# Morecambe Offshore Windfarm: Generation Assets

## Examination Documents

## Volume 9

## The Applicant’s Response to Spirit Energy’s Deadline 4 Submission Appendix C: Morecambe Offshore Windfarm / Morecambe Net Zero Interactions Report

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Morecambe Offshore Windfarm Ltd

# MOWF CCUS Support

## MOWF/MNZ Interactions Report


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# CONTENTS

# 1 INTRODUCTION

## 1.1 Overview

Figure 1-1 illustrates the area of interest, including the oil and gas infrastructure, oil and gas licensed blocks (yellow), carbon storage area (green outline) for the Morecambe Net Zero (MNZ) project, and the Morecambe Offshore Wind Farm (MOWF) site (red outline). It can be seen that the north central and eastern areas of the proposed windfarm development overlap with the southern section of the South Morecambe gas field and the carbon storage license. Due to the co-location of these projects, there is the likelihood for operations to interact and potential for the projects to impact on each other.

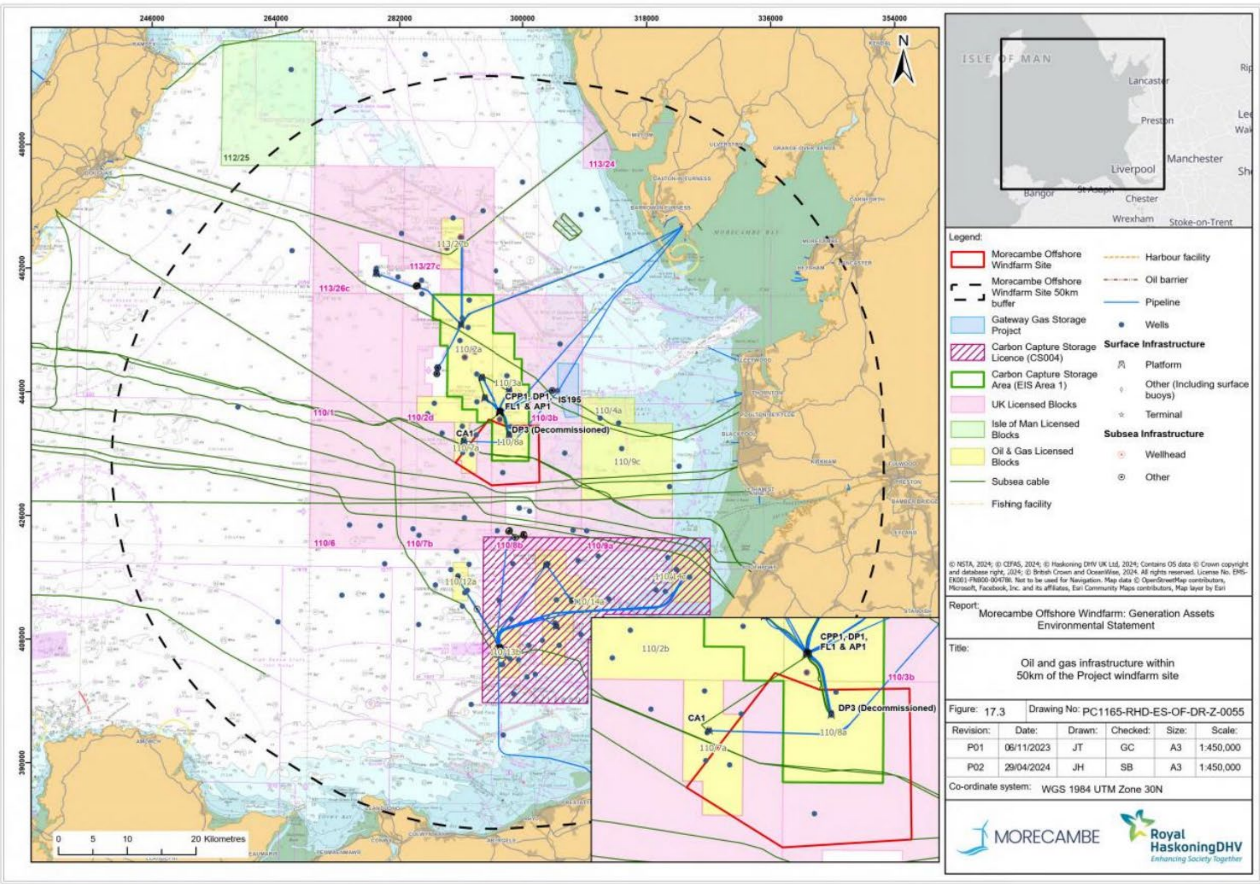


*Figure 1-1 - Summary Map of Relevant Infrastructure and Licences*

Based on Ref A3 the injection wellheads are initially planned to be at the same location as existing platforms DP3, DP1 and DP8 in South Morecambe, and DPPA in North Morecambe. This would put the southernmost injection platform inside the wind farm.

## 1.2 Scope and Objectives

Xodus Group Limited ("Xodus") has been engaged to provide support to Morecambe Offshore Windfarm Ltd on the implications of the MOWF for MNZ and to provide a report to discuss the interactions between MOWF and MNZ. Note that further reports are available as part of this wider study addressing other aspects of the interaction between these projects.

## 1.3 XODUS CCUS Experience

Xodus has extensive CCUS experience in the UK and Globally, including acting as an expert for a CCS/wind farm overlap developments consent process in the UK North Sea. Xodus has also recently acted as an independent technical expert for the North Sea Transition Authority (NSTA) reviewing Early Risk Assessments of carbon storage projects resulting from the 2023 carbon storage licence round.

## 1.4 Author

Andrew Sewell – Head of Subsurface at Xodus Group Ltd

I have 34 years of experience as a geophysicist and subsurface manager in the energy industry, working both in oil & gas and CCS. I undertake technical work and project management in a wide variety of projects, including as an expert. In the early part of my career I worked in geophysical operations and have continued to advise on such projects until now alongside more general subsurface projects. I have worked on CCS projects on and off since 2009. I have recently acted as an expert for a CCS / wind farm overlap development consent process in the UK North Sea, and also as an independent technical expert for the NSTA reviewing Early Risk Assessments of carbon storage projects resulting from the 2023 licence round.

# 2 PROJECT STATUS

## 2.1 Morecambe Offshore Windfarm (MOWF)

MOWF is a proposed offshore windfarm located in the Eastern Irish Sea, with a nominal capacity of 480 megawatts (MW). Alongside five other projects, it was selected by The Crown Estate in its Offshore Wind Leasing Round 4 in 2021.

The Agreement for Lease (AfL) was received in 2023 and comprises an area of up to 125km$^2$. The proposed windfarm site development area has now been reduced to approx. 87km$^2$

## 2.2 Morecambe Net Zero (MNZ)

Spirit Energy ("Spirit") is the operator of the Morecambe Hub, comprising three gas fields in the East Irish Sea: North Morecambe, South Morecambe and Rhyl. These are operated under Seaward Production Licences P.2541, P.1483 and P.153, across blocks 110/2a, 110/3a, 110/8a and 113/27b. Additionally, Spirit is designated duty holder, and therefore operator, of the East Irish Sea fields, including Calder, licensed by Chrysaor Resources (Irish Sea) Limited (a Harbour Energy plc group company). Production from the Morecambe Hub is currently expected to continue to 2029 at the latest.

Spirit is the holder of a Carbon Dioxide Appraisal and Storage Licence, CS010 (granted in September 2023), pursuant to the future transition of the Morecambe Hub fields for CO2 storage as part of the MNZ project. The area covered by CS010 incudes North and South Morecambe gas fields but not Calder or Rhyl gas fields. Once the gas fields have ceased natural gas production, the reservoirs and infrastructure are intended to be repurposed. Target carbon storage volumes are up to 25 million tonnes per annum (MTPA) by 2040, the cumulative volume is up to 1 GT of CO2.

South Morecambe and Calder are located in close proximity to MOWF.

In paragraphs 6.2 to 6.7 of Document 822, Spirit states that the CCS project is not merely a proposal, but a project that is advancing according to an agreed schedule with NSTA which is described in CS010, see ref A10. While the substance of this is correct, the projects that were part of the 2023 licence round (of which MNZ is one) are in the "Appraise" phase (Figure 2-1) and are behind the Track 1 (NEP and HyNet projects) which are at "Execute" and Track 2 (Acorn and Viking projects) which are at "Define" in terms of progress through the approvals process. The Track 1 and Track 2 projects are those CCS projects which had already started to progress through the NSTA approvals process prior to the 2023 licence round. The MNZ site still needs to be fully characterised and pass several stage gates before it will be able to obtain a Storage Permit. Site Characterisation requires a lot of work, and there is no guarantee of progression to "Assess" at the end of it.

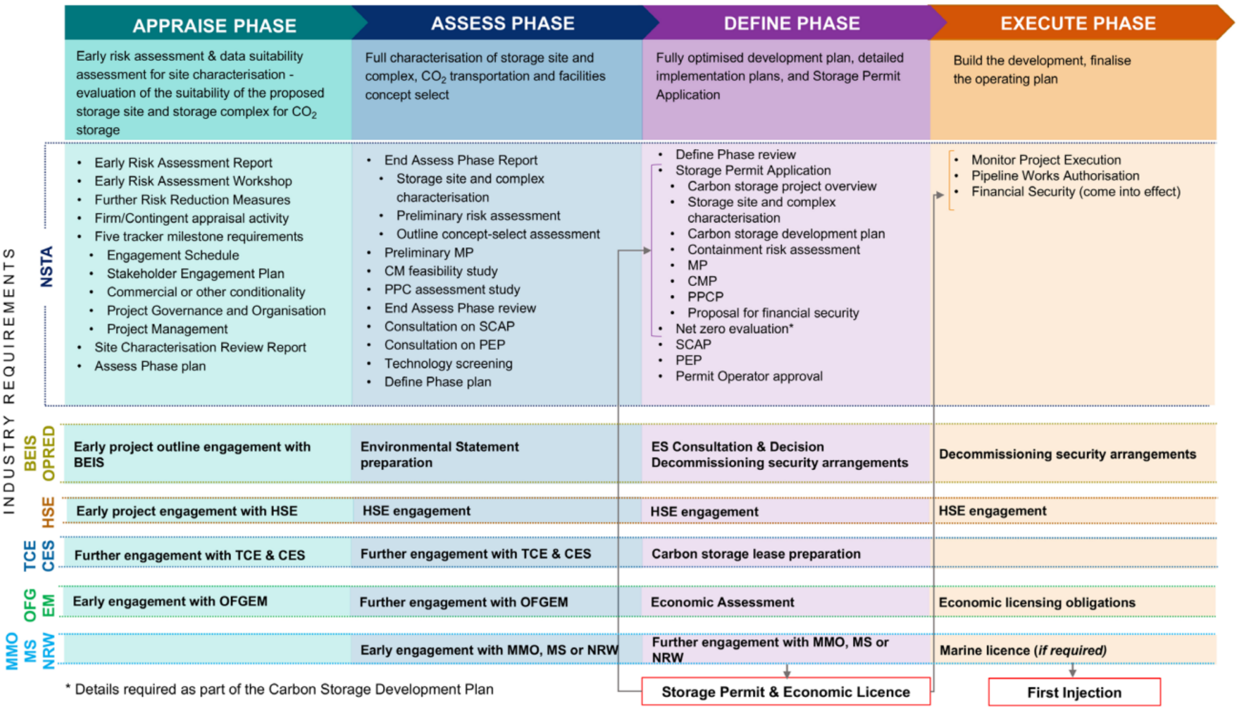


*Figure 2-1 - NSTA Carbon Storage Permit Road Map (Ref A9)*

Following the granting of a storage permit and economic licence, a CCS project enters the "Execute" phase. This starts with construction to install any new infrastructure required related to capture, transport and injection of CO2. This can be done in stages if the project is phased. Once the system has been commissioned from the CO2 source to store, the injection phase can begin. Again, this may be phased depending on CO2 supply, if multiple reservoir intervals are being injected into, or if there are multiple subsurface structures into which CO2 is planned to be injected (as may be the case with MNZ north and south stores). Concomitant with this is the measurement, monitoring and verification (MMV), to ensure the expected volume of CO2 is being injected into the store and to monitor where in the store the CO2 is contained. Following the cessation of injection, the project enters the post-injection phase during which monitoring continues. The final stage of the project is the post-closure phase, which includes decommissioning of the infrastructure and site relinquishment (following demonstration that the storage site is secure for long-term CO2 storage). Figure 2-2 summarises this and gives an approximate timing for each of the phases.

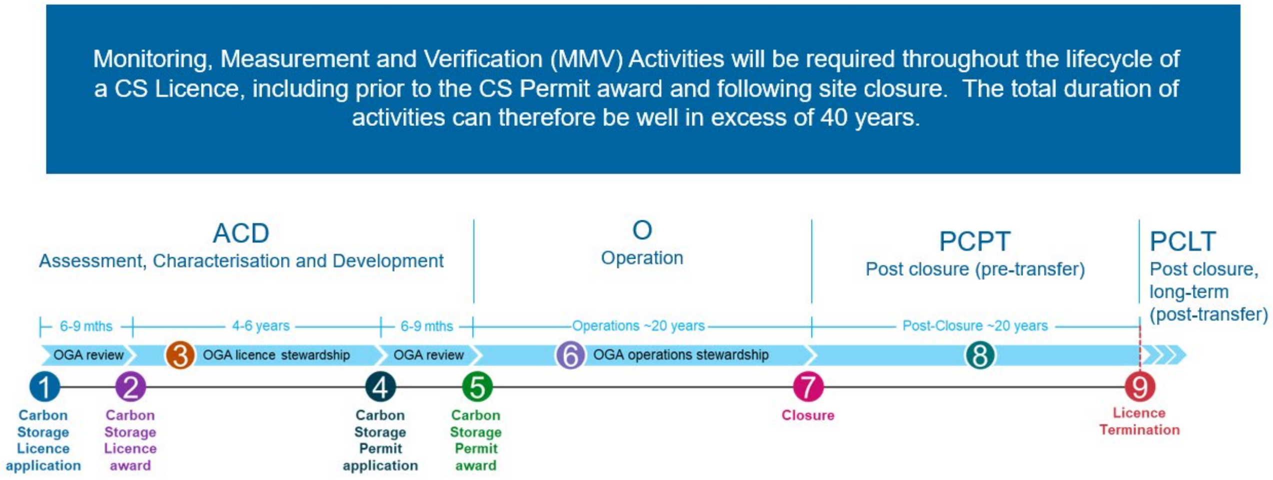


*Figure 2-2 - CCS Project Lifecycle (Ref A7)*

In paragraphs 6.8 and 6.8.1, Spirit mentions the phasing of the CCS project as a consideration made to the wind farm development:

*6.8 To date, Spirit has given, and continues to give, significant consideration to the Proposed Development to facilitate co-location of the Proposed Development and the MNZ carbon store. Spirit has already designed elements of MNZ with the Proposed Development in mind and is committed to engaging with the Applicant on project specific requirements. A summary of some of the considerations already designed into the project can be found below.*

*6.8.1 Both the north and south stores (depleted reservoirs) are within the boundary of the carbon storage licence. There is an obligation for Spirit to undertake the licence commitments on both sites. Together the stores can provide storage for 1 Gigatonne (GT) of $CO_2$. The larger South Morecambe gas field (MSF) has a theoretical capacity of 850MT $CO_2$ sequestration with North Morecambe gas field the remaining 177MT $CO_2$ sequestration. Current engineering design works is underway to assess the optimal phasing for filling the stores including consideration of other sea users in the area. Due to optimising the development and infrastructure installation it is likely the larger south store will be developed first or at the same time as the north store.*

The store phasing has no relationship to the co-location issue. Spirit would be phasing the project regardless. Furthermore, it is not clear how developing South Morecambe first is a benefit to co-location with the wind farm.

# 3 OVERLAP ISSUES

There are two main issues related to the overlap between MNZ and MOWF, excluding those related to decommissioning, helicopters and access to platforms that are covered in other reports. These are:

1) Monitoring of the spread of CO2 in the reservoir after injection starts

2) Access for a rig and associated vessels in case of leakage from a legacy well

## 3.1 CO2 Monitoring

CO2 monitoring is a crucial aspect of any CCS project, with several technologies available to use. These technologies, which are able to be used globally and in the UK are listed in Figure 3-1 (Ref A6). Note that this example is taken from BP's Endurance CCS project, but lists most of the currently available technologies for CCS monitoring.

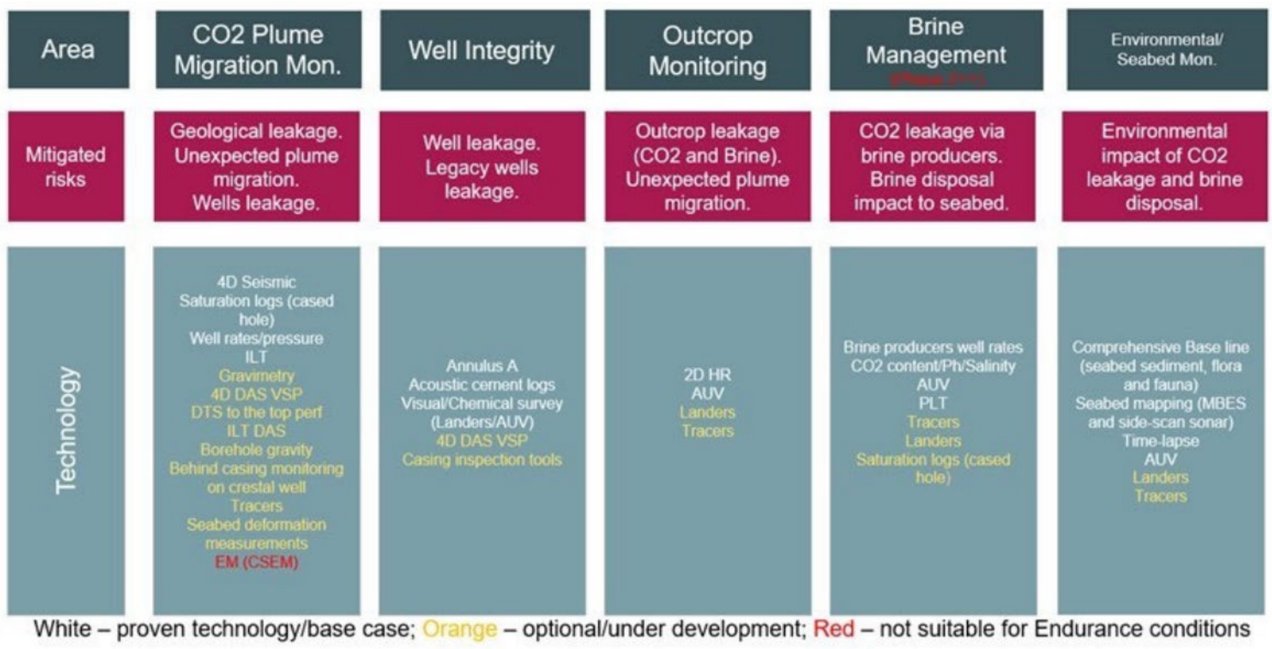


*Figure 3-1 - Available MMV Technologies (Ref A6)*

MMV activities are bespoke to each individual CO2 storage site, dependent on the risks and uncertainties as well as site-specific conditions. Whilst the CCS industry is still in its nascent stage most projects globally (and all in the UK) use (or are planning to use) multiple technologies to ensure a robust MMV plan. This ensures redundancy in the event that one technology is unable to detect CO2 migration/leakage as planned as well as the opportunity for

MMV observations at various scales (regionally vs. locally) and over different time periods, as each technology can have different spatial and temporal ranges.

Spirit currently plans to use two technologies that will require some accommodation from MOWF, but this should be possible with appropriate planning. The proposed monitoring technologies are (a) gravimetry via 4D (or time lapse) gravity surveys, and (b) seabed sampling surveys. Spirit also mentions well-based monitoring, but this would only require access to any monitor wells, which we would expect to be platform-based, like the injector wells. Spirit has rejected the use of the most common monitoring technology for CCS which is 3D time lapse seismic, also known as 4D seismic. It should be noted that as MNZ is still in the "Appraise" Phase, a full MMV plan is not currently in place, and not all of the technologies have been through a feasibility assessment.

### 3.1.1 Seismic Surveys

Seismic surveys are a technology that allows imaging of the subsurface rock formations by generating acoustic energy from a seismic source which reflects back off the various rock layers and is detected by receivers. In an offshore area such as Morecambe Bay the most prevalent technology used is a large vessel towing a long stream of hydrophone receivers. For 2D seismic the vessel tows a single streamer directly behind it. For 3D seismic surveys the vessel tows multiple (e.g. 8-16) streamers behind it and covers a swath with each sail line. The result of a 3D survey is a cube of imaged data across the area of interest and to a depth of several kilometres. A more expensive way of acquiring 3D seismic is by using Ocean Bottom Nodes (OBN) which are temporarily placed on the seabed by Remotely Operated Vehicles. In a constricted area with infrastructure on the seabed and surface, it can be impossible to acquire a 3D seismic survey with streamers. This applies in particular to an area covered by a wind farm, as shown in Figure 3-2. Then an OBN survey is the only logistically possible option.

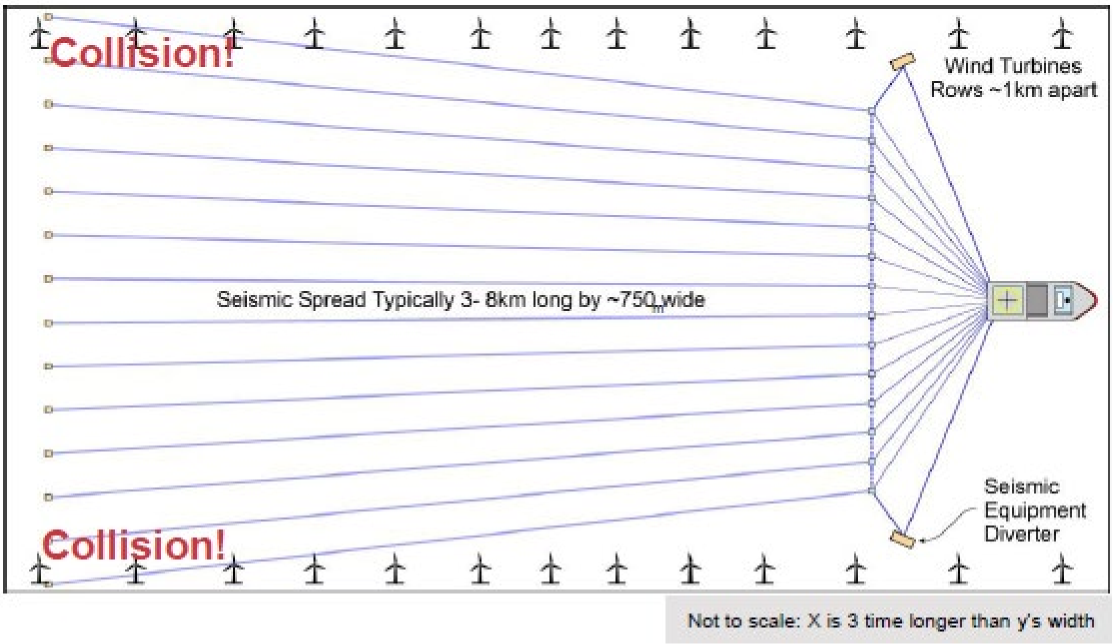


*Figure 3-2 - Typical 3D seismic streamer spread from Ref A7*

It is possible to build up an image of how fluids are moving around a subsurface reservoir over time by acquiring seismic surveys at regular time intervals. This is known as time lapse or 4D seismic. This technique is used extensively in the oil and gas industry worldwide and has been identified as particularly suitable for monitoring the spread of a CO2 plume in the subsurface store for CCS projects, both in the UK and globally. 4D seismic is usually obtained by repeating 3D seismic surveys every 3-5 years. Repeat 2D seismic surveys are also possible, although much less useful in terms of the data acquired, and would usually be called 2D time lapse or 2D/4D seismic, in order to differentiate from the more usual 4D seismic based on repeated 3D seismic surveys.

Spirit appears to have already concluded that time lapse (4D) seismic will not work technically for MNZ. The reasons for this are related to the reservoir pressure and the composition of the residual fluids in the reservoir after gas production ceases. Ref A5 is a conference paper from 2023 on which Spirit collaborated. It examines the chances of 4D seismic being suitable for MNZ and it concludes that "*Results show that 4D seismic responses of CO2 movement in the reservoir are likely to be below detection, but monitoring may be feasible if super-critical conditions exist*". However, a conference paper from 2024 presented by Spirit (Ref A3) demonstrates that most of the CO2 will be injected in the gas phase due to low reservoir pressure, which means it will not be in a super-critical condition. In our opinion the work done by Spirit and others for these two papers is reliable and implies that 4D seismic of any type is unlikely to provide a useful tool for monitoring the movement of CO2 in the MNZ store.

In Paragraph 6.8.4 of Document 822, Spirit states: *A carbon store Monitoring Plan is required for the carbon storage permit, covering the pre-development, operational and the post-closure period. Given the presence of the Proposed Development over the southern part of the carbon store, Spirit will not be able undertake 3D seismic monitoring due to limitations in operating seismic streamer cables between the turbines. Instead, as a direct result of the Proposed Development, Spirit has had to look to other monitoring technologies such as 4D gravity (which is Spirit's primary monitoring technology to fulfil the carbon storage permit monitoring requirement), seabed sampling, well based monitoring and possibly 2D seismic acquisition, all of which can be undertaken within the Proposed Development between the turbines.*

However, based on references A3 and A5, it would seem that the decision to not use 4D seismic is related to technical feasibility of the technology and mostly unrelated to the presence of the windfarm.

### 3.1.2 Gravity Surveys

Spirit has determined that 4D gravity is its preferred geophysical technology to use for monitoring the spread of CO2 in the MNZ reservoir. This involves periodic measurements of the strength of the earth's gravitational field. Subtle changes in the gravitational field occur due to small density changes resulting from the migration of injected CO2 into pore spaces in the subsurface storage site, which can be detected by highly sensitive gravimeters. In order to acquire 4D gravity surveys, Spirit would need to install a grid of small (approx. 5m diameter) semi-permanent concrete platforms on the seabed on a 1-2km grid spacing within the field area, and a few "control" stations outside, some of which may be within the perimeter of the windfarm. These platforms guarantee the time-lapse repeatability on the locations of the measurements. The obvious solution would be to place these seabed platforms at the midpoints between turbine locations, and Spirit could potentially do this before the windfarm construction starts. Approximately once every two years each pad location would be visited in turn by an ROV to place a gravimeter on them, long enough to take a single measurement (approx. 20 mins), before retrieving it and moving on to the next pad location (Ref A1). Each pad is visited at least twice per survey (to account for tidal variations), and a couple of base stations will be visited approx. 10 times per survey to allow for correction of instrumental drift during the survey (Ref A2) The vessel used to deploy the ROV is relatively small and should be able to manoeuvre through the windfarm. The duration of the survey is one to five weeks depending on the field size.

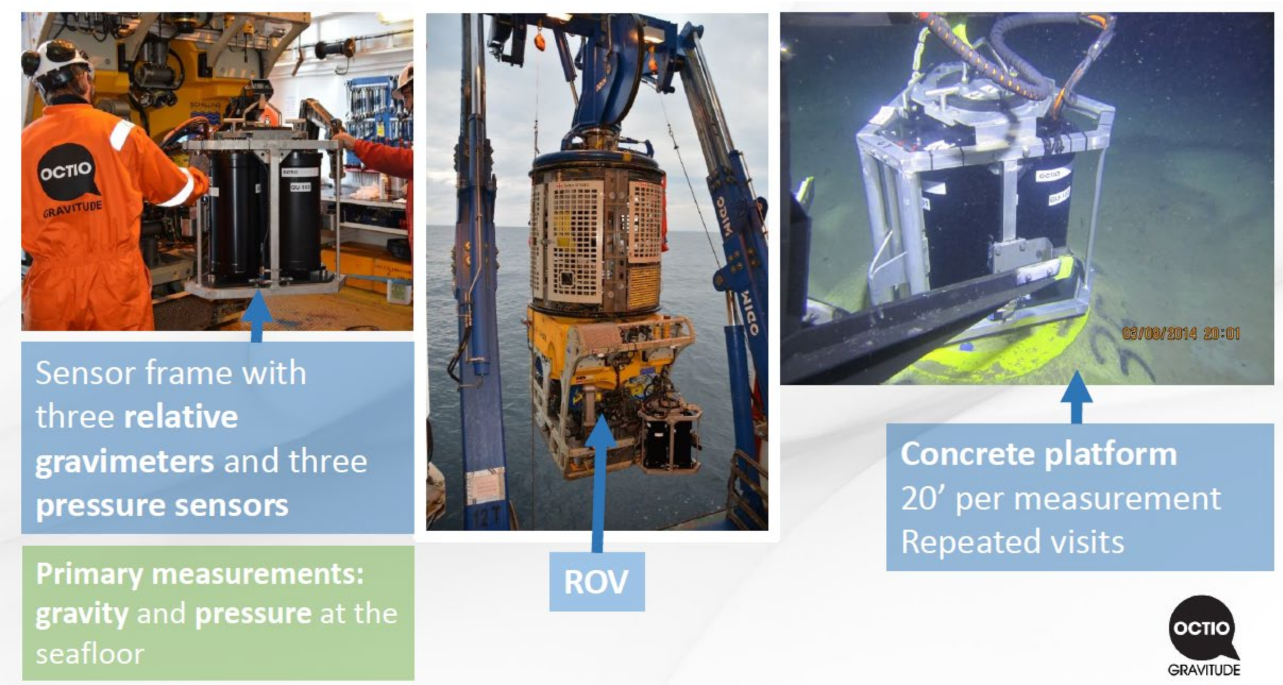


*Figure 3-3 – Pictures of gravimeter and concrete platform used for 4D gravity survey (from Ref A2)*

Historically, 4D gravity has not been used a replacement for 4D seismic, but complementary to it (Ref A2 and A7). However, an NSTA taskforce has produced a report (Ref A1) that screens technologies that may be partial replacements for 4D seismic under certain conditions and 4D gravity was the top ranked. It is proposed to be used for Hynet and is under evaluation for Endurance (Ref A6) Track 1 CCS projects. Although both these projects still plan to use 4D seismic as the primary monitoring technology. Both of these projects will start injection before MNZ, so there is a chance to apply learnings from them. As MNZ does not yet have an approved MMV plan, it is possible that by the time Spirit applies for its Carbon Storage Permit there will not be a requirement for any seismic data, and that 4D gravity will be deemed sufficient.

Ocean Bottom Node (OBN) surveys are a potential replacement for towed streamer surveys, that could be an alternative in co-located CCS and windfarm projects. Xodus has calculated the likely cost of the 2024 3D streamer survey would be $5-7mm. An OBN survey would cost 5-10 times this amount, as the shallow target would require a dense spacing of nodes. 4D gravity is approx. 10% of the cost of an equivalent seismic survey, in this case <$1mm. When comparing these costs, it is likely that even if the rock physics were conducive to detecting a 4D seismic response, the cost of using OBN as the monitor technology would be prohibitive.

The NSTA appears to be supportive at the moment that 4D gravity will be a suitable primary monitoring technology. The conclusions in Ref A1 state "*This report has identified five technologies which demonstrate the* *potential to reduce the requirement for 4D seismic within the core monitoring programme of CO2 storage sites. While high-quality 3D seismic will always be required for the characterisation of a carbon storage site prior to development and injection, the alternatives to 4D seismic monitoring could offer significant cost benefits to the nascent CO2 storage industry*". Of these technologies, time-lapse surface gravity (i.e. 4D gravity) is listed as the most promising (Figure 3-4). But the risk remains that they may not allow seismic to the dropped altogether once the wind farm is in place.

| ***Technology*** | ***Cost*** | ***Areal coverage*** | ***Plume detection*** | ***Co-location flexibility*** | ***Time to detection*** | ***Technology readiness*** | ***Potential field trial*** |
|---|---|---|---|---|---|---|---|
| ***Time-lapse surface gravity*** | | | * Depleted fields<br>* Saline Aquifers | | | | Endurance, Hynet |
| ***Time-lapse surface seismic (2D)*** | | | * | | | | Acorn, Endurance |
| ***Time-lapse S-DAS*** | unknown | | * | | | | Endurance, Hynet, Viking |
| ***Time-lapse VSP-DAS*** | | | | | | | Hynet, Viking |
| ***Surface microseismic*** | | | | | | | Endurance, Hynet |

*Note the performance of time-lapse gravity vs 4D seismic regarding plume depends strongly on store type.

**Legend: Performance relative to 4D seismic**

| Much better | Slightly better | Equal | Slightly poorer | Much poorer |
|---|---|---|---|---|

*Figure 3-4 - Technologies Recommended by NSTA (Ref A1)*

### 3.1.3 Seabed Surveys

Seabed sampling surveys can occur as frequently as annually, but also require only a small vessel which should be able to operate within the windfarm. Seabed sampling as part of an MMV programme generally consists of surveys of benthic biota and water sampling. Anomalous changes in water chemistry or biota relative to control surveys outside the CO2 storage complex can be detected and may be indicative of CO2 leakage out of the storage complex. It is generally expected that CO2 migration in the subsurface would be detected by other methods prior to physical, chemical or biological changes being detectable at the seabed, but these types of survey are considered a requirement to detect any potential environmental impacts of CCS projects.

### 3.1.4 Well-based Monitoring

CCS projects also require monitoring at the injection wells. This includes basic pressure and temperature measurements from gauges in the wells, which provide high-level information on injection rates and any potential leakage into the wellbore. Other monitoring techniques exist, e.g. more detailed distributed acoustic sensing (DAS) or distributed temperature sensing (DTS), which enable the determination of the depths into which CO2 injection is occurring, but these do not require intervention with the well.

Well-based monitoring which does require light interventions (i.e. accessing the injection wells) includes technologies such as injection logging tools (ILT), which give a more detailed profile of the CO2 inflow into the well over a certain time period.

The locations of the injection wells, and therefore platforms, are still to be determined. CO2 injection would normally be in the thickest or most central part of the reservoir, for South Morecambe this would mean near to where the CPP is currently located. Therefore it is our expectation that the platforms/injection wells will be located outside the perimeter of the MOWF and therefore that any well-based monitoring would not impact on MOWF.

## 3.2 Legacy Wells

Paragraph 6.18 of Document 822 states: *The highest risk of leakage is via legacy wells that penetrate the underground store. Spirit will require vessel access to monitor the legacy surface well head locations within the Proposed Development area. Should there be any evidence of leakage then remedial action may be required to stop the leak from the legacy well. That may be achievable via a relief well from an offset location but for most wells would require intervention from the surface well head location using a jack-up rig. In such circumstances, a 1nm access corridor to the rig location, a 500m safety zone around the well head, and helicopter access will be required. Although this scenario is unlikely, Spirit's carbon storage permit will require a corrective measures plan to address such an event.*

This risk of leakage from legacy wells needs to be planned for as a regulatory requirement from the NSTA. This is commonly the biggest risk for any CCS project in a depleted oil or gas field. In the Morecambe Gas Hub there are 46 development wells (12 abandoned e.g. DP3) and 12 exploration and appraisal (E&A) wells, all of which have been abandoned. Spirit has stated that it has abandoned all the wells in line with regulatory requirements. For example paragraph 3.24 of Document 586 includes: *All of these wells have been abandoned in line with current regulatory requirements. Integrity problems are therefore not anticipated. However, Spirit is obliged as part of its Monitoring Plan to monitor the area for potential leakage of CO2 from the wells and to secure mitigation arrangements in its Corrective Measures Plan in order to address any CO2 leakage that may occur*. Furthermore in a paper presented at the October 2023 SPE CCUS conference (Ref A8) Spirit stated that for MNZ "*Well integrity studies completed to date support very low risk of leakage*". If so, then this means that intervention should not be needed. The field will be at very low pressure (10 bar) at the start of injection, and is not expected to exceed 71 bar through the life of the CO2 store. The original reservoir pressure before natural gas production was 128 bar, therefore issues related to high pressure are unlikely. Pressure values are from ref A5.

Well 110/8A-7 is the furthest south and in the central southern portion of the wind farm area, as shown in Figure 3-5. It is outside the gas field area (grey polygon on Figure 3-5) and therefore was drilled into the aquifer (i.e. the water-bearing rock that lies below the gas field).

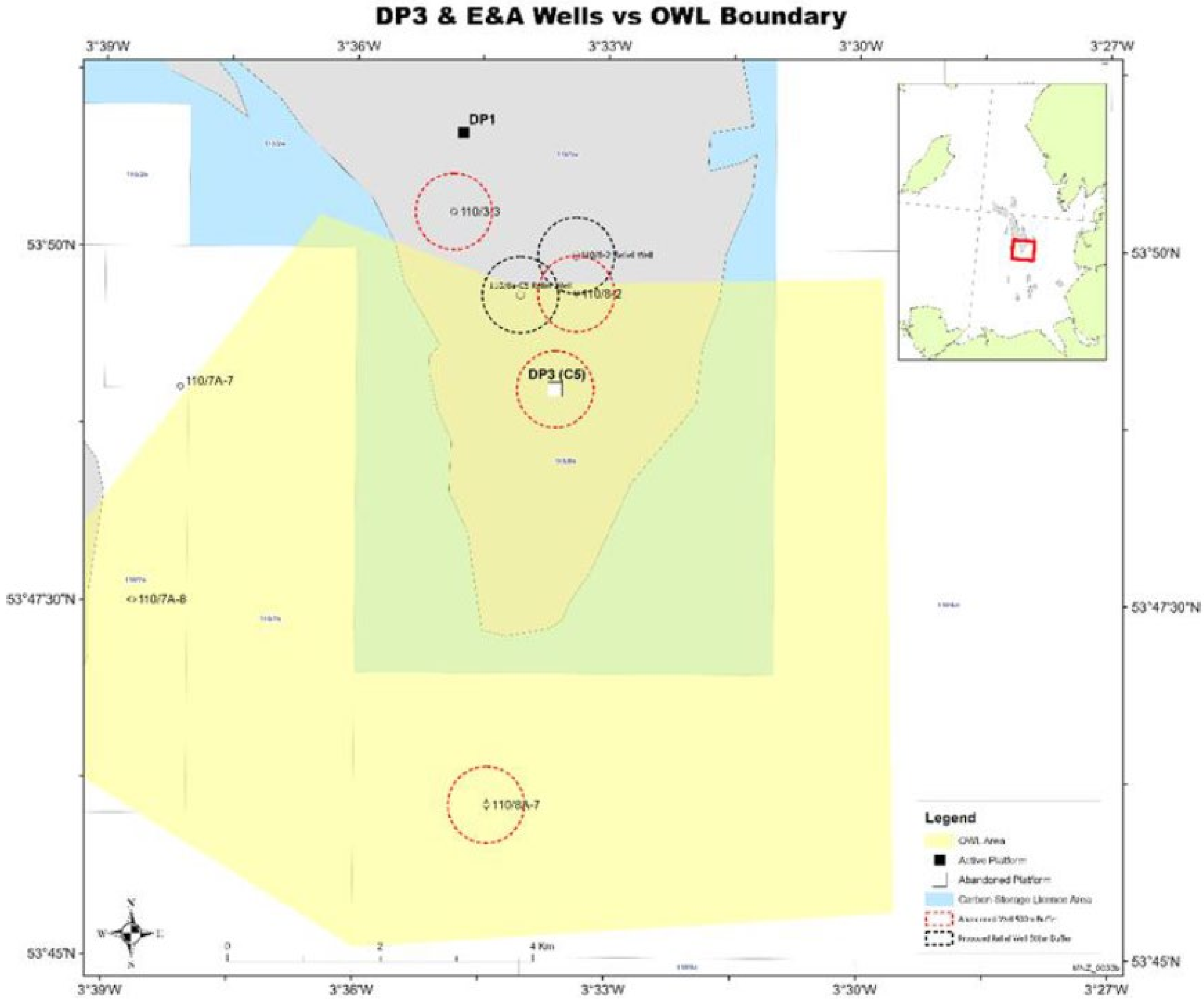


*Figure 3-5 - Platform and E&A Wells vs MOWF Boundary*

Figure 3-6 is from Ref A3 and shows a northwest-southeast cross-section through the MNZ storage complex. We have projected the approx. location of the southernmost 110/8A-7 well onto the section (the well actually lies further to the south than shown here). The blue dashed line on Figure 3-6 is the FWL (free water level). Above this line is the rock that was originally gas-bearing and has now been depleted by production. Below this line is the aquifer i.e. rock that is water-bearing. As can be seen from the yellow bars across the top of Figure 3-6, the extent of the storage site corresponds with the extent of the original gas field i.e. that volume of rock above the FWL. The storage complex (orange bar on Figure 3-6 and the blue polygon on Figure 3-5) extends slightly beyond the storage site, but does not extend as far as 110/8A-7. CO2 will be injected into the originally gas-bearing, and now depleted rock, above the FWL. In order for injected CO2 to reach 110/8A-7, the pressure in the storage site would have to increase significantly and force the CO2 below the FWL and move downdip towards the 110/8A-7 well. As the current reservoir pressure is extremely low and is not expected to increase significantly during the injection phase, this scenario is virtually impossible. Therefore Xodus considers it extremely unlikely that any CO2 would reach well 110/8A-7, and no change in pressure is anticipated at this well. So, if this well has been properly abandoned (as Spirit state it has) then it does not pose any risk. It is located outside the defined storage complex and CS010 licence area and so we can assume no access is required to this well.

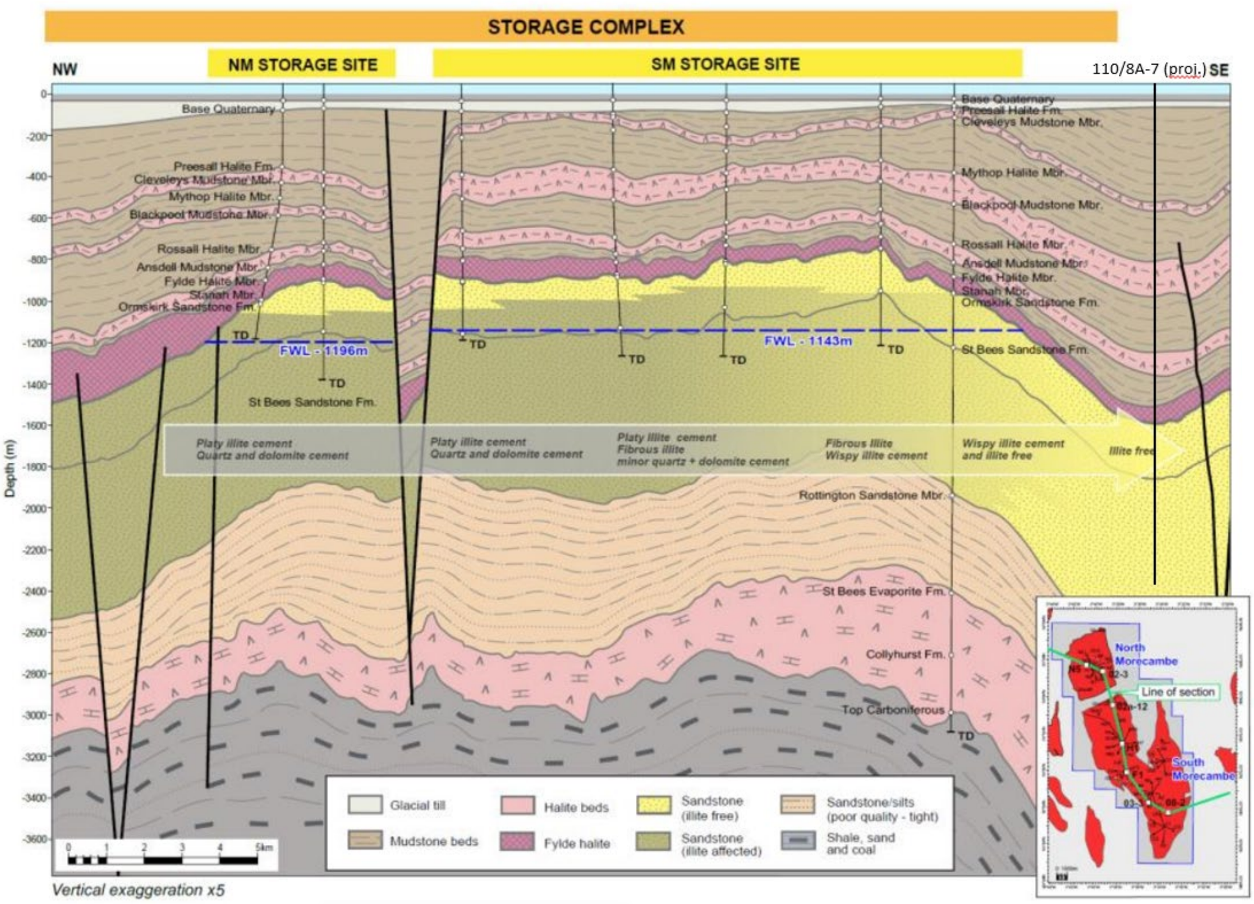


*Figure 3-6 - Cross-Section Through MNZ Storage Complex (Modified after Ref A3)*

Paragraph 3.26 of Document 586 states that: *To repair a well in case of leakage (including wells 110/08-2 and C5) would require moving a mobile drilling rig over the well to re-enter it. During operations there would be a 500m exclusion zone around the rig (reflecting the circular dashed areas in the plan below). The 500m exclusion zones overlap with Work No. 1 as shown on the Offshore Works Plan [APP-007].*

Spirit believes it may need to drill relief wells for the two wells that are on the northern edge of the windfarm area if there is any leakage from them. These are wells C5 (drilled from decommissioned DP3) and appraisal well 110/8-2 (Figure 3-5). The comment that Spirit thinks these may need relief wells indicates that there is some problem with how the wells were abandoned, contrary to what Spirit has said elsewhere. If this is the case, then the North Sea Transition Authority (NSTA) may require Spirit to take some intervention to abandon them properly even if there was no CCS project. This could be done before the construction of the wind farm starts.

Spirit says they need a 500m exclusion zone around any jack-up rig. The currently planned tophole locations of the possible relief wells appear to be within the Applicant's proposed exclusion zones and approximately 500m or more from the edge of those zones. There should also be some flexibility in where the tophole locations of the relief wells are located to ensure they are a sufficient distance from the nearest WTG. So in the case where relief wells need to be drilled after the wind farm is constructed, it appears that this should be possible.

# 4 CONCLUSIONS

MOWF overlaps the southernmost 20% of South Morecambe, one of the depleted gas fields slated for CO2 storage as part of the MNZ project.

MNZ is still at the relatively early "Site Characterisation" part of the Appraise phase, and there are several stage gates to pass through before being awarded a Storage Permit.

The key issues relating to the overlap of the two projects relate to CO2 monitoring and access to the legacy wells.

As a result of the rock physics analysis work undertaken by Spirit at MNZ, it is unlikely that 4D seismic will be an appropriate monitoring technology, which is a benefit to the co-location issue as it is extremely challenging and expensive to acquire 4D seismic within the confines of a windfarm. Spirit's preferred technology, 4D gravity, is currently unproven as a CO2 monitoring technology, but some projects are planning to use it as a complementary technology ahead of MNZ. As a result there may be evidence to support its usage as the primary monitoring technology at the time of first injection at MNZ. 4D gravity should negate any issues related to data acquisition in a windfarm as the process is much more simple than towed streamer seismic and more cost effective than an OBN seismic survey.

Regarding the legacy wells, Spirit's own work appears to suggest that the risk of leakage at the legacy wells (some of which are located within the windfarm) is very low. For the two wells this may affect (C5 and 110/8-2) if relief wells are needed (contrary to Spirit's analysis) then interventions on these wells could be undertaken before construction of the wind farm begins. Even if this is not possible the drilling of relief wells post-construction of the windfarm should be possible given the likely locations of the wind turbines. The well 110/8A-7 lies far to the south of the existing gas field and is outside the carbon storage licence area. Therefore Xodus considers that is has a negligible risk of leakage of CO2 and will not need any intervention.

# 5 REFERENCES

Document 822: EN010121-000822-Eversheds Sutherland on behalf of Spirit Energy

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