MORAY EAST
OFFSHORE WINDFARM

Operation and Maintenance Survey Summary Report: January – December 2024

December 2024

Moray Offshore Windfarm (East) Limited

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List of Abbreviations

AC	Alternative Current
CPS	Cable Protection System
EDA	Eastern Development Area
ES	Environmental Statement
GVI	General Visual Inspection
HRA	Habitats Regulations Appraisal
IAC	Inter-Array Cable
JUV	Jack-up Vessel
MBES	Multibeam Echo Sounder
MFM	Moray First Marine
O&M	Operational and Maintenance
OfTI	Offshore Transmission Infrastructure
OfTO	Offshore Transmission Owner
OnTI	Onshore Transmission Infrastructure
OSP	Offshore Substation Platform
ROV	Remotely Operated Vehicle
SSS	Side Scan Sonar
TI	Transmission Infrastructure
WTG	Wind Turbine Generator

Definitions

The following definitions have been used throughout this document with respect to the company, the consented wind farms and how these definitions have changed since submission of the Moray East Environmental Statement (ES) in 2012, the Moray East Modified Transmission Infrastructure ES in 2014 and the Moray East Offshore Substation Platform (OSP) Environmental Report in 2017.

- **Moray Offshore Windfarm (East) Limited (formerly known as Moray Offshore Renewables Limited)** – the legal entity submitting this Operation and Maintenance (O&M) Survey Summary Report;
- **The Development** – the Moray East Offshore Wind Farm that has been developed in the Moray East site. It includes the Wind Turbine Generators (WTG), inter-array cables, interconnectors and 66kV switchgear located on the Offshore Substation Platforms (OSPs). It excludes the Transmission Infrastructure (TI) which was transferred to the new Offshore Transmission Owner (OfTO), Transmission Capital Partners (TCP), on the 22nd of February 2024.
- **The Moray East site** - the area in which the Development is located. Section 36 Consents and associated Marine Licences to construct and operate up to three generating stations on the Moray East site were granted in March 2014. At that time the Moray East site was known as the "Eastern Development Area (EDA)" and was made up of three sites known as the Telford, Stevenson and MacColl offshore wind farm sites. The Section 36 Consents and Marine Licences were subsequently varied as described below;
- **Telford, Stevenson and MacColl wind farms** – these names refer to the three consented offshore wind farm sites located within the Moray East site;
- **Transmission Infrastructure (TI)** - includes both offshore and onshore electricity transmission infrastructure for the consented Telford, Stevenson and MacColl wind farms. These assets have been transferred to an OFTO on the 22 February 2024, including all associated responsibilities with operation, maintenance and decommissioning. The TI includes connection to the national electricity transmission system near New Deer in Aberdeenshire encompassing Alternating Current (AC) OSPs, AC OSP interconnector cables, AC export cables offshore to landfall point at Inverboyndie continuing onshore to the AC collector station (onshore substation) and the additional regional transmission operator substation near New Deer. A Marine Licence for the offshore TI was granted in September 2014 (Modified Offshore Transmission Infrastructure (OfTI) Marine Licence). A further Marine Licence for two additional distributed OSPs was granted in September 2017. Both Marine Licenses were subsequently varied in December 2020 and January 2022. The onshore TI was granted Planning Permission in Principle in September 2014 by Aberdeenshire Council and Planning Permission in Principle under Section 42 in June 2015. In June 2018, Aberdeenshire Council granted Approval of Matters Specified in Conditions for both the cable route and substation. All permits and licenses associated with the TI have been transferred to the OFTO, and compliance with those are no longer under the responsibility of Moray East;
- **Offshore Transmission Infrastructure (OfTI)** – the offshore elements of the transmission infrastructure, comprising AC OSPs, AC OSP inter-connector cables and AC export cables offshore to landfall (for the avoidance of doubts some elements of the OfTI are installed in the Moray East site);
- **Onshore Transmission Infrastructure (OnTI)** – The onshore transmission infrastructure required for the transmission of electricity from the Moray East Offshore Wind Farm

including the Substations, Cable Circuits, Landfall Area and ancillary Permanent Infrastructure together with all Temporary Works.

- **Moray East Environmental Statement (ES) 2012** – The ES for the Telford, Stevenson and MacColl wind farms and Associated Transmission Infrastructure, submitted August 2012;
- **Moray East Modified TI ES 2014** – the ES for the TI works in respect to the Telford, Stevenson and MacColl wind farms, submitted June 2014;
- **Moray East OSP Environmental Report 2017** – the environmental report comprising of the "Statement Regarding Implications for the Modified TI ES 2014 and the Habitats Regulations Appraisal ("HRA"). The report was produced in support of the application submitted in May 2017 for the Moray East OSP Marine Licence;
- **Development area** - the Moray East site and OfTI Corridor together;
- **Design Envelope** – the range of design parameters used to inform the assessment of impacts;
- **OfTI Corridor –** the export cable route corridor, i.e. the OfTI area as assessed in the Moray East Modified TI ES 2014 excluding the Moray East site.
- **The Applications** – (1) the Application letters and ES submitted to the Scottish Ministers on behalf of Telford Offshore Windfarm Limited, Stevenson Offshore Windfarm Limited, and MacColl Offshore Windfarm Limited on 2 August 2012 and the Additional Ornithology Information submitted to the Scottish Ministers by Moray Offshore Renewables Limited on the 17 June 2013; (2) the Section 36 Consents Variation Application Report for Telford, Stevenson and MacColl Offshore Wind Farms dated December 2017 and (3) the Marine Licence Applications and associated documents submitted for the OfTI and OSP Marine Licences in April 2014 and May 2017 respectively (these licences are now transferred to the OFTO);
- **The Development's Section 36 Consents and Marine Licences** – are comprised of the following:

  Section 36 Consents:

  - Section 36 consent for the Telford Offshore Wind Farm (as varied) – consent under Section 36 of the Electricity Act 1989 for the construction and operation of the Telford Offshore Wind Farm assigned to Moray Offshore Windfarm (East) Limited on 19 June 2018.
  - Section 36 consent for the Stevenson Offshore Wind Farm (as varied) – consent under Section 36 of the Electricity Act 1989 for the construction and operation of the Stevenson Offshore Wind Farm assigned to Moray Offshore Windfarm (East) Limited on 19 June 2018.
  - Section 36 consent for the MacColl Offshore Wind Farm (as varied) – consent under Section 36 of the Electricity Act 1989 for the construction and operation of the MacColl Offshore Wind Farm assigned to Moray Offshore Windfarm (East) Limited on 19 June 2018.

  Marine Licences

  - Marine Licence for the Telford Offshore Wind Farm (as varied) – Licence Number: MS-00009426 (formerly MS-00009051, 04629/20/0, 04629/19/0 and 04629/18/1) – granted under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act

2009, Part 4 Marine Licensing for marine renewables construction works and deposits of substances or objects in the Scottish Marine Area and the United Kingdom Marine Licensing Area transferred to Moray Offshore Windfarm (East) Limited on 19 July 2018.

  - Marine Licence for the Stevenson Offshore Wind Farm (as varied) – Licence Number: MS-00009425 (formerly MS-00008985, 04627/20/0, 04627/19/0 and 04627/18/1) – granted under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009, Part 4 Marine Licensing for marine renewables construction works and deposits of substances or objects in the Scottish Marine Area and the United Kingdom Marine Licensing Area transferred to Moray Offshore Windfarm (East) Limited on 19 July 2018.
  - Marine Licence for the MacColl Offshore Wind Farm (as varied) – Licence Number: MS-00009424 (formerly MS-00008972, 04628/20/0, 04628/19/0 and 04628/18/1) – granted under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009, Part 4 Marine Licensing for marine renewables construction works and deposits of substances or objects in the Scottish Marine Area and the United Kingdom Marine Licensing Area transferred to Moray Offshore Windfarm (East) Limited on 19 July 2018.

- **OfTI Licences** – These licences have now been transferred to the OfTO and are comprised of the following:
  - Marine Licence for the Offshore Transmission infrastructure (as varied) – Licence Number MS-00009423 (formerly MS-00008919, 05340/19/0, and 05340/14/0) – granted under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009, Part 4 Marine Licensing for marine renewables construction works and deposits of substances or objects in the Scottish Marine Area and the United Kingdom Marine Licensing Area (referred to as the "OfTI Marine Licence"), transferred to Moray Offshore Windfarm (East) Limited on 19 July 2019.
  - Marine Licence for two additional distributed OSPs (as varied) – Licence Number 06347/19/0 (formerly 06347/17/1) – granted under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009, Part 4 Marine Licensing for marine renewables construction, operation and maintenance works and the deposit of substances or objects in the Scottish Marine Area and the United Kingdom Marine Licensing Area (referred to as the "OSP Marine Licence").
  - Marine Licence for the installation of grouted supports – Licence Number MS-00010188 (formerly MS-00010009) – granted under the Marine (Scotland) Act 2010 & Marine and Coastal Access Act 2009, Part 4 Marine Licensing for the Installation of grouted supports under the Cable Protection Systems (CPS) of the export cables entering each of the three OSPs within the Moray East Offshore Wind Farm.

OfTI licences are referred to in this O&M Survey Summary Report due to the switchgear infrastructure which is part of the Development and is located on the OSPs. The OSPs will be operated and maintained by the OfTO under the transferred Marine Licences mentioned above.

1 Introduction

1.1 Background

Moray East Offshore Windfarm (herein referred to as 'Moray East') is a joint venture partnership between Ocean Winds Offshore, Diamond Generating Europe and China Three Gorges and has been established to develop, finance, construct, operate, maintain and decommission the Moray East Offshore Wind Farm.

Section 36 Consents were granted in March 2014 and were subsequently varied in March 2018 for the construction and operation of three offshore wind farms (Telford, Stevenson and MacColl) within the Moray East site, as shown below in Figure 1. Marine Licences for the three offshore wind farms were granted in September 2014 and were subsequently varied in July 2019, April 2020, October 2020, November 2020 and January 2022. Together the Section 36 Consents and Marine Licences for the Wind Farm are referred to as the Moray East Offshore Wind Farm Consents. The Section 36 consents and Marine Licences were transferred to Moray Offshore Windfarm (East) Limited in 2018.

The Moray East Offshore and Onshore Transmission Infrastructure (TI) was transferred to Transmission Capital Partners (TCP) (an Offshore Transmission Operator (OfTO)) on the 22nd of February 2024, and typically any responsibility related to the assets would be fully transferred. However, based on observations of the Cable Protection Systems (CPS) at the Offshore Substation Platforms (OSPs) prior to the transfer of the OfTI, Moray East has retained an obligation to inspect the CPS at all 3 OSPs for the next 10-15 years.

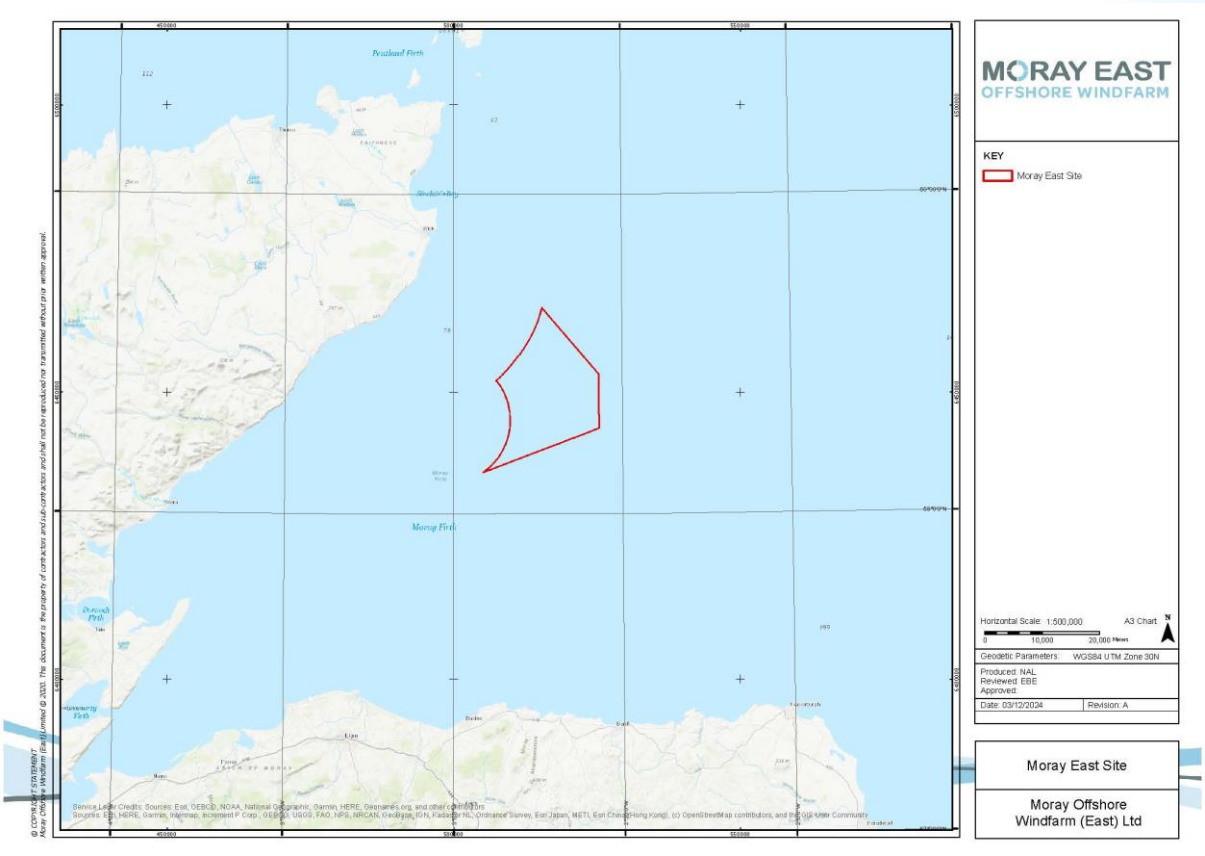

Figure 1. Geographical Location of the Moray East Site

2 O&M Survey Programme

Table 2-1 provides an overview of the surveys undertaken at the Moray East site during the period from January 2024 to December 2024. Key details and information for the respective surveys are provided in Section 3.

Table 2-1 - Moray East site surveys summary

ID	Survey Type/Details	Contractor	Coverage	Date
Inspections at substructures				
1	General Visual Inspection (GVI) and Multibeam Echo Sounder (MBES) survey of selected Inter-Array Cables (IAC)	ROVCO	IAC Locations: E04-D04, D04-C04, F04-G05, G09-F08, G13-G11, H11-H13, L09-L11, G21-G22, B13-B14, and C11-C12.	15/10/2023 to 17/10/2023*
2	Visual inspections at selected Cable Protection Systems (CPS) and scour around foundations	FON Energy Services	CPS inspected at foundations OSP1 (E06), OSP2 (F15), OSP3 (I10). WTG Locations: A01, B05, B13, C04, C13, E04, H21, J17, K11, K17, L12.	Between 16/08/2024 to 21/09/2024
Geophysical surveys				
3	Geophysical survey using MBES, Singlebeam (SBES) and Side Scan Sonar (SSS)	Moray First Marine (MFM) & Astra Marine	270m x 270m square box centred at WTGs B14 & C12.	07/01/2024 to 09/01/2024
4	Geophysical survey using MBES and SSS for Jack-up Vessel (JUV)	First Marine Solutions (FMS)	WTG Locations: H16, G20, K10, C12, D06, D09, G06, H08 & H10.	18/09/2024 to 21/09/2024
Environmental surveys				
5	Post-construction cod spawning survey	Brown & May Marine	Total of 16 tows with a duration of 30 minutes within the Moray East Site Boundary.	12/03/2024 to 29/03/2024
6	Post-construction sandeel survey	Brown & May Marine	28 tows of ~250m & 21 grab sampling stations within the Moray East Site Boundary.	17/03/2024 to 31/03/2024

**The ROVCO IAC Survey was undertaken in 2023 however, it was not reported until January 2024 and therefore was not included in the 2023 O&M Summary Survey Report.*

3 O&M Survey Summary Information

3.1 Inspections at Substructures

3.1.1 *Visual inspections ID 1: Visual and geophysical inspections of selected Inter-Array Cables (IAC)*

ROVCO carried out a general visual inspection (GVI) and a Multibeam Echosounder (MBES) survey during the period between the 15th and the 17th of October 2023. The operations were conducted utilising a Remotely Operated Vehicle (ROV), the Leopard 1703, which was deployed from the MV Glomar Supporter. The Leopard 1703 is equipped with 4k camera, Dual MBES and ROVINs.

The purpose of the GVI and MBES survey was to identify any anomalies impacting the integrity of the IAC. Potential anomalies could include cable exposure, corrosion, cable free-spans, local seabed scour or significant debris on or surrounding the IAC which could cause cable damage. The length of the IAC was surveyed from the J-tube bellmouth to the touchdown point then onward to the point of burial. The positional fix was recorded for each of these three points.

The following ten sections of the IAC were selected for inspection:

- WTG E04 to WTG D04
- WTG D04 to WTG C04
- WTG F04 to WTG G05
- WTG G09 to WTG F08
- WTG G13 to WTG G11
- WTG H11 to WTG H13
- WTG L09 to WTG L11
- WTG G21 to WTG G22
- WTG B13 to WTG B14
- WTG C11 to WTG C12

A total of five anomalies were detected across three of the inspected sections of the IAC, between WTG D04 to WTG C04, WTG G09 to WTG F08, and WTG C11 to WTG C12. Corrosion staining of varying size spots were identified on the reduction collar at two of these sites. At WTG G09, exposure of the cable after the initial burial point was observed in addition to freespan of the cable which measured approximately 3.0m in length and had a maximum height of 0.3m. The final anomaly was detected at D04 and comprised of the cable exiting the J-tube at a skewed position instead of being centrally aligned. The anomalies are being monitored, and no further action is being taken at this time.

3.1.2 *Visual inspections ID 2: Visual inspections at selected Cable Protection Systems (CPS) and scour around foundations*

Between the 16th of August 2024 and the 21st of September 2024, FON Energy Services conducted visual inspections at the foundations of all 3 OSPs: E06, F15 and I10; and at eleven selected WTGs: A01, B05, B13, C04, C13, E04, H21, J17, K11, K17, L12. The objective of the inspection campaign was to visually assess the integrity of the selected assets and secondary structures, as well as monitor any scour around the foundations. Thickness measurements of any marine growth observed on the selected structures were also taken to support monitoring efforts. A Falcon ROV was utilised to inspect the J-Tube, cable and CPS system, the boat landing (including the fenders, ladder and suspension

system), and the north, east and west faces. At each face the pilestoppers, grouted connection, nodes, leg members and anodes were visually inspected.

No recommendations were made for any of the eleven WTGs inspected however, several were outlined for each of the OSPs. At present, the recommendations are limited to monitoring the identified anomalies, which include :

- Cable freespan;
- CPS damage;
- CPS touching bell mouth;
- Misaligned rockbags;
- White stains at the upper X-node, and
- Tight cable resulting in the cable not being fully supported by the rockdump.

3.2 Geophysical Surveys

3.2.1 *Geophysical Survey ID 3: Geophysical survey using MBES, Singlebeam (SBES) and Side Scan Sonar (SSS)*

Moray First Marine (MFM) & Astra Marine conducted two high-resolution MBES, SBES and SSS surveys utilising the vessel MV Waterfall. Survey activities were completed on the 7th of January 2024 to determine the optimum position for a Jackup vessel (JUV) required for scheduled maintenance works.

The survey area consisted of a 270m x 270m square box centred on WTG locations B14 & C12. All surveyed areas were generally flat, with variations not greater than 1m overall. Several shallow depressions were observed in the seabed at each site and related to previous JUV footprints from construction. Each remaining footprint had an approximate diameter of 13m and had a depth of under 0.6m compared to the surrounding seabed. Other targets detected and to be avoided by the JUV positioning, included a series of mounds, small targets and one hard target at C12, whereas only one target, a mound, was identified at B14.

3.2.2 *Geophysical Survey ID 4: Geophysical survey using MBES and SSS for Jack-up Vessel (JUV)*

First Marine Solutions (FMS) used the vessel, Ondine Jule, to carry out a geophysical survey campaign using MBES and SSS between the 18th of September 2024 and the 21st of September 2024. The survey was conducted to inform the most favourable position for a JUV to be used during maintenance works.

As per the line plan, four 270m lines were ran on each side of the grid centred on each of the selected WTG locations:

- H08
- H10
- H16
- G20
- K10
- C12
- D06
- D09
- G06

The SSS and MBES surveys identified possible boulders at each of the selected WTG locations, none of which exceeded of 0.8m. Other detected targets to be avoided by the positioning of the JUV were possible pinnacles, a possible subsea structure and two hard contacts. A hard contact is defined as an object of either manmade or geological origin which has no measurable height above the seabed but has a high acoustic reflectivity in the sonar record. The largest hard contact target was 3.8m in length by 2.9m width. The maximum height recorded for a potential pinnacle was 1.1m.

3.3 Environmental Surveys

3.3.1 *Environmental Survey ID 5: Post-construction cod spawning survey*

Brown & May Marine conducted two survey trips, Trip A and Trip B, between the 12th of March 2024 and the 29th of March 2024, to coincide with the peak cod, (*Gadus morhua)*, spawning season. The same eight stations were sampled during each trip utilising the vessel, the Reaper, which is a commercial rock-hopper otter trawl with a 120 mm mesh cod-end, fitted with a 40 mm blinder. Each tow had a duration of 30 minutes.

The purpose of the survey was to collect data on the spatial and temporal distribution of spawning cod in the vicinity of the Moray East site; and to establish the level of spawning activity within the surveyed area.

Across both survey trips a total of 10 cod were caught, one of which was juvenile and the other nine were of spawning stage. Findings indicate that construction has not impacted the number of spawning cod present in the survey area with low numbers observed in both the pre-construction and post-construction surveys. Analysis of the pre- and post-construction surveys showed no discernible pattern in the distribution of spawning activity within the survey area.

3.3.2 *Environmental Survey ID 6: Post-construction sandeel survey*

Brown & May Marine utilised the vessel, the Reaper, to conduct the post-construction sandeel, (*Ammodytes sp.)*, survey between the 17th of March 2024 to the 31st of March 2024. Tows of 250m were undertaken at 28 sampling stations using a modified shellfish 1.24m dredge with a fixed tooth bar (6" teeth) 10 mm mesh and a 6 mm mesh cod-end liner. To conduct sediment analysis for the survey area, a grab sample was taken within a 50m radius of the start point of each dredge tow. However, grab sampling was only successful at 21 out of the 28 dredged stations.

The survey aimed to gather data to characterise the spatial distribution and relative abundance of sandeel in the vicinity of the Moray East site. Additionally, a comparison was conducted between the pre- and post-construction sandeel surveys.

A total of 45 individuals were caught from 15 of the 28 sample stations. Four sandeel species were caught, with Raitt's sandeel, *Ammodytes marinus*, comprising 77% of the total sandeel catch. The overall distribution of sandeels throughout the survey area was classified as patchy however, higher abundances were observed at sampling stations in the northern extents. As low numbers of sandeels were recorded in both the pre- and post-construction surveys it was concluded the survey area does not support key sandeel populations.

4 References

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