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## BP'S RESPONSE TO DEADLINE 8

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## Deadline 8 submission

### BP'S RESPONSE TO DEADLINE 8

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#### 1. OVERVIEW

- 1.1 BP Exploration Operating Company Limited ("bp") has prepared this submission in response to Deadline 8 and provides:
- 1.1.1 bp's submissions to address the submissions made Orsted at Deadline 7 ([REP7-087](#)), and The Crown Estate Commissioners ("TCE") at Deadline 6, including at Annex 1 a Legal Opinion from Jason Coppel QC on the lawfulness of the bp's proposed protective provisions, particularly in relation to the provisions addressing the Interface Agreement;
  - 1.1.2 bp's submissions in respect of the report by the North Sea Transition Authority ("NSTA") which was published by the NSTA on 1 August 2022 (the "NSTA Technical Report") and reviews the role of monitoring for offshore carbon storage sites, with a particular emphasis on those sites with restricted access owing to co-location with other marine industries, particularly offshore windfarms (submitted by Orsted at Deadline 7 ([REP7-087](#), Annex 4, electronic page 88) as it relates to previous submissions into this examination, as well as bp's response to the additional submissions made by Mr Sewell (of Xodus) on Orsted's behalf at Deadline 7; and
  - 1.1.3 Version 5 of bp's proposed protective provisions (clean copy as Annex 3 and tracked-change version as Annex 4), to correct a minor cross-referencing error from the previous Version 4 submitted at Deadline 6.

#### 2. BP'S RESPONSE TO ORSTED'S DEADLINE 7 SUBMISSIONS AND TCE'S DEADLINE 6 SUBMISSIONS

##### **Response to Orsted's submissions**

- 2.1 Orsted's submissions at Deadline 7 in respect of the interface between the projects in the 'Overlap Zone' included minor updates to their protective provisions, and responses to:
- 2.1.1 the decision-making flowchart provided by bp at Annex 8 to its Deadline 6 submission ([REP6-046](#));
  - 2.1.2 Version 4 of bp's proposed protective provisions, submitted at Annex 2 to its Deadline 6 submission; and
  - 2.1.3 bp's further response to the Sewell Report provided at Annex 4 to its Deadline 6 submission (with its initial response having been provided at Annex 1 to its Deadline 5a submission ([REP5a-025](#)).
- 2.2 There is little new evidence included in these responses, with much of the content having been responded to and addressed in bp's previous submissions. Rather than duplicate the same in this submission, bp has signposted (for the ExA's ease of reference) where it has

responded to relevant points in its previous submissions and supplemented where it is considered there is anything material or helpful to add.

- 2.3 Specific to the minor amendments to **their protective provisions** (paragraph 1.1.1.3 of their response):
- 2.3.1 Paragraphs 3.2 to 3.12 of bp's Deadline 6 submission ([REP6-046](#), electronic pages 4 and 5) provided bp's general submissions in respect of Orsted's proposed protective provisions, and how/why they are flawed.
- 2.3.2 Specific to the amendments proposed at D7, bp commented on the inappropriate nature of the conditionality (including time-limit) proposed by Orsted in paragraph 6.6.1 of its Deadline 2 submission ([REP2-062](#), electronic page 10). Whilst that was in the context of a three month period, the same point remains in relation to a 4 month period.
- 2.4 Specific to the **decision-making flowchart** (section 2 of their response), Orsted query the accuracy of the conclusions suggested and generally assert that bp would not/should not have entered into the Interface Agreement were they to hold such conclusions, and that the Interface Agreement should continue to be the preferred forum through which the interface issues and any associated compensation can be determined. In response:
- 2.4.1 bp "adhered" to the terms of the Interface Agreement in February 2021, by virtue of becoming the 'Carbon Entity' for the purposes of the Agreement for Lease over the Endurance Store, in accordance with the requirements stipulated under clause 8 of the Interface Agreement. It was a procedural step pursuant to the extant terms of the Interface Agreement.
- 2.4.2 Nevertheless, bp has clarified in previous submissions (see para 7 of its Deadline 1 submission ([REP1-057](#), electronic page 128) that it was in December 2021 (i.e. following the adherence to the Interface Agreement in February 2021) that it was concluded that co-existence between the projects over the same area of sea-bed would not be possible, for the reasons stated in the Technical Assessment which was shared with Orsted (and TCE, BEIS and the OGA (now the NSTA)) (included at Annex 1 to bp's Deadline 1 submission, electronic page 147). Extensive further technical evidence has been submitted into this examination in support of this position, including again at this Deadline 8 (Section 3 below).
- 2.4.3 bp has also clarified why the Interface Agreement does not provide a workable solution to manage the potential compensation claims that could result from Orsted's inability to develop within the Exclusion Area, and why it is misleading to claim otherwise (paragraphs 3.32 to 3.45 of bp's Deadline 6 response, [REP6-046](#), electronic pages 8 and 9).
- 2.4.4 Whilst it may be strictly true that bp has not sought to renegotiate the terms of the Interface Agreement, it is disingenuous to suggest that bp has not sought to reach alternative agreement with Orsted in relation to this interface and Orsted have themselves referenced such negotiations in this examination. The focus of these discussions have been on a commercial resolution, rather than a variation to the IA for the implicit reason that co-existence is not deemed feasible. bp's submissions in relation to the feasibility of such voluntary agreement being reached were set out in paragraphs 3.46 to 3.50 of its Deadline 6 submissions ([REP6-046](#), electronic page 10).
- 2.4.5 The central premise of Orsted's proposals is their 'confidence' that a solution can be found to enable co-existence in the Overlap Zone (or more specifically, the Exclusion Area as the sub-part to the wider Overlap Zone). Simply, there is no substance to this confidence for the reasons submitted by bp in its various submissions into this examination, including at this Deadline 8 (see Section 3 below), and their continued suggestion that one will come forward, with their drafting predicated on the same represents a fig-leaf that cannot be relied upon

(as noted in paragraph 3.5 of bp's Deadline 6 submission, [REP6-046](#), electronic page 5).

- 2.5 Regarding Orsted's comment on **bp's protective provisions** (section 3 of their response), and specifically the revised approach put forward in Version 4 submitted at Deadline 6:
- 2.5.1 Orsted note that bp's protective provisions, and specifically the 3 year longstop/walk-away period does not incentivise bp seeking to achieve co-existence in that period. That is correct, with the central purpose of the imposition of the Exclusion Area being that that co-existence will not be possible and so the drafting is not intended to preserve that possibility.
- 2.5.2 The 'longstop' period was reduced from five years to three years in version 4 of the protective provisions in recognition of Orsted's previous submissions. It is acknowledged that this period still goes beyond the scheduled FID date for the NEP project (in accordance with the ECC plan milestones); however, there are factors outside of bp's (and its partners) control which may import unforeseen delay (e.g. government delay to the TRI Licensing model, meaning the partners need more time to decide whether to proceed with the project and crystallise the associated compensation liability under the protective provisions), and which needs to be reflected in this period.
- 2.5.3 The proposed timescale for the payment of the compensation is conceptually linked to when Orsted would have otherwise started to receive revenue resulting from generating capacity in the Exclusion Area, but with a specific date also provided to enable certainty that such compensation would be paid by a particular point.
- 2.5.4 Orsted note their previous legal submissions (REP5-076) apply equally to the revised approach put forward by bp in Version 4. To supplement bp's previous response to those legal submissions (Annex 2 of bp's response to Deadline 5a, [REP5a-025](#), electronic page 26), bp instructed Jason Coppel QC to consider and confirm the lawfulness of the approach in relation to the *vires* under s120 of the Planning Act 2008 and, particularly, any perceived breach of Article 1 of Protocol No.1 to the European Convention on Human Rights ("A1P1"). The Opinion is included at Annex 1 to this Deadline 8 submission, and provides confirmation that:
- (A) s. 120(3) PA 2008 read, in particular, with paragraph 3 of Schedule 5 to that Act, clearly provides the necessary *vires* for the inclusion of bp's proposed protective provisions in the Hornsea Project Four DCO; and
  - (B) in circumstances where the provisions are considered to interfere with the 'possessions' of Orsted in terms of A1P1 (by reference to their rights under the Interface Agreement), that the SoS would be entitled to establish that any such interference would be proportionate in the public interest, given the very strong public interest in preserving the full extent of the Endurance Store and so the delivery of the ECC plan.
- 2.5.5 Orsted also reference The Crown Estate's ("TCE") submissions, particularly with regards to the need to obtain TCE consent pursuant to s135(2) of the Planning Act 2008 in order to include bp's protective provisions in the Hornsea Project Four DCO. bp's response to such submissions, and the suggested way to proceed is set out in paragraphs 2.6 to 2.10 below.
- 2.5.6 Finally, Orsted note that bp's protective provisions (through the imposition of the Exclusion Area) may result in an increased WTG density in a smaller developable area outside of the Exclusion Area, which may lead to wake loss impact and ultimately a less competitive project in the Contract for Difference Auction Round

model. They also reference the potential implications of the same from a UK energy policy perspective in section 5 to their submission.

- 2.5.7 bp acknowledge such impacts/consequences are possible, and clearly the turbine size and layout would be primarily at Orsted's discretion as developer. However, Orsted have confirmed that such amendments to their scheme would not render their project unviable (in response to Question INF2.1 at Deadline 5, [REP5-074](#), electronic page 44). This is contrast to the counter-factual scenario where they are permitted to locate wind turbines in the Exclusion Area, which would lead to NEP not developing the Endurance Store in that area, leading to a circa 70% reduction in the available storage capacity, the ECC plan being rendered unviable and the loss of 10-11MTPA of CO2 injection capacity, greater than 50% of the Government's minimum CCUS capacity target for 2030 (as set out in the decision-making flowchart, Annex 8, REP6-046), electronic page 82).

### **Response to TCE's submissions**

- 2.6 bp notes TCE remain of the view that its consent, pursuant to section 135(2) of the Planning Act 2008 is required because the Interface Agreement and provisions relating to the same relate to Crown land ([REP6-066](#)).
- 2.7 bp notes that this submission was made without sight of the revised drafting proposed by bp in Version 4 of its protective provisions submitted at Deadline 6, which altered the approach taken in respect of the Interface Agreement ([REP6-046](#), electronic page 12). The drafting now expressly states that the protective provisions do not affect the rights or obligations as exist under the terms of the Interface Agreement, save in relation to the Carbon Entity's liability to the Wind Entity from under it, with such liability removed and replaced with an alternative compensation provision (paragraph 6). This drafting ensures that TCE's rights/interests under the Interface Agreement are now expressly preserved and not prejudiced in any way.
- 2.8 This revised approach was developed in acknowledgement of the submissions made by TCE (and Orsted) at Deadline 5 and sought to address the concerns expressed within them.
- 2.9 As a result, to the extent TCE consider that section 135(2) is otherwise engaged because of the nature of the Interface Agreement and its prevailing context to Crown land, bp would anticipate that TCE should be prepared to consent to the inclusion of the provision pursuant to s135. This could be provided on a 'without prejudice' basis to the merits of the technical submissions made by bp and Orsted into the examination, which will be determined by the SoS in due course. This would mean that any consent granted by TCE pursuant to s135(2) for the inclusion of the provisions put forward in bp's protective provisions would be contingent on the SoS finding in favour of bp's submissions on the need for such protective provisions.
- 2.10 If, alternatively, TCE is not prepared to grant consent pursuant to s135 on that without prejudice basis, it would be helpful to understand what remaining concerns TCE have that would prevent them from doing so. bp is liaising with TCE on this basis; however, given the proximity to the close of the examination, it may be this is a matter that the SoS needs to further consider in the decision-making stage.

### **3. THE NSTA TECHNICAL REPORT AND RESPONSE TO SEWELL'S RESPONSE TO BP'S SUBMISSIONS**

- 3.1 The NSTA Technical Report reviews the role of monitoring for offshore carbon storage sites, with a particular emphasis on those sites with restricted access owing to co-location with other marine industries, particularly offshore windfarms. Orsted submitted a copy of this report (along with a slide pack dated June 2022 and a slide pack dated 26 July 2022) prepared by the NSTA for discussions with industry participants and others interested in CCS and in wind farms) at Deadline 7 (Annexes 2 to 4), together with additional submissions made by Mr Sewell (Xodus) in response to bp's comments on his original report (Annex 1) ([REP7-087](#)).

- 3.2 bp's comments in respect of both the NSTA Technical Report and Sewell's additional submissions are included at Annex 2 to this response to Deadline 8.
- 3.3 As a general observation, bp notes that Orsted position the Sewell report and subsequent submissions as supplemental to the original technical evidence Orsted submitted in the form of the OREC/NZTC report (paragraph 4.1.1.3 of Orsted's response to Deadline 7). However, it is unclear to bp how it can be positioned as 'supplemental', when the reports are in conflict with one another in a number of core technical areas – as detailed by bp in its response to the Sewell Report at D6 (see, for example, paragraphs 2.3 to 2.16 of Annex 4 to the Deadline 6 response, [REP6-046](#), electronic pages 31 to 34). It is also noted that the authors of the original OREC/NZTC report did not wish to participate in the examination (as confirmed by Orsted at ISH9 and in their summary of oral case from the same (REP6-036, [electronic page 11](#)). In any event, and notwithstanding the inconsistencies/disagreement between Orsted's consultants, bp has responded to all aspects of both in this examination, including finally at Annex 2 to this response.
4. **VERSION 5 OF THE PROTECTIVE PROVISIONS**
- 4.1 bp has provided Version 5 of its proposed protective provisions (clean copy as Annex 4 and tracked-change version as Annex 5), to correct a minor cross-referencing error from the previous Version 4 submitted at Deadline 6.
- 4.2 No further edits have been made and the corresponding protective provisions plan remains as included as Annex 3 to the Deadline 6 submission ([REP6-046](#), electronic page 25).

**ANNEX 1**  
**LEGAL OPINION FROM JASON COPPEL QC**



**BP EXPLORATION OPERATING COMPANY LIMITED**

**NEP-HP4 INTERFACE AGREEMENT**

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**ADVICE**

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**Background**

1. I am instructed to advise BP Exploration Operating Company Limited (“**bp**”) in the matter of possible revisions to an “Interface Agreement” (“**IA**”) dated 14 February 2013 relating to an “Overlap Zone” of seabed. Agreements for lease which include the “Overlap Zone” have been made with the Crown Estate Commissioners (“**CEC**”) for the purposes of two different projects: the Northern Endurance Partnership (“**NEP**”), of which bp is the current operator, and Hornsea Project Four (“**HP4**”), the operator of which is Orsted Hornsea Project Four Ltd (“**Orsted**”). My advice is sought on the question of whether certain revisions to the IA which have been proposed by bp would be lawful if effected by a Development Consent Order (“**DCO**”) the terms of which are to be determined by the Secretary of State for Business, Energy and Industrial Strategy (“**the SoS**”), in particular having regard to any Convention rights of Orsted in the existing IA.
2. I am a practising barrister, specialising in public law and human rights. I have long experience of advising and representing a wide range of parties in public law and human rights matters, including central Government departments, both as a junior barrister, when I was a member of the Attorney General’s panels of civil Counsel, and since my appointment as Queen’s Counsel in March 2013. I have acted in a number of judicial review claims which raised the issue of whether any “possessions” within the meaning of Article 1 of Protocol No. 1 to the European Convention on Human Rights (“**A1P**”, “**ECHR**”) had been unlawfully interfered with, and represented the UK Government in Strasbourg proceedings on that question. I have recently advised the SoS and OFGEM on public law and Convention rights issues arising out of recent turmoil in the energy supply markets and currently represent OFGEM in Technology and Construction Court proceedings regarding the quantum of compensation which should be awarded to companies

which were unlawfully refused registration as biomethane producers under the non-domestic Renewable Heat Incentive Scheme.

3. The relevant factual background, as provided in my Instructions, may be summarised as follows:
  - (1) The NEP proposes to construct and operate a CO<sub>2</sub> transportation and storage system that will enable CO<sub>2</sub> from certain carbon capture projects on Teesside and the Humber to be transported to a geological storage facility in the 'Endurance' saline aquifer, a geological reservoir below the Southern North Sea seabed (the "**Endurance Store**"). The carbon capture projects across Teesside and the Humber which would be enabled by the NEP project are together known as the "East Coast Cluster" ("**ECC**") and represent almost 50% of the UK's current industrial cluster CO<sub>2</sub> emissions as defined by the SoS. The SoS selected the ECC for one of the UK's first two carbon capture, usage and storage ("**CCUS**") projects. The proposed plan for deployment of CCUS by the ECC ("**the ECC Plan**") will play a key role in reaching the UK's target of net zero emissions by 2050.
  - (2) HP4 is a proposal to develop an offshore wind farm of up to 180 wind turbine generators, together with associated offshore and onshore infrastructure, approximately 69km off the Yorkshire coast. A DCO application was made in respect of HP4 pursuant to the Planning Act 2008 ("**PA 2008**") in late 2021 and is currently undergoing examination.
  - (3) The area of seabed subject to the agreement for lease granted by CEC in relation to HP4 overlaps with the area of seabed subject to the agreement for lease granted by CEC in relation to NEP's development of the Endurance Store, giving rise to the Overlap Zone.
  - (4) It was originally anticipated that it would be possible for the HP4 and NEP projects to co-exist in the Overlap Zone. The IA was negotiated on that premise and makes provision for regulating and co-ordinating the parties' activities in an attempt to manage potential conflicts. However, after extensive analysis, bp and its NEP partners have now concluded that co-existence of the two projects across the Overlap Zone is not technically feasible. Put shortly, in the event that the HP4 DCO is granted in a form which permits wind infrastructure to be located across the entirety of the Overlap Zone, and CEC give their consent to that occurring (pursuant to §2 of the IA), the Endurance Store could only be developed outside of the Overlap Zone. On this scenario, the Endurance Store would only

achieve approximately 30% of its potential storage capacity, thereby rendering the ECC Plan unviable.

- (5) If the HP4 project were to be precluded from installing infrastructure in the Overlap Zone in order to ensure the delivery of the ECC Plan this could in principle constitute a “Material Adverse Effect (Pre-Operational)”, as defined in §1.3 IA, as giving rise to “Re-location costs” and/or “Re-programming costs”. The IA, as currently framed, provides for bp (as the “Carbon Entity” under the IA) to compensate Orsted (the “Wind Entity”) for such costs. In the case of Re-location costs, these would be calculated on the basis of *“the diminution in the market value of the Wind Entity’s project that will arise due to the loss of such infrastructure [from the Overlap Zone] or reduction in power output [as a result of infrastructure not being able to be located in the Overlap Zone] as the case may be”* (§1.3 IA). If the parties cannot agree on the amount of compensation which is payable, there is provision in the IA for this to be decided by a single expert, whose determination *“shall be final and binding upon the Entities except in the case of fraud or manifest error or failure by the Expert to disclose any interest or duty which conflicts with his functions under his appointment as Expert”* (§6.4.10).
- (6) At this stage, there is considerable uncertainty as to the amount of any compensation which may be required by the IA and so considerable risk to bp and other members of the NEP as to their potential liability to Orsted, as may be determined by the Expert. I am instructed that this risk, if unaddressed in the DCO, would likely lead to the NEP partners electing not to proceed with developing the Endurance Store in the Overlap Zone (with the consequences for the ECC Plan noted above).
- (7) bp has made proposals for the DCO currently under examination to revise the IA in order to mitigate the significant risk currently facing the NEP, and the ECC Plan. These proposals were, initially, for disapplication of the IA in its entirety; and more recently for removal of bp’s liability to Orsted under the IA and for a new regime whereby the SoS would assess and determine appropriate compensation for Orsted, taking explicit account of the need to preserve the deliverability of the full extent of the Endurance Store and so the viability of the ECC Plan. Orsted has resisted any changes being made to the IA, and has relied upon submissions drafted by James Maurici QC (“**JMQC**”) dated 8 June 2022 which argue that disapplication of the IA would be unlawful, as *ultra vires* s. 120(3) PA 2008 narrowly

construed and/or contrary to the Human Rights Act 1998 (“HRA”) as a breach of the A1P rights of Orsted.

4. I am asked to advise whether it would be lawful, including under the HRA, for the SoS to make provision in the DCO for revision of the compensation provisions of the IA. My conclusions, in summary, are as follows:

(1) On its ordinary meaning, and taking into account relevant common law principles of statutory interpretation, s. 120(3) PA 2008 read, in particular, with §3 of Schedule 5 to that Act, clearly provides the necessary *vires* for provision in the DCO which removes the current provision of the IA for payment of compensation by bp to Orsted.

(2) On the assumption that such provision would interfere with the “possessions” of Orsted (whether by “interference”, deprivation or control of use), there is good reason to think that the SoS could establish that any such interference would be proportionate in the public interest, given in particular the very strong public interest in the success of the ECC Plan. On that basis, there would be no breach of Article 1P and so no reason to read down s. 120(3) PA 2008 so as to preclude the action sought by bp.

#### **Vires to make provision in the DCO to disapply part or all of the IA**

5. Section 120 PA 2008 confers very broad discretionary powers upon the SoS to determine the contents of a DCO. A DCO may “*impose requirements in connection with the development for which consent is granted*” (s. 120(1)) and “*may make provision relating to, or to matters ancillary to, the development for which consent is granted*” (s. 120(3)). Examples of provision which may be made under s. 120(3) are included in Part 1 of Schedule 5 PA 2008 (see s. 120(4)). This includes, in §3 of Schedule 5, “*The abrogation or modification of agreements relating to land*” and, in §11, “*The imposition or exclusion of obligations or liability in respect of acts or omissions*”. With regard to §3, “land” is defined in s. 235 PA 2008 as including “*land covered with water*”.

6. It is, in my view, clear that the SoS has power to include provision in the DCO to prevent development by Orsted in the Overlap Zone (pursuant to s. 120(1)) and (pursuant to s. 120(3)) to modify the IA, which is an agreement relating to land covered with water, or even to abrogate it altogether. He could also exclude obligations or liability of bp, as the Carbon Entity under the IA, whether this is regarded as an agreement relating to land or simply as an agreement which

regulates the relationship between two projects and which gives rise to potential obligations or liabilities.

7. It has been argued on behalf of Orsted (in opposition to bp's original proposals) that s. 120(3) PA 2008 "*should not be construed as allowing for the overriding of contractual rights in a commercial agreement*" but "*should be interpreted narrowly and as not authorising the disapplication (deprivation) of valuable contractual rights absent any compensation*" (§48 of JMQC's Submissions). That argument is based on the premise (stated in §45 of the Submissions) that bp's proposals are founded only on s. 120(3) itself and not upon any provision of Schedule 5 PA 2008. In fact, as I have explained above, there is specific provision in §3 of Schedule 5 for the abrogation or modification of agreements relating to land covered by water, which does not impose any pre-condition of the payment of compensation. This is not, therefore, a case of general words being relied upon to found a power to modify contractual rights, but of specific provision which clearly covers what is proposed. The provisions of the PA 2008 are broad and clear enough to permit the SoS to disapply or abrogate the IA in its entirety (which was bp's former proposal) and *a fortiori* they are broad enough to permit the lesser step of removing the compensation provisions of the IA, and/or bp's liability under those compensation provisions. In my view, there is clear authority in the PA 2008 for the modification or abrogation of the IA by provision in the DCO and Orsted's argument to the contrary, insofar as it is based upon common law principles of statutory interpretation (see §47i-v of JMQC's Submissions), is wrong.
8. Orsted has placed some emphasis on the absence of direct and closely analogous precedent for making provision in a DCO such as that sought by bp. I understand that those instructing me have identified a previous DCO which made provision for the abrogation of contractual obligations imposed upon the developer in an agreement with the relevant local planning authority (see §52(6) of the Hinkley Point C (Nuclear Generating Station) Order 2013 (SI 2013/648)). This does represent an exercise of the power conferred by §3 of Schedule 5 PA 2008, albeit in different circumstances. However, it is of little or no relevance to the legal analysis, either for the purposes of *vires*, or under the HRA, that there is a dearth of previous cases where DCOs have modified or abrogated pre-existing contractual provisions. The current situation, of overlapping agreements for lease, and an agreement between developers to regulate that overlap, which was wrongly premised on the view that co-existence within the Overlap Zone was technically feasible, is genuinely unusual and one would not expect to see any previous case where similar facts have arisen or where similar provision has been made.

9. Orsted also contends – in §47vi of JMQC’s submissions - that s. 120(3) PA 2008 should be read down pursuant to s. 3 HRA so as to not to permit the modification of the IA, as such modification would contravene its rights under Article 1P. I agree that if the modification of the IA, or the exclusion of bp’s liability under it, did contravene Orsted’s Convention rights, it would not be open to the SoS to make such provision in the DCO. However, if there were a sufficient justification for any interference with Orsted’s Article 1P rights, the provisions of the PA 2008 need not be read down and, on their ordinary meaning, are amply sufficient to permit the SoS to include terms in the DCO for which bp has advocated. I turn now to consider the Convention rights argument in more detail.

### **The argument based on Orsted’s Convention rights**

10. Article 1P provides as follows:

*“Every natural or legal person is entitled to the peaceful enjoyment of his possessions. No one shall be deprived of his possessions except in the public interest and subject to the conditions provided for by law and by the general principles of international law.*

*The preceding provisions shall not, however, in any way impair the right of a State to enforce such laws as it deems necessary to control the use of property in accordance with the general interest or to secure the payment of taxes or other contributions or penalties.”*

11. I am asked to assume for the purposes of this issue that the clauses of the IA which make provision for bp to pay compensation to Orsted, in particular in the event of a “*Material Adverse Effect*”, represent a “possession” of Orsted within Article 1P. I make that assumption, noting the dictum of Coulson LJ in *Solaria Energy v Department for Business, Energy and Industrial Strategy* [2021] 1 WLR 2349, §34 that “*a signed and part-performed commercial contract is, prima facie, a possession*”. However, this would not be a straightforward case of contractual obligations being interfered with by legislation. On bp’s most recent proposals, the IA would continue in operation, save that bp’s potential liability to Orsted pursuant to its terms would be removed.
12. These and other points are also relevant to the question whether the removal of bp’s liability to pay compensation under the IA would deprive Orsted of any “possession” within the second sentence of Article 1P, or would merely interfere with the peaceful enjoyment of, or control the use of, any “possession”. The removal of a crystallised right to compensation of determined or predictable amount would more likely constitute a deprivation of a possession. The removal of

a right in principle to compensation which might be triggered in the future but whose value is currently indeterminate is more likely to constitute an interference with peaceful enjoyment or a control of use, *a fortiori* if that contingent right is replaced by an alternative compensation mechanism. As JMQC points out (in §40 of his submissions), citing *Mott v Environment Agency* [2018] 1 WLR 1022, the Courts do not deem it necessary to categorise a measure as a deprivation or a control of use. However, I would agree with the thrust of his argument, that the closer a measure is to a deprivation of possessions, the more seriously it is likely to be regarded by the Courts.

13. A very significant component of the question of whether there has been or would be a breach of Article 1P, which is not addressed in JMQC's submissions, is that of justification for interference. Any interference with possessions, whether within the first, second or third sentences of Article 1P, is in principle capable of justification as a proportionate measure in the public interest. Further, the Courts will afford a broad margin of discretion to a decision-maker seeking to justify a potential breach of Article 1P. According to long-established principles in the case-law of the European Court of Human Rights, an interference with possessions which is provided for in domestic law and pursues a legitimate aim will be held to be proportionate and so lawful unless it is "*manifestly without reasonable foundation*" – in other words, unless it is irrational (see, for example, *James v. United Kingdom* (1986) EHHR 123, §46). On that basis, provision in the DCO which amounted to an interference with Orsted's possessions, even one which – putting the matter at its highest – is tantamount to a deprivation of possessions, could be justified by the SoS, and so would be lawful, provided that it could be established to be rational. Rationality is traditionally a low threshold for a defendant to surmount in defending a decision challenged under public law.
  
14. The domestic courts have analysed the issue of proportionality of interference with Article 1P "possessions" as comprising four stages (see, recently, *Aviva Insurance Ltd & Anor v Secretary of State for Work and Pensions* [2022] 1 WLR 2753, §§77-85): (i) whether the objective of a measure is sufficiently important to justify the limitation of a fundamental right; (ii) whether the measure is rationally connected to the objective; (iii) whether a less intrusive measure could have been used; and (iv) whether, having regard to these matters and to the severity of the consequences, a fair balance has been struck between the rights of the individual and the interests of the community. There has been some fluctuation in the case-law as to whether the "*manifestly without reasonable foundation*" test applies at all stages of the proportionality analysis, or only at the first three stages. The latest position, as explained in *Aviva*, appears to

be that “*manifestly without reasonable foundation*” is the governing test at all stages, but that certain factors may serve to increase the intensity of review within the framework of that test, such as where the interference with Convention rights involves discrimination on a suspect ground (see §84 of *Aviva*). Generally, however, and in the absence of special factors, judgments of a Minister in the field of social or economic policy will attract a wide margin of appreciation, or a low intensity of review.

15. Against that background, the key question for the SoS is whether provision in the DCO modifying the IA so as to remove Orsted’s potential entitlement to compensation would be defensible as a proportionate interference with “possessions”. In my view, and subject of course to the facts which are accepted by the SoS, there is good reason to think that proportionality, and so justification of interference, could be established in this case (whether that “interference” is properly to be analysed as an interference *stricto sensu*, a deprivation or a control of use of possessions).
16. The objective of removing Orsted’s potential entitlement to compensation from the IA would be to ensure the progress and success of the ECC Plan. As I have noted in §3(7) above, bp’s position is that the risk of a significant potential compensation liability arising from the IA would likely lead to the NEP partners electing not to proceed with developing the Endurance Store within the Overlap Zone, so rendering the ECC Plan unviable. The ECC Plan is of enormous significance to the UK’s strategy for achieving Net Zero (in accordance with the targets set under the Climate Change Act 2008) and the objective of ensuring that it proceeds is plainly important enough to warrant interference with Convention rights. There would, moreover, be an obvious connection between the provision sought by bp and this legitimate objective. It follows that stages (i) and (ii) of the proportionality test would be satisfied.
17. As to stages (iii) and (iv) of the proportionality test:
  - (1) The judgment of the SoS would attract a broad margin of discretion. Ensuring the future progress of the ECC Plan is a matter of social and economic policy and, in my view, there are no special factors, such as discrimination on a suspect ground, which would serve to narrow the “*manifestly without reasonable foundation*” test in this case.
  - (2) The starting point would then be the very strong public interest in ensuring that the ECC Plan was able to proceed and to achieve its objectives. If the SoS were satisfied that



modification of the IA were necessary to this end, that would go a very long way towards him establishing the necessary rational basis for the action proposed by bp.

- (3) HP4 will also make a contribution to energy sustainability and security and to achieving net zero, but there has been no suggestion that the project will become unviable and could not proceed in the event that Orsted were excluded from the Overlap Zone without payment of compensation pursuant to the IA. Orsted has an understandable commercial interest in receiving compensation, but this is a private and not a public interest to which the SoS may legitimately attribute much less weight than he attributes to the public interest in the ECC Plan. The net result may well be that certain losses fall on Orsted which it would have expected to pass on to the NEP, but given the DCO process, the need for consent of CEC to the location of infrastructure and the complexity added by the Overlap Zone, there was always significant commercial uncertainty surrounding Orsted's plans. The HP4 project remains, nevertheless, an attractive and lucrative one. In those circumstances, the SoS may rationally take the view that a reduction in Orsted's profitability or in the value of the HP4 project is justified in the interests of the ECC Plan proceeding.
- (4) Orsted's legal submissions have placed much weight on the IA being a commercial agreement which bp freely entered into in the relatively recent past. That is of course true, but the full context is that bp was effectively required to succeed to the IA given the obligations assumed under §8 of the IA ("Succession") by the previous Carbon Entity and, as I understand it, the IA was originally negotiated and entered into on the basis of an expectation that the two projects could co-exist within the Overlap Zone. Having done substantial further investigation, bp's technical conclusions are different, and rule out co-existence, and if the SoS were to accept them, that would go to undermining a key premise for the original IA, and for bp succeeding to it.
- (5) Orsted has also contended that it must be compensated for any loss of rights under the IA. It would of course make no sense for the SoS to remove the potential liability to Orsted under the IA whilst making fresh provision for the same or similar compensation to be paid by the NEP outside the framework of the IA. If the SoS accepts the need to remove the existing compensation provisions from the IA, this must be on the footing that compensation will only be payable to Orsted on a less favourable and more certain basis, in order to ensure the progress of the ECC Plan.

- (6) As a matter of general principle, it is certainly not a condition for establishing proportionality of interference under Article 1P that compensation is paid, even where the interference is properly analysed as a straightforward deprivation of possessions (see, for a recent example of justification being made out where no compensation was paid, *R (Durand Education Trust) v Secretary of State for Education* [2021] ELR 213). That must be the case where the interference in question is the removal of a potential entitlement to compensation (since payment of compensation for this removal would fatally undermine the objectives of the measure).
- (7) Therefore, if the SoS is satisfied in principle of the need for removal of bp's potential liability to Orsted under the IA, it will be a matter for his rational judgment whether and to what extent to replace that liability with another compensation mechanism. That judgment will depend, critically, upon the view which he takes of the current risk to the ECC Plan, and of the strength of the public interest in that project proceeding as well as his opinion as to the weight which is to be attributed to Orsted's commercial interests in maximising the profitability of HP4. I see no legal obstacle to the SoS reaching a rational conclusion to give effect to the proposals made by bp. In those circumstances, proportionality and so justification would be established and there would be no breach of Orsted's Article 1P rights.

## **Conclusions**

18. In summary, therefore, I have concluded:

- (1) On its ordinary meaning, and taking into account relevant common law principles of statutory interpretation, s. 120(3) PA 2008 read, in particular, with §3 of Schedule 5 to that Act, clearly provides the necessary *vires* for provision in the DCO which removes the current provision of the IA for payment of compensation by bp to Orsted.
- (2) On the assumption that such provision would interfere with the "possessions" of Orsted (whether by "interference", deprivation or control of use), there is good reason to think that the SoS could establish that any such interference would be proportionate in the public interest, given in particular the very strong public interest in the delivery of the ECC

Plan. On that basis, there would be no breach of Article 10 and so no reason to read down s. 120(3) PA 2008 so as to preclude the action sought by bp.



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**15 August 2022**

**ANNEX 2  
BP'S COMMENTS ON THE NSTA REPORT AND RESPONSE TO SEWELL FURTHER  
SUBMISSIONS**

## ANNEX 2

### BP'S COMMENTS ON THE NSTA REPORT AND RESPONSE TO SEWELL FURTHER SUBMISSIONS

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#### 1. OVERVIEW

- 1.1 Orsted's Deadline 7 submission ([REP7-087](#)) includes as Annex 1 a 7 August 2022 report by Andrew Sewell (the "August Sewell Report") responding to Annex 4 of the Deadline 6 submission by BP Exploration Operating Company Limited ("bp") ([REP6-046](#), electronic page 27). bp addresses the August Sewell Report in Appendix 1 of this Annex.
- 1.2 bp also addresses below the North Sea Transition Authority's July 2022 Technical Report entitled "Measurement, Monitoring and Verification (MMV) of Carbon Capture Storage (CCS) Projects with Co-Location considerations" (the "NSTA's Technical Report"), which was included as Annex 4 to Orsted's above-referenced Deadline 7 submission, together with:
- 1.2.1 Energy Integration Project Phase 3 Spatial Co-Location Project, NSTA, June 2022 ("NSTA, June 2022") (Annex 2 to Orsted's Deadline 7 Submission); and
- 1.2.2 CCS MMV & Spatial Co-Location Project, NSTA, 26 July 2022 ("NSTA, July 2022") (Annex 3 to Orsted's Deadline 7 submission).
- 1.3 bp notes that:
- 1.3.1 although the NSTA published its Technical Report on 1 August (prior to Mr Sewell completing his August report) and Orsted's submission states that the Sewell August Report is "*supported by*" the NSTA Technical Report, in fact, Mr Sewell does not reference or discuss the NSTA's Technical Report in his August Report. Instead, he only references the NSTA, June 2022 and NSTA, July 2022 documents, which he describes (at page 4) as "*two versions of the NSTA co-location slide pack*"; and
- 1.3.2 Orsted's submission does not discuss or cite anything in the NSTA Technical Report or explain how it "*supports*" the August Sewell Report.
- 1.4 The two slide packs referenced in the August Sewell Report are documents prepared by the NSTA for purposes of discussions held with various members of industry and others involved in CCS and offshore wind (including Orsted and bp). Unlike the NSTA Technical Report, the slide packs Mr Sewell refers to are not available on the NSTA's website (and bp notes the slide packs Mr Sewell refers to contain materials that are not in the NSTA Technical Report). bp understands that the NSTA Technical Report on the NSTA's website (which is the slide pack document labelled "TECHNICAL REPORT" and described as "A technical study on the Monitoring, Measurement and Verification (MMV) Activities with reference to the co-existence of Offshore Carbon Capture Storage, Wind and Oil/Gas Projects", as included as Annex 4 to Orsted's above-referenced Deadline 7 submission) to be the document containing the NSTA's findings concerning the study it undertook and guidance it has decided to provide at this stage in respect of co-location of offshore CCS and windfarm projects with the NSTA describing the document and its work as follows:

***"This document represents an internal NSTA technical study into the role of MMV for CCS sites, with a particular emphasis on those sites with restricted***

access owing to co-location with other seabed infrastructure users (e.g. windfarms). **It is intended to provide both high level industry guidance and detailed examples of the type of technology to be considered around a CCS site**” (emphasis added)

and

**“Project Scope**

***The primary objective of this project was to identify and scope specific issues associated with offshore geological/geophysical surveying and monitoring activity.***

**Technical Study Aims**

***Provide a general view of MMV activities for carbon storage sites in proximity to offshore wind farms. It is not specific to any particular carbon storage site, Offshore Windfarm, or Oil/Gas project, however, individual project developers contributed key learnings and insights from existing and planned projects.***

- *Build on work undertaken by the OGA/NSTA-led Energy Integration Project and with The Crown Estate’s ‘Project Vulcan’, covering generic CCS vs Offshore Wind engineering interactions. (Reference 1)*
- ***While this project identified potential solutions, the intent was to identify further studies that could provide more detailed recommendations or actionable results in support of industry and regulatory activities. (emphasis added)***

**Report Method**

*This report is largely based upon insights gleaned and distilled from ~ 30 meetings with a selection of over 20 relevant and interested parties in early 2021*

- *Parties ranged over oil and gas operators and others with CCS licenses/leases (or an intent to enter this market), seismic/geophysical contractors, site survey contractors, academia, other regulatory/government bodies, geophysical service analysis providers, wind farm operators, suppliers of novel geophysical acquisition and processing techniques.*
- *Whilst not every possible interested party was consulted, it is believed that a fair cross-section of views was likely sampled.*
- *This MMV report was revised, prior to public release, after a subsequent 2022 project considering OBN technology.”*

1.5 bp believes the NSTA’s published Technical Report is the appropriate document to refer to when discussing the NSTA’s work and guidance relating to MMV of CCS projects that have co-location/co-existence (used interchangeably in this context) considerations. Accordingly, in this submission, bp addresses aspects of the NSTA’s Technical Report that are relevant to the technical submissions that have been made in the HP4 DCO examination process. bp would of course be happy to provide such further clarification or information as the ExA, or in time the SoS, may consider helpful or necessary to assist their recommendation/determination.

1.6 Additionally, in Appendix 1 to this Annex, bp has provided additional comment where considered necessary in response to the August Sewell Report.

**2. CO-EXISTENCE IS NOT FEASIBLE IN THE ENTIRETY OF THE OVERLAP ZONE**

2.1 bp does not intend to repeat in this submission the comprehensive explanation it has provided in its prior submissions of why having wind turbines in the Exclusion Area would make the ECC plan unviable. However, it draws the Examining Authority’s attention to the

following two fundamental reasons why it would not be feasible to have wind turbines in the Exclusion Area:

- 2.1.1 it would mean the combined access requirements for Endurance could not be satisfied in terms of:
  - (A) helicopter access for routine and emergency purposes;
  - (B) access for drilling rigs (for drilling new wells and for maintenance of existing wells);
  - (C) access to drill (if necessary) relief wells;
  - (D) access to other seabed infrastructure (e.g. for maintaining pipelines on the seabed); and
- 2.1.2 would prevent NEP from using towed streamers to acquire the 3D seismic data that is needed to provide the quality of data necessary to evidence CO<sub>2</sub> migration and settlement and thereby ensure conformance and containment of the CO<sub>2</sub> plume.
- 2.2 The NSTA Technical Report addresses both of these issues, and although its findings are not specific to a particular CCS site and therefore are general in nature, what the NSTA Technical Report states in relation to these particular issues is consistent with and supports what bp and its NEP partners have concluded in the context of Hornsea 4 and the Endurance Store. The relevant findings by the NSTA include the following statements in the Executive Summary found on slide 4 of the report:

***“Executive Summary***

...

*Seismic is the key geophysical monitoring technology providing best resolution. Surveying activities for carbon storage sites in and **around offshore windfarms** can be extremely challenging, and **unacceptable collision risk if deploying long towed seismic streamers (receivers)**. There are some potential mitigating solutions (e.g. Ocean Bottom Nodes (OBN), although with higher cost and more limited coverage.*

...

***Periodic access to Carbon Storage infrastructure within Offshore Windfarms is a more significant obstacle.*** *The siting of platforms and wells with their associated access requirements for routine and emergency operations requires sufficient stand-off. **Consequently, largely overlapping carbon storage sites and wind farms<sup>1</sup> are presently considered not to be feasible with current technology.***

...”

**Wind Turbines in the Exclusion Area would affect the Access Requirements for Endurance**

- 2.3 In finding that periodic access to carbon storage infrastructure within an offshore windfarm is a “*significant obstacle*” and that “*Consequently, largely overlapping carbon storage sites and wind farms are presently considered not to be feasible with current technology*”, the NSTA Technical Report identifies and discusses a number of “*operational scenarios*” which take account of various activities typically required for a CCS project operating in a marine environment, which include issues addressed in bp’s report “A Technical Assessment of

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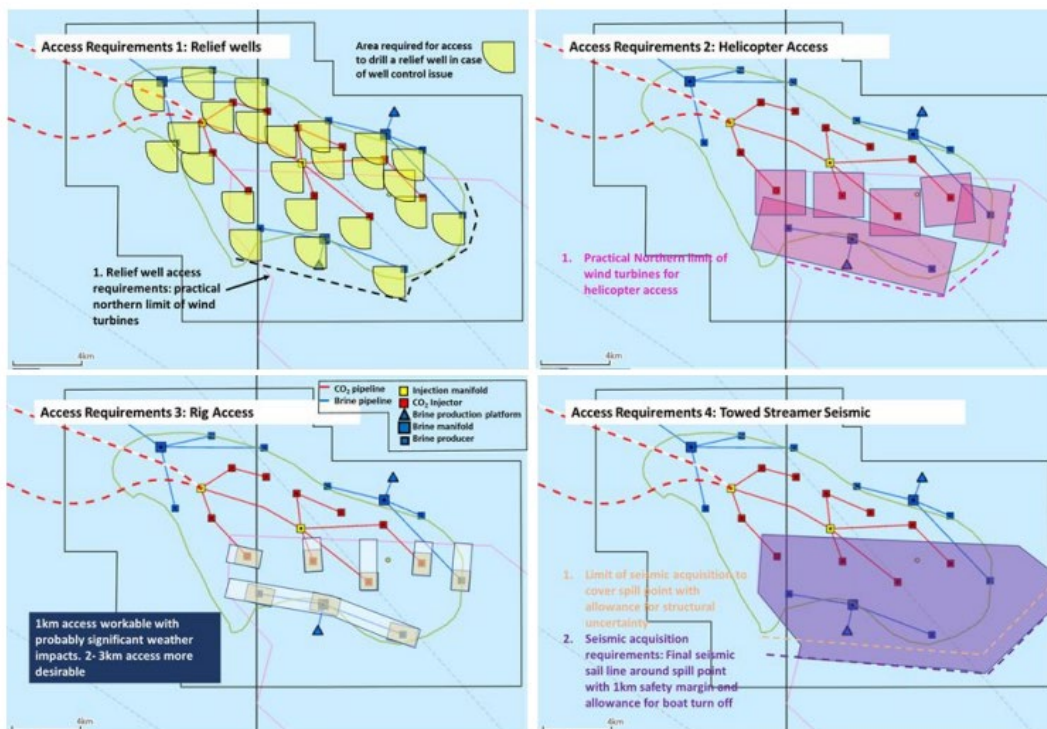
<sup>1</sup> The Exclusion Area included in bp’s protective provisions accounts for ~45% of the Endurance store seabed area and ~25% of the H4 developable seabed area.

the Endurance Reservoir and Hornsea Project Four Wind Farm” (the “bp Technical Assessment “) submitted in this DCO examination process as part of the Joint Position Statement of Orsted and bp submitted at Deadline 1 such as support vessels, well heads, aviation and temporary installations.<sup>2</sup> The NSTA’s comments, which are consistent with bp’s discussion of specific access requirements for Endurance, include the following (on Slide 13):

- All operation types require vessel and aviation support/supplies.
- CCS or Oil/Gas operations require the drilling of wells, initially with temporary installations, but with fixed surface installation or subsurface equipment during injection/production.
- Wells require a clear zone around them for maintenance and emergency operations, including the drilling of relief wells and final abandonment.”

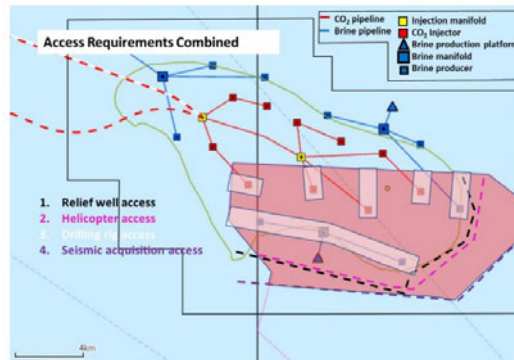
2.4 The NSTA also notes (Slide 15) that the details of aviation constraints were beyond the scope of its study and states that this requires further engagement with the CAA (Civil Aviation Authority). The NSTA identifies a number of topics for a consultation with the CAA. Again, this includes various factors that bp considered in its Technical Assessment, including SAR (Search and Rescue Operations) in the event of an emergency and long term access to well and seabed infrastructure.

2.5 bp previously explained in detail why and how access requirements are necessary for developing and operating the Endurance Store and why, as a result, co-existence in the Exclusion Area is not feasible. This is illustrated in bp’s Technical Assessment Report ([REP1-057](#), section 9 (Figures 36/37), p.201) by showing the individual requirements and combined impact on the Exclusion Area (extracts shown below).



<sup>2</sup> See Section 7.1 of bp’s Technical Assessment Report submitted at Deadline 1 ([REP1-057](#), electronic pages 175 to 188) and Slides 12, 13 and 15 in the NSTA Technical Report (Annex 4 of Orsted’s Deadline 7 submission, ([REP7-087](#)))





All five diagrams show clearly that the combined area required for each of these operational activities results in there being no ability to locate any turbines within the Exclusion Area.

- 2.6 The specific access related problems that bp has identified in respect of Endurance reflect, and are consistent with, the NSTA's general finding that the operational activities required at a carbon storage site mean that currently largely overlapping carbon storage sites and wind farms are not considered to be feasible.<sup>3</sup>
- 2.7 As explained in bp's Deadline 6 submission, the evidence before the Examining Authority does not support finding that the rig, wells and helicopter access requirements at Endurance could be satisfied if there are wind turbines in the Exclusion Area.<sup>4</sup> Instead, the evidence from bp, and findings of the NSTA, establish that in fact wind turbines in the Exclusion Area would impact access requirements by posing such a "significant obstacle" to accessing Endurance infrastructure that it would not be feasible for Endurance and Hornsea 4 to co-exist in the Exclusion Area.

#### Wind Turbines in the Exclusion Area Would Prevent NEP Using Towed Streamers

- 2.8 In considering various operational scenarios and reaching its view that long towed streamers cannot be used to acquire seismic data within a windfarm, the NSTA states (see slide 17):

##### **"Operational Scenarios – Seismic Surveys**

- *Seismic surveys remain the primary geophysical tool of choice for imaging the subsurface.*
  - *Essential for managing the geometry and extent of storage sites and complexities which underpin dynamic fluid prediction models.*
  - *A high-quality baseline survey is expected for all CO2 Storage Sites, since this data will be used for decades beyond post-closure*
  - *Seismic Acquisition parameters will depend on the subsurface scenarios that need to be addressed*
  - *Reprocessed old surveys (> ~ 15 years) are unlikely to adequately address risks.*

<sup>3</sup> In the August Sewell Report, Mr Sewell states that he was not instructed to address the access requirements for Endurance. Therefore, the position remains as set out by bp in its Deadline 6 submission (sub-paragraphs 2.17.4 and 2.17.6). Specifically: (i) the Sewell Report does not address what bp said (in its Technical Assessment and its Deadline 3 submission) about access requirements; (ii) the OREC/NZTC report fails to take account of both bp's Technical Assessment and the specific access requirements that will exist at Endurance; and (iii) Mr Sewell has not addressed the analysis of access requirements in the OREC/NZTC report or taken issue with or disagreed with bp's submissions concerning access requirements.

<sup>4</sup> See paragraph 2.17 of Annex 4 to bp's Deadline 6 submission ([REP6-046](#), electronic pages 34-35)

- *Streamer surveys are lower cost, but use of **long streamers are impossible** close to & within dense turbine infrastructure*
- *Ocean Bottom receivers (nodes) surveys are available at a much higher cost. They can be deployed within infrastructure, if seabed conditions are conducive. A high specification/more manoeuvrable (dynamically positioned) seismic source boat is still required.*

...

2.9 The NSTA Technical Report also contains the following statement in the section of the report discussing “Seismic Options Around Offshore Windfarms”:

**“Co-existence using reservoir towed streamer is not considered safe nor practicable.” (Slide 25)**

2.10 The NSTA’s statements about it not being safe, practicable or possible to use long towed streamers “close to & within dense turbine infrastructure” are consistent with bp’s conclusion in the bp Technical Assessment Report (submitted at Deadline 1 (REP1-057), as referenced above) that if there were wind turbines in the Exclusion Area, NEP could not use towed streamers to acquire the necessary seismic data. Additionally (and as explained in bp’s Deadline 6 submission):

2.10.1 in the July 2022 report by Mr Sewell submitted by Orsted at Deadline 5 (the “Sewell Report”), he agreed with bp’s position that: (i) in the event there was co-location in the Exclusion Area, NEP could not use conventional towed streamers to acquire seismic data for CO<sub>2</sub> monitoring; and (ii) this would be the case even with a sparser layout of a 2x2km grid formation;

2.10.2 Mr Sewell also agrees with bp’s conclusion that it could not use short streamers of 200m or less for acquiring seismic if wind turbines were present in the Exclusion Area;<sup>5</sup> and

2.10.3 accordingly, the evidence before the Examining Authority does not support finding either that a grid formation of 2x2km would allow co-location in the Exclusion Area or that NEP could use short streamers of less than 200m to acquire seismic data in the event wind turbines were present in the Exclusion Area.

**The Seismic Monitoring Requirements NEP Must Satisfy for the Endurance Store**

2.11 A comprehensive MMV programme for all CCUS projects, including the NEP project, is required to establish that injected CO<sub>2</sub> behaves as predicted in the reservoir and to verify that the CO<sub>2</sub> remains safely contained within the store both during injection and after closure of the project. Monitoring must therefore be able to detect any unexpected behaviour of the CO<sub>2</sub> plume and possible migration out of the CO<sub>2</sub> store.

2.12 As explained in bp’s Technical Assessment Report (As above, REP1-057, paragraph 7.3.1, electronic page 190), injection of CO<sub>2</sub> into the Endurance aquifer is expected to produce a clear signal using 4D seismic monitoring. Thus 4D seismic is a critical component of the MMV strategy for the NEP project.

2.13 As noted in bp’s Deadline 6 submission ([REP6-046](#), paragraph 2.5.1, electronic page 31), the Sewell Report agrees with bp’s conclusion that it is necessary to use 3D/4D seismic for NEP’s MMV plan, with Mr Sewell stating that “it is unlikely that there will be a replacement technology for 3D seismic with the availability (sic) to provide monitoring over the whole

<sup>5</sup> See also paragraphs 2.11-2.12 of Appendix 1 to this Annex where bp addresses Mr Sewell’s comment in his August report that he believes that although P-cables on their own could not be used at Endurance, using a hybrid of P-cables and OBN might enable co-existence in the Exclusion Area.

*areal extent of a CO<sub>2</sub> storage site for a long time. The use of 3D/4D seismic in the MMV plan for Northern Endurance is a necessity.”*

- 2.14 The NSTA also recognises the important role seismic monitoring plays in MMV plans for offshore CCS projects, with the NSTA Technical Report stating that “*seismic monitoring [is] expected to provide [a] critical role in MMV strategy*” for projects injecting CO<sub>2</sub> into an aquifer (slide 21) and that “*4D (Time Lapse 3D) seismic remains the principal, proven, reliable monitoring method supporting... Conformance/Reservoir management... [and] ...Containment*”<sup>6</sup> (slide 22).<sup>7</sup>
- 2.15 The NSTA also notes that “*seismic monitoring [is] reliant upon consistent, repeatable acquisition & careful processing*”.<sup>8</sup> bp fully agrees with this statement, and has explained in the bp Technical Assessment and its prior submissions in this DCO examination process how bp has applied this paramount need to acquire consistent, reliable and repeatable seismic data to its review and assessment of potential ways of undertaking seismic monitoring of the Endurance store.
- 2.16 The agreement between bp and Mr Sewell that 3D/4D seismic has to be used in the MMV plan for NEP means the two seismic technologies that could be considered for use in Endurance’s MMV strategy are: (i) towed streamer; and (ii) OBN.
- 2.17 In relation to the use of towed streamer, as explained above:
- 2.17.1 the NSTA recognises that it is not safe, practicable or possible to use long towed streamers to acquire seismic data close to or within an offshore windfarm; and
- 2.17.2 bp and Mr Sewell agree that it would not be possible to use long or short towed streamers for the NEP MMV plan.<sup>9</sup>

**Using OBN or a hybrid of OBN and P-cables to acquire seismic data at Endurance would not enable co-existence in the Exclusion Area**

- 2.18 In terms of using OBN, or a hybrid of OBN and P-cables, to acquire seismic data at Endurance, bp has explained in detail in the bp Technical Assessment and its Deadline 5a ([REP5a-025](#)) and 6 ([REP6-046](#)) submissions why it would not be possible to do this if there are wind turbines in the Exclusion Area.<sup>10</sup>
- 2.19 In particular:

<sup>6</sup> In discussing seismic monitoring for CCS, the NSTA refers to two examples of “direct CO<sub>2</sub> seismic Detection”. The first is Sleipner, where CO<sub>2</sub> is injected into an aquifer in the Norwegian section of the North Sea (and bp addressed Sleipner in Section 7.3.4 of the bp Technical Assessment, paragraph 2.34 of bp’s Deadline 3 submission, Section 4 of bp’s Deadline 5a submission and paragraphs 4.47 – 4.52 of bp’s Deadline 6 submission). The second example that the NSTA refers to is Ketzin. It is an aquifer CO<sub>2</sub> injection project in Germany. However, it is an onshore project.

<sup>7</sup> bp notes that the NSTA states (see slide 35) that “*seafloor PRM is likely to exacerbate the coexistence issue and is unlikely to have a significant role in congested areas*” as well as the fact that it will “*prevent CCS subsea development / windfarm expansion*” and has “*very high upfront capital expenditure*”. The NSTA also states (slide 25) that an “*alternative P-Cable arrangement still does not present full spatial data*” and that “*2.5D monitoring gives very limited image*”. Lastly, “*non-seismic geophysical remote sensing techniques can complement, but are unlikely to replace active seismic acquisition*” (slide 19).

<sup>8</sup> Slide 23 of the NSTA Technical Report (Annex 4 of Orsted’s Deadline 7 submission, ([REP7-087](#)))

<sup>9</sup> See paragraphs 2.11-2.12 of Appendix 1 to this Annex where bp addresses Mr Sewell’s comment in his August report that he believes that although P-cables on their own could not be used at Endurance, using a hybrid of P-cables and OBN might enable co-existence in the Exclusion Area.

<sup>10</sup> bp notes that the NSTA states (see Slide 20) that “*Seismic Streamer surveys remain the obvious choice where clear water access is available (i.e. there is no windfarm anticipated over CCS site)*”. This is consistent with bp’s conclusion that provided there are no wind turbines in the Exclusion Area, towed streamer should be used to acquire seismic data for Endurance.

- 2.19.1 although OBN and P-cables are used to acquire seismic data for offshore oil and gas projects:
- (A) A hybrid of OBN and P-cables have not been used for 4D monitoring of an oil and gas project;
  - (B) OBN has not been used for seismic monitoring of an offshore CCS project;
  - (C) P-cables have not been used for seismic monitoring of an offshore CCS project;
  - (D) a hybrid of OBN and P-cables has not been used for seismic monitoring of an offshore CCS project;
  - (E) OBN has not been used to acquire seismic data in a windfarm;
  - (F) P-cables have not been used to acquire 3D seismic data in a windfarm<sup>11</sup>;
  - (G) a hybrid of OBN and P-cables has not been used to acquire seismic data in a windfarm; and
  - (H) a hybrid of OBN and P-cables has not been used for 4D seismic monitoring of a CCS project in a windfarm.
- 2.19.2 Accordingly, although OBN and P-cables are “proven” technologies in the context of acquiring 3D seismic data for oil and gas projects, currently there is no example of them being used to acquire seismic data in an offshore CCS project to enable CCS project operators to ensure containment and conformance of a CO<sub>2</sub> plume. In that sense, OBN and P-cables (and a hybrid of the two) are unproven technologies for the purpose of monitoring CCS projects, and particularly inside of a windfarm;
- 2.19.3 Mr Sewell and OREC/NZTC do not claim that NEP could or should use OBN, P-cables or a hybrid of the two technologies to acquire seismic data at Endurance:
- (A) as explained in bp’s Deadline 3 submission, the OREC/NZTC report:
    - (1) does not conclude that co-location within the Overlap Zone is, in fact, feasible;
    - (2) does not conclude that (in the event there were wind turbines in the Exclusion Area) it would be appropriate to use OBN technology for monitoring purposes in the Exclusion Area;
    - (3) does not confirm that (in the event there were wind turbines in the Exclusion Area) there are monitoring technologies that would be provide the degree of quality and repeatability of seismic data and imaging that bp and its NEP co-venturers need in order to satisfy operator and regulatory obligations;
    - (4) does not offer any solution(s) that OREC/NZTC has determined would, if implemented, overcome the Overlap Zone related

<sup>11</sup> bp notes that Slide 27 of the NSTA Technical Report states “NSTA is aware of only one, carefully planned field example of intra-windfarm 2D HR survey acquisition.” bp understands this to be the testing that was done at Ormonde windfarm and referred to in the OREC/NZTC report ([REP1-057](#), Appendix 1.1, sections 3.5-3.6, electronic pages 58-63). As explained in bp’s Technical Assessment ([REP1-057](#), Annex 1 of Appendix 2, section 7.3.2, electronic page 193), 2DHR cannot be used for seismic monitoring at Endurance.

challenges currently facing the NEP and Hornsea 4 projects;<sup>12</sup>  
and

- (B) as explained in bp’s Deadline 5 and 6 submissions, all Mr Sewell does is recommend that modelling and field trials be undertaken as part of assessing whether, in the event there were wind turbines in the entirety of the Overlap Zone, a hybrid of OBN and P-cables could be used at Endurance;
- 2.19.4 for the reasons explained in bp’s Deadline 5a and 6 submissions, the modelling and field trial exercise recommended by Mr Sewell will not enable co-existence in the Exclusion Area;
- 2.19.5 it also is not necessary to undertake the time consuming and costly type of modelling and pre and post modelling field trial exercise that bp has explained (in its D5a and D6 submissions) would need to be undertaken to determine whether a hybrid of OBN and P-cables might be able to be used for monitoring if there were wind turbines in the Exclusion Area<sup>13</sup> as:
- (A) bp previously considered the feasibility of using OBN and P-cables for NEP’s MMV plan for Endurance and determined that using OBN (even dense OBN) would still lead to there being significant gaps in offset coverage which would prevent NEP from imaging the complete Endurance store (and that would be the case even if it was possible to acquire seismic data as close as 100m from wind turbines<sup>14</sup>);
  - (B) bp would not be willing to put forward to the NSTA a MMV plan for the NEP project that included a hybrid of dense OBN and P-cables as the monitoring component for the Endurance store because of insufficient certainty that it would provide a workable solution in practice either: (i) for predicted conditions or (ii) for unexpected circumstances where critical corrective measures are required or additional monitoring is needed;
  - (C) undertaking modelling and field trial work would serve no purpose because the rig, well and helicopter access requirements identified by bp mean there could not be co-existence in the Exclusion Area.
- 2.20 The NSTA Technical Report refers to OBN, and in discussing “Seismic Options around Offshore Windfarms” states (in Slide 25) that “*Ocean Bottom nodes (OBN) could be deployed amongst turbines.*” In considering this statement, it is important to take account of the following:
- 2.20.1 the NSTA does not say that OBN could or should be used for MMV of CCS projects in a windfarm. It simply says that using OBN is a “*potential monitoring acquisition option*”;
  - 2.20.2 the NSTA recognises that as OBN seismic surveys have never been acquired within a windfarm (slide 27), field trials will be necessary (slides 50-51) before the

<sup>12</sup> See sections 1 and 5 of bp’s Response to the OREC/NZTC Report ([REP3-047](#), Appendix 1, electronic pages 8-11 and 33-36)

<sup>13</sup> In paragraphs 2.16-2.23 of Appendix 1 of this Annex, bp addresses Mr Sewell’s comment in his August report that what bp is proposing is more extensive than what he suggests occur.

<sup>14</sup> Although this is suggested in the Sewell Report, as explained in paragraph 8.21 of bp’s Deadline 5a submission and paragraph 4.7.2 of Annex 4 of its Deadline 6 submission, bp does not consider that it would, in fact, be possible to do so. bp notes that even if it were possible to do so, acquiring seismic as close as 100m still creates a 200m data gap. bp notes that Slide 3 of the NSTA Technical Report includes a diagram depicting a 200m gap of seismic data. However, the NSTA does not explain the basis on which it believes vessel owners and operators would, taking account of safety requirements, in fact be able to acquire seismic data as close as 100m from a turbine.



technology can be recognised as being proven and feasible for use as a monitoring tool for co-location projects. This is not surprising given the fact (as explained above in paragraphs 2.18.1 and 2.18.2) that currently OBN technology is not proven for seismic monitoring of an offshore CCS project in a windfarm.

- 2.20.3 in an earlier section of its report where the NSTA discusses seismic surveys generally, the NSTA expressly recognises that deploying OBN within infrastructure is dependent on seabed conditions (and as explained below in paragraph 2.20.5 also involves operational/logistical considerations):

**“Operational Scenarios – Seismic Surveys**

- *Seismic surveys remain the primary geophysical tool of choice for imaging the subsurface*

...

- *Ocean Bottom receivers (nodes) surveys are available at a much higher cost. They can be deployed within infrastructure, if seabed conditions are conducive. A high specification/more manoeuvrable (dynamically positioned) seismic source boat is still required.” (Slide 17)*

- 2.20.4 The importance of seabed conditions being conducive to using OBN around the infrastructure of an offshore oil and gas project applies equally to the potential use of OBN within a windfarm, and as previously explained bp has determined that the strong tidal currents and sand waves present on the seabed in the Exclusion Area means there likely would be significant problems in using the dense layout of OBN that would be needed to obtain the necessary seismic data at Endurance;

- 2.20.5 The NSTA recognises that there are various fundamental challenges that the OBN monitoring method would need to overcome to prove it is feasible for operations within a windfarm, including (Slide 30):

- (A) Deployment speed / risk of completing survey in a single season;
- (B) Safety considerations for OBN vessel operations (*‘HR contractors currently hesitant to commit to minimal HR scope (any more than 1 x 600m cable) between turbines’*);
- (C) Multiple vessels required (exacerbates operational issue);
- (D) Data coverage gaps at the seabed and shallow section; and
- (E) High cost is a significant factor,

bp addresses in its Deadline 6 submission ([REP6-046](#)) why these factors preclude the use of OBN as a means of facilitating co-existence between Endurance and Hornsea Project Four.

- 2.20.6 the NSTA Technical Report does not address the extent to which the gaps in seismic data that would result from using OBN within a wind farm may mean that it would not be feasible to use OBN in a particular CCS and windfarm overlap situation. Instead, the NSTA notes in its Executive Summary (Slide 4) that there could be more limited coverage if OBN is used and identifies coverage gaps as one of the “negatives” of using OBN to acquire seismic data within a windfarm:

*“Seismic is the key geophysical monitoring technology providing best resolution. Surveying activities for carbon storage sites in and **around offshore windfarms** can be extremely challenging, and **unacceptable collision risk if deploying long towed seismic streamers (receivers).**”*

*There are some potential mitigating seismic solutions (e.g. Ocean Bottom Nodes OBN) although with higher cost and more limited coverage.”<sup>15</sup>*

and:

**“Ocean-Bottom Nodes Acquisition within Windfarm**

...

**Negatives**

...

- *Coverage gaps @ seabed & shallow section*
  - *Needs High density/very narrow receiver line spacing to compensate*
  - *Significant cost factor”<sup>16</sup>*

2.20.7 As previously explained in bp’s submissions in this DCO examination process, it has determined that if there were wind turbines in the Exclusion Area, the gaps in coverage that would result from using OBN at Endurance means bp and its NEP partners would not be prepared to submit a MMV plan for Endurance based on using OBN (even dense OBN).

2.20.8 Importantly, the NSTA recognises that whether it would be appropriate to use OBN in a MMV plan will depend on a number of factors that will be specific to the CCS project in question and it is clear that the NSTA is not suggesting that OBN (or a hybrid of OBN and streamers or OBN and P-cables) could or should be used in all offshore CCS MMV plans:

**“There are no one-size-fits-all solutions. Monitoring, Measurement and Verification (MMV) activities must be tailored to clearly identified Carbon Storage site risks and uncertainties, taking into account store type, geometric arrangements/scenarios, injection strategies, met-ocean/seabed conditions, etc.”<sup>17</sup>**

2.21 As explained previously, after an extensive review and consideration of these, and other factors relevant to the Endurance Store, bp and its NEP partners have concluded that they are not in a position to develop a MMV plan for Endurance that would allow co-existence in the Exclusion Area. Nothing in the NSTA Technical Report or the August Sewell Report alters this conclusion.

2.22 Accordingly, it continues to be the case that the materials and information relating to technical matters that have been put forward during this HP4 DCO examination process do not support any findings that:

<sup>15</sup> Slide 4 (Annex 4 of Orsted's Deadline 7 submission, [\(REP7-087\)](#))

<sup>16</sup> Slide 30 (Annex 4 of Orsted's Deadline 7 submission, [\(REP7-087\)](#))

<sup>17</sup> Slide 4. See also slides 12-15 (Annex 4 of Orsted's Deadline 7 submission, [\(REP7-087\)](#))

- 2.22.1 if wind turbines were present in the Exclusion Area, a hybrid of OBN and P-cables either could or should be used to acquire seismic data and imaging;
- 2.22.2 the NSTA has indicated that it expects that where offshore CCS and windfarm projects overlap, the MMV plan for CCS will use OBN (or a hybrid of OBN and streamers or P-cables) to acquire seismic data; and
- 2.22.3 the NSTA has indicated or suggested that NEP's MMV plan could or should be based on using OBN or a hybrid of OBN and P-cables.



## Appendix 1 to Annex 2

### BP'S COMMENTS ON ANDREW SEWELL'S 7 AUGUST 2022 REPORT

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#### 1. INTRODUCTION

- 1.1 Orsted's Deadline 7 submission includes a short report by Andrew Sewell of Xodus Group Limited dated 7 August 2022 (the "August Sewell Report") in which Mr Sewell comments on bp's responses (in its Deadline 5a submissions ([REP5a-025](#)) and Annex 4 of its Deadline 6 submissions ([REP6-046](#)) to the July 2022 report by Mr Sewell submitted as Appendix A to Orsted's Deadline 5 submission (the "Sewell Report") ([REP5-075](#)).
- 1.2 Set out below are bp's comments on the August Sewell Report. As that report does not contain numbered paragraphs, in this document bp has: (i) set out what Mr Sewell says in his August report (which for ease of reference is shown in blue text); and (ii) set out below each quoted extract from the August Sewell Report, bp's comments (which are shown in black text). bp has also, for ease of reference, provided a link to the parts of bp's prior submissions that Mr Sewell refers to in his August report.
- 1.3 The statements by Mr Sewell and bp's comments on those statements are set out in the same order as they appear in the August Sewell Report.
- 1.4 To confirm, nothing in the August Sewell Report alters the conclusion of bp and its NEP co-venturers that co-existence in the Exclusion Area (also referred by Orsted and Mr Sewell as the Overlap Zone) is not feasible.

#### 2. BP'S COMMENTS

- 2.1 Extract from the August Sewell Report:

"In 2.1.4<sup>1</sup> bp states that hybrid OBN and towed streamer seismic data would not provide a "*consistent, reliable and repeatable seismic image*". The NSTA co-location slides [1] provide an example of hybrid streamer and OBN survey around an obstructed area in Malaysia (slide 11), and although this does not appear to be for 4D purposes, there is no reason why a hybrid survey would be less repeatable than individual streamer or OBN surveys."

- 2.2 The slide that Mr Sewell refers to in the NSTA's June 2022 slide pack entitled "Energy Integration Project Phase 3 Spatial Co-Location Project, NSTA, June 2022 (Annex 2 to Orsted's Deadline 7 submission"<sup>2</sup> contains information about seismic data acquired in respect of an oil and gas facility located offshore of Malaysia using a hybrid of OBN and streamer. The slide simply shows that seismic data was successfully acquired by using OBN to conduct a survey around a small number of isolated obstructions. It does not assist in showing either the quality of the seismic data that would be acquired, or the "gaps" that would exist where no data could be acquired, if OBN was used to acquire seismic in a survey carried out within a windfarm, where vessels would need to be moving between wind turbines and the limited space between the turbines means there are likely to be

<sup>1</sup> [REP6-046](#), Annex 4, paragraph 2.1.4 (electronic page 30)

<sup>2</sup> As explained in paragraphs 1.5 – 1.6 of Annex 2 of bp's Deadline 8 submission, the June 2022 slide pack is a document the NSTA prepared for purposes of discussions held with various members of industry and others involved in CCS and offshore wind. The NSTA has not published the document on its website, and the slide Mr Sewell refers to was not included in the Technical Report that the NSTA published on its website on 1 August 2022.

many more areas where seismic cannot be acquired than is the case when a vessel is shooting seismic whilst going around an oil and gas platform.

- 2.3 Additionally, the slide does not provide any information about the quality of the data that was acquired at the Malaysian facility. Without such data, it would be premature to draw any conclusions about the 4D quality and its repeatability. Accordingly, Mr Sewell saying that “*there is no reason why a hybrid survey would be less repeatable than individual streamer or OBN surveys*” is simply opinion and speculation, and the information he refers to does not support a conclusion that using a hybrid of OBN and P-cables within a windfarm at Endurance would provide the necessary “*consistent, reliable and repeatable seismic image*” of the Endurance store that is needed to ensure containment and conformance of the CO2 plume.
- 2.4 Finally, bp understands that the Malaysian survey involved nodes being placed 300m apart which (for reasons explained in bp’s prior submissions in this DCO examination process) is much sparser than what would be needed for Endurance.
- 2.5 Extract from the August Sewell Report:
- “2.6<sup>3</sup> states “Given Mr Sewell’s agreement with bp’s position concerning emerging technologies and the need for NEP’s MMV plan for Endurance to use 3D/4D seismic imaging, the evidence before the Examining Authority does not support finding that emerging technologies would allow co-existence to occur in the Exclusion Area or that NEP does not need to use 3D/4D seismic imaging in its MMV plan”
- It is my opinion however (and I believe bp’s also based on section 3.1 of Annex 4) that neither OBN nor P-Cable are “emerging technologies” but are proven technology in general, even if not yet for 4D for CO2 monitoring. The NSTA co-location slides [1] and [2] provide ample evidence of this for OBN, including bp’s experience at Clair Ridge, slides 19 and 20 in the June 2022 slide pack [1].”
- 2.6 The reference in paragraph 2.6 of Annex 4 of bp’s Deadline 6 submission to “emerging technologies” was to various forms of technologies that are discussed in the OREC/NZTC report and described in the Sewell Report as “*the alternative MMV technologies discussed at the end of section 3.3.1 on pages 19 and 20 [of the OREC/NZTC report]*” and referred to in Section 5.8 of Orsted’s Deadline 1 submission as “emerging technology” (see paragraph 2.5 of Annex 4, [REP6-046](#), electronic page 31).
- 2.7 In terms of OBN and P-cables, bp did not characterise these as “emerging technologies”. Mr Sewell is correct that OBN and P-cables are “proven technology” in the sense that both OBN and P-cables are used to acquire seismic data for offshore oil and gas projects. However (and as explained in paragraph 2.19 of Annex 2 to bp’s Deadline 8 submission):
- 2.7.1 A hybrid of OBN and P-cables have not been used for 4D monitoring of an oil and gas project;
  - 2.7.2 OBN has not been used for seismic monitoring of an offshore CCS project;
  - 2.7.3 P-cables have not been used for seismic monitoring of an offshore CCS project;
  - 2.7.4 a hybrid of OBN and P-cables has not been used for seismic monitoring of an offshore CCS project;
  - 2.7.5 OBN has not been used to acquire seismic data in a windfarm;
  - 2.7.6 P-cables have not been used to acquire 3D seismic data in a windfarm<sup>4</sup>;

<sup>3</sup> [REP6-046](#), Annex 4, paragraph 2.6 (electronic page 31)

<sup>4</sup> bp notes that Slide 27 of the NSTA Technical Report states “NSTA is aware of only one, carefully planned field example of intra-windfarm 2D HR survey acquisition.” bp understands this to be the testing that was done at Ormonde windfarm and referred to in the OREC/NZTC report ([REP1-057](#), Appendix

- 2.7.7 a hybrid of OBN and P-cables has not been used to acquire seismic data in a windfarm; and
- 2.7.8 a hybrid of OBN and P-cables has not been used for 4D seismic monitoring of a CCS project in a windfarm.
- 2.8 Accordingly, although OBN and P-cables are “proven” technologies in the context of acquiring 3D seismic data for oil and gas projects, currently there are no examples of them being used to acquire seismic data in an offshore CCS project to enable CCS project operators to ensure containment and conformance of a CO2 plume. In that sense, OBN and P-cables (and a hybrid of the two) are unproven technologies for the purpose of monitoring CCS projects, and particularly inside of a windfarm ([REP6-046](#), electronic page 35).
- 2.9 Mr Sewell is correct that Clair Ridge provides information about OBN. However, Clair Ridge is an oil and gas project and the seismic acquired by OBN occurs around infrastructure, which is very different from what would be involved in using OBN to acquire seismic within a windfarm. Accordingly, the information from Clair Ridge does not assist in determining what would occur in using a hybrid of OBN and P-cables to conduct 4D seismic monitoring of a CCS project in a windfarm.
- 2.10 Extract from the August Sewell Report:
- “2.16<sup>5</sup> states “Given Mr Sewell’s agreement with bp’s position on these issues [the use of streamers in a wind farm and P-Cable in general], the evidence before the Examining Authority does not support finding either that a grid formation of 2x2km would allow co-location in the Exclusion Area or that NEP could use short streamers of less than 200m to acquire seismic data in the event wind turbines were present in the Exclusion Area.*
- To clarify the point made in this section, my opinion is limited to saying that P-Cable on its own is not a viable solution for Endurance. However P-Cable in addition to OBN is a viable solution. OBN would be targeting the Bunter reservoir and sealing formations directly overlaying the Bunter, while the P-Cable would be targeting the shallowest formations from seabed to 500m TVDSS.”*
- 2.11 bp’s statement in paragraph 2.16 of Annex 4 of its Deadline 6 submission was simply referring to the fact that Mr Sewell (as confirmed by him in his August report) had not suggested that P-cables on their own could be used to allow co-location in the Exclusion Zone. bp was not suggesting that Mr Sewell did not believe P-cables could be used at Endurance – it always understood that Mr Sewell’s view was that a hybrid of P-cables with OBN could be a “*viable solution*.”<sup>6</sup>
- 2.12 bp also notes that if a combination of OBN and P-cables were used to acquire seismic in a windfarm, the presence of turbines means that there would be gaps in both the data acquired using OBN and the data acquired using P-cables<sup>7</sup>. Given that OBN and P-cables would (as proposed by Mr Sewell) be used to cover separate parts of the subsurface, using a combination of OBN and P-cables in fact would complicate (rather than resolve) the problems of there being “gaps” in the seismic data and imaging of the Endurance store.

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1.1, sections 3.5-3.6, electronic pages 58-63). As explained in bp’s Technical Assessment ([REP1-057](#), Annex 1 of Appendix 2, section 7.3.2, electronic page 193), 2DHR cannot be used for seismic monitoring at Endurance.

<sup>5</sup> [REP6-046](#), Annex 4, paragraph 2.6 (electronic page 34)

<sup>6</sup> Sections 3 and 4 of Annex 4 of bp’s Deadline 6 submission ([REP6-046](#)) address why such a hybrid would not be a “*viable solution*” and how the Sewell Report, in fact, did not state that such a hybrid could or should be used at Endurance and instead only recommends modelling and field testing occur. bp understands that continues to be the case, albeit that in his August report Mr Sewell has provided additional information about the type of modelling and testing he recommends occur.

<sup>7</sup> In its Deadline 5a submission, bp explains in its response to request number 4 of the Request for Additional Information set out in Section 4.1 of the Sewell Report why and how using P-cables in the shallow section of the subsurface would create gaps ([REP5a-025](#), Annex 1, Appendix 1, electronic pages 20-21)

2.13 Extract from the August Sewell Report:

“4.1<sup>8</sup> describes bp’s initial response to my report and that the scope and timeframe of the .about the nature of the field trials and modelling that I was suggesting. The field trials I was proposing are related to logistics rather than direct data quality and so do not require a full 3D seismic survey to be acquired and processed.”

2.14 Conducting field trials for logistical purposes is only one element of the work that would need to be undertaken to assess whether a hybrid of OBN and P-cables could be used at Endurance and provide the seismic data and image needed to ensure containment and conformance of the CO2 plume. Mr Sewell saying that he is not suggesting that bp undertake field trials and other work relating to data quality does not mean that such work would not need to be undertaken, and bp disagrees with any suggestion that Mr Sewell may be making that carrying out a test to determine whether equipment can be deployed within a certain radius of an obstruction would enable bp and its NEP partners to determine that using OBN and P-cables would allow wind turbines to be present in the Exclusion Zone.

2.15 Extract from the August Sewell Report:

“4.7.2<sup>9</sup> states “if in theory it might be possible to use OBN to acquire good quality seismic data at Endurance, if there were wind turbines in the Exclusion Area, then no matter how good the quality of the data, there would be “gaps” in the seismic data at the location of the wind turbines. .... This means that no matter how good the seismic data acquired by OBN and P-cables might be, it would not be sufficient for NEP’s MMV plan as NEP would not be able to image the complete Endurance store”

The purpose of the field trials and modelling that I am suggesting is to show whether or not this is the case. The field trials would show how close to a wind turbine nodes and air guns could be used. The modelling would show the impact of this on seismic data quality and ability to monitor the CO2 plume.

In 4.8 to 4.13<sup>10</sup> I understand that bp are proposing something more extensive than I had in mind. For example I don’t think it is necessary to acquire an actual OBN 3D seismic survey as part of this. If an OBN 4D baseline survey is needed it can be done any time prior to CO2 injection starting. With regards to sand waves, my concern was with nodes being moved during a survey. Field trials for the impact of sand waves physically moving nodes around does not require a full seismic acquisition. In general, I think bp is describing a different set of trials and modelling to what I envisaged. bp might think that more is required than I had suggested, but this has not been the subject of any discussions so far.

In particular, 4.8.1 states “*by its nature, forward modelling is at best only indicative of a likely “best-case” scenario of what is theoretically possible;*”

The modelling I am suggesting is not to produce a single base case, but to consider a range of seismic survey designs and exclusions zones to see the relative impact on signal-to-noise ratio and imaging of each of these scenarios, and in comparison to a base case of long streamer acquisition.”

2.16 In its Deadline 5a and 6 submissions bp explained in detail the type of modelling and testing that it believes would be required in terms of assessing whether using a hybrid of OBN and P-cables would enable co-existence in the Exclusion Area (and bp explained why such modelling and testing is not feasible or necessary). The additional information that Mr Sewell has provided about the modelling and testing work he suggests occur does not change bp’s views and conclusions explained in its D6 submission, and bp continues to believe that undertaking an exercise of the nature of what Mr Sewell is suggesting would not enable co-location in the Exclusion Area.<sup>11</sup>

<sup>8</sup> [REP6-046](#), Annex 4, paragraph 4.1 (electronic page 36)

<sup>9</sup> [Ibid](#), paragraph 4.7.2 (electronic pages 37-38)

<sup>10</sup> [Ibid](#), paragraphs 4.8-4.13 (electronic pages 38-40)

<sup>11</sup> [Ibid](#), paragraphs 4.8-4.15 (electronic pages 38-40)

- 2.17 In terms of the additional information that Mr Sewell provides in his August report, the testing he proposes would not address or resolve various underlying issues<sup>12</sup>. For example:
- 2.17.1 Mr Sewell says that his concern is with sand waves moving nodes during a survey. As explained in paragraph 8.9 of bp's Deadline 5a submission<sup>13</sup>, a field trial to see how the nodes move during one survey will not address the underlying issue of how the movement of sand waves between surveys will impact on the ability to ensure that the nodes are able to be placed in the same locations for the next survey. It also will not assist in determining the extent of vertical changes in bathymetry between surveys;
- 2.17.2 Carrying out a "*range of survey designs and exclusion zones to see the relative impact of signal-to-noise ratio and imaging of each of these scenarios, and in comparison to a base case of long streamer acquisition*" does not address the underlying issue that the results produced by each survey design are only a "best case scenario".
- 2.18 Mr Sewell says that the work bp says would need to be undertaken concerning the potential use of a OBN and P-cable hybrid at Endurance is "*more extensive than what I had in mind.*"
- 2.19 It is unsurprising that bp would require the type of extensive modelling and testing described in bp's Deadline 5a and 6 submissions, given that Endurance is a First of a Kind (FOAK) project for which its proposed MMV method will be closely scrutinised by the NSTA. Indeed, the NSTA Technical Report, in discussing FOAK projects, states that "*maintaining public confidence is crucial*" and "*Each project requires a robust environmental baseline.*" and it states that "*First-of-a-Kind (FOAK) projects **may be expected to be potentially over-engineered, particularly as MMV methods are tested and certified***".<sup>14</sup> The NSTA also states the following in the "Seismic – Regulatory Requirements" section of its report:
- "The NSTA and UKCS operators generally acknowledged **FOAK surveys should be over-engineered.**"*<sup>15</sup> (emphasis added)
- 2.20 Additionally, the NSTA recognises the importance of taking a robust and risk-based approach to MMV strategies and tools in its Executive Summary, where it states:
- "MMV strategies and tools for carbon storage sites need to address conformance irregularities and containment breaches using a risk-based approach. **A robust suite of surface, marine and downhole tools/methods needs to be tested and deployed to support these strategies, including through trials**"*<sup>16</sup>
- 2.21 This approach by the NSTA and industry is understandable for a number of different reasons, including (as noted by the NSTA in its Technical Report) the importance of public confidence.
- 2.22 BEIS and the NSTA understand that public perception of CCUS technology is a key driver to the success of the CCUS industry. For example, in July 2021 BEIS commissioned Traverse to deliver a public dialogue to understand citizens' attitudes towards Carbon Capture Usage and Storage (CCUS).<sup>17</sup> Public dialogues provide in-depth insight into citizens' views, concerns and aspirations on issues by engaging a diverse and inclusive group of participants. The key finding from the public dialogue was that '*CCUS must be*

<sup>12</sup> bp notes that Mr Sewell does not say in his August report that the work he is suggesting take place would impact the "illustrative" 9 month timeframe he identified in his first report.

<sup>13</sup> [REP5a-025](#), Annex 1, paragraph 8.9, electronic page 14

<sup>14</sup> Slide 4 of the NSTA Technical Report (Annex 4 of Orsted's Deadline 7 submission, [\(REP7-087\)](#))

<sup>15</sup> Slide 19 of the NSTA Technical Report

<sup>16</sup> Slide 4 of the NSTA Technical Report

<sup>17</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1005434/ccus-public-perceptions-traverse-report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005434/ccus-public-perceptions-traverse-report.pdf)



safe', indicating safety was the most important criterion identified by the public, with specific reference to injected CO<sub>2</sub> remaining safely within a carbon store.

- 2.23 bp also recognised the importance of public confidence in its Deadline 1 submission<sup>18</sup>, and the bp Technical Assessment:

*“The ability to image and evidence where CO<sub>2</sub> is stored within the Endurance reservoir throughout the injection phase and all the way to closure and transfer to the Government, underpins the ability of bp as the operator to provide confidence to the regulator and the public, in the safety of CCUS operations as a First of a Kind (FOAK) development in the UK. Containment, conformance and confidence constitute the Licence to Operate (LTO) for NEP, regulated by the Oil & Gas Authority (OGA), and requires NEP to utilise best available, proven technologies and techniques to mitigate the risks and challenges of developing the reservoir. This principle is critical given there is no operational experience of CCUS in the UK.”<sup>19</sup>*

- 2.24 Extract from the August Sewell Report:

*“In 4.13.3 bp states “the rig, well and helicopter access requirements identified by bp (which, as explained above in paragraph 2.17 have not been challenged by Mr Sewell ....) mean there could not be co-existence in the Exclusion Area.”*

*This is simply because access issues were outside the scope of my report, and not because I have reviewed these issues and agree with bp’s conclusions.”*

- 2.25 bp stated in sub-paragraph 2.17.5 of Annex 4 of its Deadline 6 submission that Mr Sewell did not address in his report what bp said about access requirements – bp did not say that Mr Sewell agreed with bp in respect of access requirements. The fact that Orsted did not instruct Mr Sewell to address access issues does not alter the point that bp was making. Namely, that Mr Sewell has not said anything that takes issue with or disagrees with what bp has said about access requirements.

- 2.26 Extract from the Sewell August Report:

*“bp’s comments in 4.20<sup>20</sup> are conflating the direct impact of wind turbines as source of seismic noise, with the indirect impact on seismic data quality from small exclusion zones around each turbine. The July NSTA co-location slides [2] contain comments on the direct noise issue from work being done by Heriot Watt university (slide 44). The conclusion says “Windfarms .... appear to be a low level acoustic noise source within the seismic survey spectrum” and “less than an [sic] distant earthquake”. This indicates to me that it should not be a major factor in seismic data quality. I would still maintain that the level of noise from an inactive turbine is likely to be less than that of an active one, although this is not something that I have investigated. Measuring wind turbine noise is another of the field trials that I suggested, and which could be done in a short time frame, around existing wind turbines.”*

- 2.27 The point that bp was making is that inactive wind turbines would be a source of noise that could impact acquiring seismic data. bp was not claiming that an inactive turbine would be as noisy as an active one.

- 2.28 In terms of the study being done by Heriot Watt university, bp notes that (per slide 9 of the 26 July slide pack that Mr Sewell refers to) the work the university is carrying out has not been completed (and the NSTA does not refer to the work in the Technical Report published on 1 August after the 26 July slide pack that Mr Sewell refers to in his August report). Additionally, the implications for Endurance of the results of the work are dependent on various factors including the number and size of turbines included in the study. Accordingly, Mr Sewell’s view that the study indicates that acoustic noise from turbines “*should not be a major factor in seismic data quality*” does not mean that bp’s concerns about the potential impact of acoustic noise on seismic monitoring at Endurance

<sup>18</sup> [REP1-057](#), Appendix 2, paragraph 8.1 (electronic page 130)

<sup>19</sup> [REP1-057](#), Annex 1 of Appendix 2, electronic page 153

<sup>20</sup> [REP6-046](#), Annex 4, paragraph 4.20 (electronic page 41)

are not valid or that when the Heriot Watt work is completed it will address all of bp's concerns.

2.29 Extract from the August Sewell Report:

*"In 4.30<sup>21</sup> bp states "... there are large sand waves and substantial ripple effects present on the seabed of the Endurance area and that the strong tidal currents in the area mean there is a real risk that nodes placed on the seabed could move during the time a survey was being undertaken, which would degrade the seismic data that was acquired.."*

I agree and this is why I suggest that a small number of nodes could be placed on the seabed for the equivalent of the duration of a seismic survey, and their movements tracked to quantify the problem. This would not need a full 3D seismic survey to be acquired.

2.30 bp has explained above in paragraph 2.17 why Mr Sewell's suggestion of placing and tracking a small number of nodes on the seabed during one survey would fail to resolve the OBN sand wave related issues at Endurance, which can only be properly understood and assessed through multiple surveys being conducted over a period of time. Additionally, placing a small number of nodes in one area of the seabed would not address the fact that the size and nature of the sand waves and how they act in one area of the seabed may be very different than in another area, and a survey done in one area is unlikely to be representative of all of the sand waves present in the Endurance seabed area at the time the survey is conducted.

2.31 Extract from the August Sewell Report:

*"The comment in 4.33<sup>22</sup> somewhat overstates what I intended. I think that OBN costs will reduce relative to streamer, but will stay more expensive in the time frames that matter to this project and therefore not "significantly reduced". This is also the opinion of the authors of the NSTA co-location report [1] and [2]. Additionally, I don't think that any emerging technology will have matured sufficiently to make a difference to MMV requirements for Endurance. As noted above however, it is my opinion however (and I believe bp's also based on section 3.1 of Annex 4) that neither OBN nor P-Cable are "emerging technologies"*

2.32 Paragraphs 2.7 - 2.8 above explain why OBN and P-cables currently are not proven in the context of using them for acquiring seismic data for an offshore CCS project and of using them for 4D seismic monitoring of a CCS project located in a windfarm.

2.33 See paragraph 2.43 below for bp's comments concerning the cost of OBN.

2.34 Extract from the August Sewell Report:

*"The issues raised in 4.42<sup>23</sup> relate to how exclusion zones around wind turbines may affect OBN data and is the reason why I suggest conducting field trials and modelling which would be able to quantify the relative impact of different acquisition techniques and exclusion zones the ability of 4D seismic to monitor the CO2 plume."*

2.35 See paragraph 2.14 above as to why Mr Sewell's suggestion does not alter bp's views concerning modelling and field trials.

2.36 Extract from the August Sewell Report:

["Comments on Annex 5: February 2021 \(Endurance 4D Seismic Feasibility\) slide pack](#)

I had not seen this slide pack before but there is not much in there that is new or different to the other documents that I had seen. The summary table on slide 6 is good. I note that this concludes that a dense OBN on a grid of 200m x 50m is a viable solution for 4D monitoring at Endurance, with the caveats about mobile seabed and exclusion zones around wind turbines. This is a different definition of dense OBN to that contained in the table on slide 11 of bp's October 2021 slide pack, which describes a dense OBN as a grid of 100m x 50m, which is twice the number of nodes as assumed in the February 2021

<sup>21</sup> Ibid, paragraph 4.30 (electronic page 43)

<sup>22</sup> Ibid, paragraph 4.33 (electronic page 44)

<sup>23</sup> Ibid, paragraph 4.42 (electronic page 46)

summary. The question of what constitutes a sufficiently dense OBN grid to enable the necessary MMV at Endurance is what could be answered the modelling I suggested.

It is also worth noting that bp estimated the cost of dense (100m x 50m) OBN as £260M-£315M over the lifetime of Endurance MMV compared to £17m for HR towed streamer, in the October 2021 slide pack. In other words more than fifteen times the cost. The work done by the NSTA co-location forum and shown in the June 2022 slide pack [1], estimates that OBN 4D seismic for CCS would be two to three times the cost of towed streamer over the lifetime of a “large aquifer” storage project in UKCS (slide 8). This highlights that different assumptions about survey design can have a large impact on cost estimates.”

- 2.37 Mr Sewell notes that bp’s initial investigation into OBN versus towed streamer technologies in February 2021 summarises that 200m by 50m node spacing was sufficient for imaging Endurance. The summary slide states that the image quality is only “good” versus the “very good – high resolution” label applied to towed streamer seismic. bp’s summary clearly shows that 200m by 50m spacing was not sufficient to equal the image quality and high resolution achieved from towed streamer. The February 2021 investigation was only an investigation of the technologies in a clear water scenario and did not take into account co-location with a windfarm.
- 2.38 In October 2021, bp updated its investigation<sup>24</sup> and provided a summary of what is necessary to achieve as similar a seismic image as possible from OBN as from towed streamer seismic. It is for this reason that the node density increased from 200m by 50m to 100m by 50m, causing the increase in monitoring cost. Consideration was also provided for operating within a windfarm as a dense OBN survey is unlikely to be completed within a single season (also confirmed by the NSTA in their August Technical Report), leading to further increases in monitoring cost.
- 2.39 The NSTA is also in agreement that due to seismic coverage gaps at the seabed and shallow section, OBN “needs high density / very narrow receiver line spacing to compensate”.<sup>25</sup>
- 2.40 Mr Sewell references the NSTA presentation to the co-location forum (led by The Crown Estate) in June 2022<sup>26</sup> where the NSTA stated that the cost of OBN monitoring was “2 to 3 times” greater than towed streamer monitoring. Also submitted in Orsted’s Deadline 7 submission was another presentation by the NSTA from 26<sup>th</sup> July 2022 which was presented at a CCSA led forum by Nick Richardson and Ronnie Parr. The presentation clearly states that “the cost of each OBN 4D survey (baseline + every monitor) is 2 to 5 times more expensive than its streamer equivalent.”<sup>27</sup>
- 2.41 Additionally, at Deadline 1, Orsted submitted the OREC/NZTC report titled “Northern Endurance CCUS Co-location Review”. OREC/NZTC states that the “the cost of acquiring OBN seismic is **approx. 10 times** that of conventional 3D broadband data which is the current standard for towed streamer acquisition.”<sup>28</sup> (emphasis added).
- 2.42 Mr Sewell has not referenced either the OREC/NZTC report or this updated view from the NSTA in his additional comments which shows the level of uncertainty in estimating costs is greater than he suggests, given that both of the NSTA presentations that he references were completed one month apart. It is also clear that the NSTA uses different survey assumptions to bp’s for Endurance in both of its presentations.
- 2.43 bp still believes that the cost for acquiring OBN seismic over Endurance versus towed streamer is up to 15 times greater and in October 2021, bp presented to Orsted, NSTA, TCE and BEIS that the increase in cost for acquiring just 6 OBN seismic surveys versus 6

<sup>24</sup> [REP6-046](#), Annex 6, electronic page 72

<sup>25</sup> [REP7-087](#), electronic page 117

<sup>26</sup> [Ibid](#), electronic page 19

<sup>27</sup> [Ibid](#), electronic page 55

<sup>28</sup> [REP1-057](#), Appendix 1.1, electronic page 47



towed streamer seismic surveys for NEP over the project lifespan, was forecast to be between £243m - £298m.<sup>29</sup>

- 2.44 It is important to note that the NSTA stated that “*OBN will always be slower (and more costly) than [towed] streamer.*”<sup>30</sup> and that OBN “*cost is a significant factor*”, despite a recognition that costs are likely to reduce in the long-term. As submitted in bp’s Deadline 1 submission<sup>31</sup>, the NEP project will be governed by BEIS’ Transportation and Storage Regulated Investment (TRI) model where the economic regulator will be under an obligation to ensure that all investment in the CCUS infrastructure is economic and efficient.

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<sup>29</sup> [REP6-046](#), Annex 6, electronic page 72

<sup>30</sup> [REP7-087](#), electronic page 63

<sup>31</sup> [REP1-057](#), Appendix 2, sections 9-10 (electronic page 132-134)

**ANNEX 3**  
**VERSION 5 OF BP'S PROTECTIVE PROVISIONS (CLEAN)**

**SCHEDULE [ ], PART [ ]  
Protection for Carbon Dioxide  
Appraisal and Storage Licensee(s)**

**Application:**

1. For the Protection of the Licensee(s) from time to time of United Kingdom Carbon Dioxide Appraisal and Storage Licence CS001, unless otherwise provided for in this Schedule or agreed in writing between the Undertaker and the Carbon Entity the provisions of this part of this Schedule shall have effect.

**Interpretation:**

2. In this Part of this Schedule—

“Applicable Laws” means applicable laws, rules, orders, guidelines and regulations, including without limitation, those relating to health, safety and the environment and logistics activities such as helicopter and vessel operations;

“BP Exploration Operating Company Limited” means BP Exploration Operating Company Limited, with Company Registration Number 00305943, whose registered office is at Chertsey Road, Sunbury On Thames, Middlesex TW16 7BP;

"Carbon Entity" means the entity defined as the Carbon Entity under the Interface Agreement;

“Carbon Sentinel Limited” means Carbon Sentinel Limited, with Company Registration Number 08116471, whose registered office is at 1-3 Strand, London WC2N 5EH;

"Commercial Operation Date" means the date on which the authorised project has supplied electricity on a commercial basis to the national grid;

"Endurance Store" means the geological storage facility in the 'Endurance' saline aquifer subject to the Licence;

"Entity" means the undertaker or the Carbon Entity as appropriate and "Entities" means both of them;

"Exclusion Area" means any area within the area hatched orange on the Protective Provisions Plan and as delineated in the Table of Co-Ordinates;

“Good Offshore Wind Farm Construction Practice” means the application of those methods and practices customarily used in construction of wind farms in the United Kingdom Continental Shelf with that degree of diligence and prudence reasonably and ordinarily exercised by experienced operators and contractors engaged in the United Kingdom Continental Shelf in a similar activity under similar circumstances and conditions;

“Interface Agreement” means the agreement dated 14 February 2013 between (1) The Crown Estate Commissioners (2) Carbon Sentinel Limited and (3) Smart Wind Limited, as varied and adhered to by an agreement dated 12 September 2016 between (1) The Crown Estate Commissioners (2) Smart Wind Limited (3) Carbon Sentinel Limited and (4) the Undertaker and a Deed of Covenant and Adherence dated 10 February 2021 between (1) The Crown Estate Commissioners (2) the Undertaker (3) Smart Wind Limited (4) Carbon Sentinel Limited and (5) BP Exploration Operating Company Limited, or such other agreement as may be entered into by the parties in substitution for those agreements;

“Licence” means the United Kingdom Carbon Dioxide Appraisal and Storage Licence CS001;

“Licensee” means the licensee from time to time of the Licence;

"Longstop Date" means:

- (a) the date three (3) years after the coming into force of this Order; or
- (b) such later date as may be notified to the Entities in writing from time to time by the Secretary of State;

"Notification Area" means any area within the area hatched blue on the Protective Provisions Plan and as detailed in the Table of Co-Ordinates;

"Plan of the Undertaker's Works" means a construction programme, method and details of the proposed location of the Undertaker's Works and minimum requirements known at that time such as safety in accordance with Good Offshore Wind Farm Construction Practice and Applicable Laws to enable the Undertaker to construct and operate the Undertaker's Works;

"Smart Wind Limited" means Smart Wind Limited, with Company Registration Number 07107382, whose registered office is at 5 Howick Place, London, England SW1P 1WG;

"The Crown Estate Commissioners" means The Crown Estate Commissioners on behalf of Her Majesty the Queen, acting in exercise of the powers of the Crown Estate Act 1961;

"the Protective Provisions Plan" means the plan entitled Endurance Store Protective Provisions Plan and certified as the Endurance Store Protective Provisions Plan for the purposes of this Part of this Schedule;

"the Table of Co-Ordinates" means the following table:

Exclusion Area	
Latitude	Longitude
54°8'51.929"N	1°0'34.075"E
54°9'13.497"N	1°0'43.850"E
54°10'49.480"N	0°58'21.782"E
54°12'37.143"N	0°58'31.095"E
54°12'17.413"N	1°12'18.263"E
54°10'48.297"N	1°15'35.528"E
54°9'52.770"N	1°13'54.364"E
54°8'17.458"N	1°11'0.989"E
Notification Area	
Latitude	Longitude
54°7'57.201"N	1°0'9.286"E
54°8'51.943"N	1°0'34.082"E
54°8'17.458"N	1°11'0.989"E
54°9'52.770"N	1°13'54.364"E
54°7'57.603"N	1°13'55.408"E

"Undertaker's Works" means the indicative works permitted by this Order; and

"Wind Entity" means the entity defined as the Wind Entity under the Interface Agreement.

### **The Undertaker's Works**

3. The undertaker must not construct any of the authorised project within the Exclusion Area.
4. The undertaker must not commence construction of any of the authorised project within the Notification Area unless the undertaker has submitted to the Carbon Entity, not less than 56 days' prior, a Plan of the Undertaker's Works within that area.
5. Nothing in this paragraph precludes the undertaker from submitting at any time or from time to time, but in no case less than 56 days before commencing construction, a new plan, instead of the plan previously submitted in accordance with paragraph 4 above.

## Interface Agreement

6. Nothing in this Part of this Schedule shall affect any rights or obligations that exist under the terms of the Interface Agreement, save that the Carbon Entity shall have no liability to the Wind Entity under that agreement due to or arising from the imposition of the provisions of this Part of this Schedule or its impact upon the authorised project and no claim may be made by, nor award granted to, the Wind Entity for any damages as a result of any alleged antecedent breach of the Interface Agreement prior to the date of this Order.

### [Compensation<sup>1</sup>

7. Unless otherwise agreed between the Entities, the Carbon Entity will pay to the Wind Entity [£...] on the earlier of:

(a) the date no more than 60 days after notification by the undertaker to the Carbon Entity of the Commercial Operation Date; or

(b) 1 February 2029,

provided that the provisions of this Part of this Schedule have not ceased to have effect in accordance with paragraph [8]<sup>2</sup> by that date (in which case no payment shall be due).<sup>3</sup>

OR

7. Unless otherwise agreed between the Entities and notified to the Secretary of State in writing, the Secretary of State shall within 2 months of this Order coming into force determine and notify the Entities of the Compensation<sup>4</sup> to be paid by the Carbon Entity to the Wind Entity, such Compensation to be paid on the earlier of:

(a) the date no more than 60 days after notification by the undertaker to the Carbon Entity of the Commercial Operation Date; or

(b) 1 February 2029,

provided that the provisions of this Part of this Schedule have not ceased to have effect in accordance with paragraph [12] by that date (in which case no payment shall be due).

8. In determining the Compensation, the Secretary of State shall balance the impact of the imposition of the Exclusion Area on the authorised project (and the removal of the Carbon Entity's liability to the Wind Entity under the Interface Agreement) pursuant to this Order with the public interest in preserving the full developable area of the Endurance Store;

9. In making a determination of Compensation under paragraph 7, the Secretary of State shall take into account relevant submissions made by the Entities during the examination of the Order (application reference: EN010098), and such further information (if any) provided by the Entities pursuant to paragraph 10.

10. Where the Secretary of State considers that further information is necessary to determine Compensation under paragraph 7, he or she may request this from the Entities, who shall provide it within the period specified in the request.

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<sup>1</sup> Two alternative forms of drafting are proposed, which achieve the same basic purpose and would have the same general process, with the distinction being whether the SoS determines the quantum of compensation prior to determining the DCO and writes the figure into the made Order (bp's Preferred Option) or in the period immediately after the DCO is determined (the Alternative Option). The drafting is included in this version on an 'either/or' basis for the ExA and SoS' consideration. bp's main Deadline 6 submission elaborates on the reasoning.

<sup>2</sup> This refers to the 'Cessation of Provisions' paragraph below, which would be paragraph 8 in circumstances where the Preferred Option compensation drafting was included.

<sup>3</sup> This is the 'Preferred Option'.

<sup>4</sup> If included, 'Compensation' to be defined as '*means a sum of money payable to the Wind Entity in recognition of the removal of the Carbon Entity's liability under the Interface Agreement pursuant to the provisions of this Part of this Schedule*'

11. Any information provided pursuant to paragraph 10 shall be treated as confidential and commercially sensitive by the Secretary of State and (in the event that it is shared by the Secretary of State with that Entity as part of the process of determining Compensation) by the non-disclosing Entity.<sup>5</sup> ]

**Cessation of provisions**

12. Save for paragraph 6, the provisions of this Part of this Schedule shall cease to have effect in the event that prior to the Longstop Date, the Carbon Entity notifies the undertaker that the authorised project may be constructed within the Exclusion Area.

**Notices**

13. Any notice or other written communication required shall be sufficient if made or give to the other Party by personal delivery or by first class post, postage prepaid, to the address set out below:

if to the undertaker, at:

[ ]

if to the Carbon Entity at:

Andy Lane, VP hydrogen, UK

[REDACTED]

By way of copy to Clare Haley

[REDACTED]

14. Notices or written communications made or given by personal delivery shall be deemed to have been sufficiently made or given when sent (receipt acknowledged), or if posted, 5 business days after being placed in the post, postage prepaid, or upon receipt, whichever is sooner.

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<sup>5</sup> This is the 'Alternative Option'.

**ANNEX 4**  
**VERSION 5 OF BP'S PROTECTIVE PROVISIONS (TRACKED-CHANGE)**

**SCHEDULE [ ], PART [ ]  
Protection for Carbon Dioxide  
Appraisal and Storage Licensee(s)**

**Application:**

1. For the Protection of the Licensee(s) from time to time of United Kingdom Carbon Dioxide Appraisal and Storage Licence CS001, unless otherwise provided for in this Schedule or agreed in writing between the Undertaker and the Carbon Entity the provisions of this part of this Schedule shall have effect.

**Interpretation:**

2. In this Part of this Schedule—

“Applicable Laws” means applicable laws, rules, orders, guidelines and regulations, including without limitation, those relating to health, safety and the environment and logistics activities such as helicopter and vessel operations;

“BP Exploration Operating Company Limited” means BP Exploration Operating Company Limited, with Company Registration Number 00305943, whose registered office is at Chertsey Road, Sunbury On Thames, Middlesex TW16 7BP;

"Carbon Entity" means the entity defined as the Carbon Entity under the Interface Agreement;

“Carbon Sentinel Limited” means Carbon Sentinel Limited, with Company Registration Number 08116471, whose registered office is at 1-3 Strand, London WC2N 5EH;

"Commercial Operation Date" means the date on which the authorised project has supplied electricity on a commercial basis to the national grid;

"Endurance Store" means the geological storage facility in the 'Endurance' saline aquifer subject to the Licence;

"Entity" means the undertaker or the Carbon Entity as appropriate and "Entities" means both of them;

"Exclusion Area" means any area within the area hatched orange on the Protective Provisions Plan and as delineated in the Table of Co-Ordinates;

“Good Offshore Wind Farm Construction Practice” means the application of those methods and practices customarily used in construction of wind farms in the United Kingdom Continental Shelf with that degree of diligence and prudence reasonably and ordinarily exercised by experienced operators and contractors engaged in the United Kingdom Continental Shelf in a similar activity under similar circumstances and conditions;

“Interface Agreement” means the agreement dated 14 February 2013 between (1) The Crown Estate Commissioners (2) Carbon Sentinel Limited and (3) Smart Wind Limited, as varied and adhered to by an agreement dated 12 September 2016 between (1) The Crown Estate Commissioners (2) Smart Wind Limited (3) Carbon Sentinel Limited and (4) the Undertaker and a Deed of Covenant and Adherence dated 10 February 2021 between (1) The Crown Estate Commissioners (2) the Undertaker (3) Smart Wind Limited (4) Carbon Sentinel Limited and (5) BP Exploration Operating Company Limited, or such other agreement as may be entered into by the parties in substitution for those agreements;

“Licence” means the United Kingdom Carbon Dioxide Appraisal and Storage Licence CS001;

“Licensee” means the licensee from time to time of the Licence;

"Longstop Date" means:



- (a) the date three (3) years after the coming into force of this Order; or
- (b) such later date as may be notified to the Entities in writing from time to time by the Secretary of State;

"Notification Area" means any area within the area hatched blue on the Protective Provisions Plan and as detailed in the Table of Co-Ordinates;

"Plan of the Undertaker's Works" means a construction programme, method and details of the proposed location of the Undertaker's Works and minimum requirements known at that time such as safety in accordance with Good Offshore Wind Farm Construction Practice and Applicable Laws to enable the Undertaker to construct and operate the Undertaker's Works;

"Smart Wind Limited" means Smart Wind Limited, with Company Registration Number 07107382, whose registered office is at 5 Howick Place, London, England SW1P 1WG;

"The Crown Estate Commissioners" means The Crown Estate Commissioners on behalf of Her Majesty the Queen, acting in exercise of the powers of the Crown Estate Act 1961;

"the Protective Provisions Plan" means the plan entitled Endurance Store Protective Provisions Plan and certified as the Endurance Store Protective Provisions Plan for the purposes of this Part of this Schedule;

"the Table of Co-Ordinates" means the following table:

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54°10'48.297"N	1°15'35.528"E
54°9'52.770"N	1°13'54.364"E
54°8'17.458"N	1°11'0.989"E
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54°7'57.201"N	1°0'9.286"E
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54°7'57.603"N	1°13'55.408"E

"Undertaker's Works" means the indicative works permitted by this Order; and

"Wind Entity" means the entity defined as the Wind Entity under the Interface Agreement.

### The Undertaker's Works

3. The undertaker must not construct any of the authorised project within the Exclusion Area.
4. The undertaker must not commence construction of any of the authorised project within the Notification Area unless the undertaker has submitted to the Carbon Entity, not less than 56 days' prior, a Plan of the Undertaker's Works within that area.
5. Nothing in this paragraph precludes the undertaker from submitting at any time or from time to time, but in no case less than 56 days before commencing construction, a new plan, instead of the plan previously submitted in accordance with paragraph 4 above.

## Interface Agreement

6. Nothing in this Part of this Schedule shall affect any rights or obligations that exist under the terms of the Interface Agreement, save that the Carbon Entity shall have no liability to the Wind Entity under that agreement due to or arising from the imposition of the provisions of this Part of this Schedule or its impact upon the authorised project and no claim may be made by, nor award granted to, the Wind Entity for any damages as a result of any alleged antecedent breach of the Interface Agreement prior to the date of this Order.

### [Compensation<sup>1</sup>

7. Unless otherwise agreed between the Entities, the Carbon Entity will pay to the Wind Entity [£...] on the earlier of:

(a) the date no more than 60 days after notification by the undertaker to the Carbon Entity of the Commercial Operation Date; or

(b) 1 February 2029,

provided that the provisions of this Part of this Schedule have not ceased to have effect in accordance with paragraph [8]<sup>2</sup> by that date (in which case no payment shall be due).<sup>3</sup>

OR

7. Unless otherwise agreed between the Entities and notified to the Secretary of State in writing, the Secretary of State shall within 2 months of this Order coming into force determine and notify the Entities of the Compensation<sup>4</sup> to be paid by the Carbon Entity to the Wind Entity, such Compensation to be paid on the earlier of:

(a) the date no more than 60 days after notification by the undertaker to the Carbon Entity of the Commercial Operation Date; or

(b) 1 February 2029,

provided that the provisions of this Part of this Schedule have not ceased to have effect in accordance with paragraph [12] by that date (in which case no payment shall be due).

8. In determining the Compensation, the Secretary of State shall balance the impact of the imposition of the Exclusion Area on the authorised project (and the removal of the Carbon Entity's liability to the Wind Entity under the Interface Agreement) pursuant to this Order with the public interest in preserving the full developable area of the Endurance Store;

9. In making a determination of Compensation under paragraph ~~8~~7, the Secretary of State shall take into account relevant submissions made by the Entities during the examination of the Order (application reference: EN010098), and such further information (if any) provided by the Entities pursuant to paragraph 10.

10. Where the Secretary of State considers that further information is necessary to determine Compensation under paragraph ~~8~~7, he or she may request this from the Entities, who shall provide it within the period specified in the request.

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<sup>1</sup> Two alternative forms of drafting are proposed, which achieve the same basic purpose and would have the same general process, with the distinction being whether the SoS determines the quantum of compensation prior to determining the DCO and writes the figure into the made Order (bp's Preferred Option) or in the period immediately after the DCO is determined (the Alternative Option). The drafting is included in this version on an 'either/or' basis for the ExA and SoS' consideration. bp's main Deadline 6 submission elaborates on the reasoning.

<sup>2</sup> This refers to the 'Cessation of Provisions' paragraph below, which would be paragraph 8 in circumstances where the Preferred Option compensation drafting was included.

<sup>3</sup> This is the 'Preferred Option'.

<sup>4</sup> If included, 'Compensation' to be defined as '*means a sum of money payable to the Wind Entity in recognition of the removal of the Carbon Entity's liability under the Interface Agreement pursuant to the provisions of this Part of this Schedule*'

11. Any information provided pursuant to paragraph 10 shall be treated as confidential and commercially sensitive by the Secretary of State and (in the event that it is shared by the Secretary of State with that Entity as part of the process of determining Compensation) by the non-disclosing Entity.<sup>5</sup> ]

**Cessation of provisions**

12. Save for paragraph 6, the provisions of this Part of this Schedule shall cease to have effect in the event that prior to the Longstop Date, the Carbon Entity notifies the undertaker that the authorised project may be constructed within the Exclusion Area.

**Notices**

13. Any notice or other written communication required shall be sufficient if made or give to the other Party by personal delivery or by first class post, postage prepaid, to the address set out below:

if to the undertaker, at:

[ ]

if to the Carbon Entity at:

Andy Lane, VP hydrogen, UK

[REDACTED]

By way of copy to Clare Haley

[REDACTED]

14. Notices or written communications made or given by personal delivery shall be deemed to have been sufficiently made or given when sent (receipt acknowledged), or if posted, 5 business days after being placed in the post, postage prepaid, or upon receipt, whichever is sooner.

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<sup>5</sup> This is the 'Alternative Option'.