDF and BLF interface comment below)

15) Section 3:10 Soft Coastal Defence Feature.
If you take into consideration the current profile of the beach, the proposed location of the hard defence, the proposed volume of sediment to be added (According to [REP-7101] 130 to 250 cubic meters) per metre and the rather misleading statement in 3.10.13 '*before sloping down gently to merge with the existing beach profile'*, it is clear that the coastline will need to be advanced eastwards into the sea. This is to provide sufficient protection (at least in the short term) to the HCDF. The lack of detailed illustrations in the documentation adds to my concern that EDF / Cefas are avoiding examination of the detail. The Figure 3-13 – SCDF, Indicative Recharge Threshold is not georeferenced and is therefore of little use in determining the impact of the recharge.

16) SCDF and BLF interface.
In Figure 3-14 there is an illustration of the BLF road round the sea defence. Whilst the top of the sea defence is marked at +14.6m the road in figure 3-11 cross section A-A the BLF road is at +6.062m. It is not clear as to how vulnerable the SSSI / BLF road and main site is to tidal surge flooding. Clearly the main sea defences on the eastern side are at +12.6m to +14.6m are vulnerable to flooding via the road then the design is flawed. This is also the north eastern corner which is most vulnerable to major storms.

17) 3.12 Minimising the eastward extent – This section seeks to justify the location of the HCDF and why it cannot be moved further westward. In [REP2-230] I have outlined the compromise that replicating the Hinkley point C design on this site makes. The long-term safety of the site and meeting EDF own risk assessment [APP-616] has been traded for avoiding the shorter-term challenges of taking more SSSI to the west. In short, this site is too small for the EPR design and is putting the future of the site, Sizewell C and the adjacent coastline at risk. EDF / Cefas has created elaborate and complex mitigation measure but cannot hide the basic problem, it is the wrong solution for this site and should not receive DCO approval.

18) The proposed adaptive design identified in Fig 3-17 now has a vertical face to the additional height. Vertical faces in sea defences are considered undesirable due to the way waves a) break over them and b) don't dissipate energy. Whilst this design is not detailed in this paper it has fundamental compromises and with the restricted width due to the desire to reduce overall defence width it should not be accepted without greater further examination.

19) There is an inconsistency in section 4 Construction and Sequencing. The section on Temporary Sea Defence makes no mention of delivering ground improvements

where as in 4.3.5 it states '*Ground Improvement will be required for the eventual Permanent Sea Defences. This would be installed at the early stage in advance of the Temporary Sea Defence, along with other similar Ground Improvement measures concentrated at the northern end of the MCA site*.' The sequence of activities appears to be confused or poorly thought through in the delivery process for the various sea defences.

Conclusion:

This latest iteration of the coast defence design from EDF / Cefas right at the end of the public consultation stage of the DCO process raises many concerns. Whilst EDF / Cefas may claim that they do not have to finalise the design yet, the fact that there is so much uncertainty should raise significant concerns with the Planning Inspectorate and cause them to challenge the Applicant on its plans. The ExA would be right to be sceptical that EDF can deliver a safe and secure site delivering all the undertakings being made. This location is highly vulnerable and to build Sizewell C in this location is in contravention of Government policy including from EN-1

'4.8.8 The IPC should be satisfied that there are not features of the design of new energy infrastructure critical to its operation which may be seriously affected by more radical changes to the climate'

This proposal fails this test and therefore the ExA should recommend refusal of the DCO.

Bill Parker

12/10/21