EVALUATION REPORT SITE CONDITIONS - MEASUREMENT CAMPAIGN FOR WIND AND METOCEAN CONDITIONS - NORTH SEA 1

PREPARED FOR:

ENERGINET ELTRANSMISSION A/S

Order No.: 15626432

Report No.: *R15626432-0-1, Rev. 0, 2025-01-02*

Wind Farm: North Sea 1

CLASSIFICATION

CLIENT'S DISCRETION

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DOCUMENT HISTORY

REVISION	RELEASE DATE	MODIFICATION
0	2025-01-02	Initial Document

1 DOCUMENTS

1.1 Examined Documents

/1.1.1/ DNV: Certificate
"Fugro Norway AS - ISO 9001 Management System Certificate",
Doc. No. 10000409040-MSC-NA-NOR, Rev. -, 2023-09-28, 2 pages
(DEWI-OCC Order-No.: 15626432 - Doc No. -00c+167)

/1.1.2/ fugro Norway: Report
"SWLB measurements - Danish Offshore Wind 2030
Project Measurement Plan, All Lots",
Doc. No. C75516/C75517/C75518_Project_Measurement_Plan_All_Lots 09, Rev. 9, 2023-11-25, 50 pages
(DEWI-OCC Order-No.: 15626432 - Doc. No. -00c+062)

/1.1.3/ fugro Norway: Documentation
"Stations and deployment record - DOW2030 NSI",
Doc. No. 377B23C776A73A863E49535005E46852, 81kb
(DEWI-OCC Order-No.: 15626432 - Doc No. -00a+063)

/1.1.4/ Energinet: Folder
“Buoy drawings and moorings”
6 files
(DEWI-OCC Order-No.: 15626432 - Doc No. -00a+001 - +006)

/1.1.5/ Energinet: Folder
“Buoy pre-deployment verification reports”
4 files
(DEWI-OCC Order-No.: 15626432 - Doc No. -00a+007 - +010)

/1.1.6/ Energinet: Folder
“Instrument Certificates”
46 files
(DEWI-OCC Order-No.: 15626432 - Doc No. -00a+011 - +056)

/1.1.7/ Energinet: Folder
“Service Reports”
5 files
(DEWI-OCC Order-No.: 15626432 - Doc No. -00a+057 - +061)

2 CERTIFICATION SCHEME

/2.1/ IECRE OD-502: Operational Document, "Project Certification Scheme", Edition 1.0, 2018-10-11

3 STANDARDS AND GUIDELINES

The conformity evaluation was carried out based on the following standards and guidelines:

/3.1/ ISO/IEC 17025: “General requirements for the competence of testing and calibration laboratories”. Edition 2017

4 SCOPE OF EVALUATION

An on-site measurement campaign for the North Sea 1 offshore wind farm was executed by the company “Fugro” for the purpose of use in the design basis for FEED design as part of project certification according to IECRE OD-502 /2.1/. Fugro is not recognized by IECRE as a testing laboratory nor accredited according to ISO 17025 /3.1/ for wind and metocean measurements. The qualification of the testing laboratory and the involved personnel as well as the quality of the measurement campaign shall be confirmed by DEWI-OCC. The quality of the executed measurement campaign, the qualification of the testing laboratory and the involved personnel shall be evaluated for conformity with requirements of ISO 17025 /3.1/ on the basis of the documentation /1.1.1/ to /1.1.7/ for use in a project certification according to IECRE OD-502 /2.1/.

Evaluation of results of the measurement campaign, validation of results, and presentation of design parameters as well as the investigation of soil conditions are not subject of this evaluation report.

5 REMARKS

5.1 General

The offshore wind farm North Sea 1 is located 20 to 80 km off the western coast of Denmark, in the Central North Sea.

The number and locations of wind turbines are not yet defined.

The documents listed in chapter 1.1 present proof for the quality of the measurement campaign executed for the offshore wind farm North Sea 1, the qualification of the measurement company Fugro and the suitability of the personnel that was involved in the presented measurement campaign.

5.2 Measurement Campaign

The company Fugro, executing the measurements for the offshore wind farm North Sea 1, holds an ISO 9001 certification /1.1.1/, valid at the time of measurement activity. Based on this the compliance of the quality measurement system of Fugro with the requirements of ISO 17025 /3.1/ will be considered as given.

A measurement plan /1.1.2/ describing the instrumentation of the buoys, measurement principles and methodology, data treatment, post-processing and quality control was provided by Fugro.

Document /1.1.3/ provides an overview of deployment locations for the measurement equipment in the North Sea. It also provides information on the existence of service records and any disturbances as well as a detailed list of the configuration of each buoy.

In addition, /1.1.3/ provides a list of the involved Fugro personnel, their role in the project and their qualification.

Drawings of the buoys /1.1.4/, certificates for the measurement instruments /1.1.6/ and service records for the measurement equipment /1.1.7/, were included in the evaluation.

The performance of the utilized buoys was verified by DNV before project specific adjustments, which is documented in pre-deployment validation reports /1.1.5/.

Procedures to ensure general competency, training procedures and personnel information are assumed to be covered by the ISO 9001 certificate /1.1.1/ of Fugro. The qualification of personnel involved in the project as presented in /1.1.3/ is deemed appropriate.

The equipment presented in /1.1.2/ and /1.1.3/ is appropriate for the measurements executed for the project. The described methodologies, measurement procedures, data handling and processing are deemed suitable. Certificates, pre-deployment validation and in service documentation are deemed sufficient and measurement results are traceable.

The qualification of Fugro as well as the involved personnel and the presented execution of measurements are deemed to be in compliance with the requirements of ISO 17025 /3.1/ for measurements of offshore wind and metocean data for the North Sea offshore wind farm. Consequently, the quality of measurements of the wind data and metocean data to be used in the site conditions assessment is deemed sufficient for the purpose of use in the design basis.

6 INTERFACE TO OTHER EVALUATION MODULES

6.1 Wind conditions at the offshore wind farm North Sea 1 are evaluated in R15626432-0-2

6.2 Metocean conditions for the offshore wind farm North Sea 1 are evaluated in R15626432-0-3

7 CONCLUSION

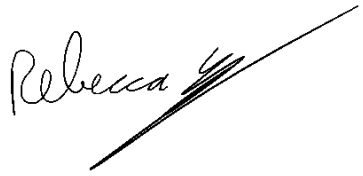
The qualification of the company Fugro for the on-site measurement campaign for the North Sea 1 offshore wind farm as well as the measurement instrumentation and processes as documented in /1.1.1/ to /1.1.7/ were found plausible with ISO 17025 /3.1/ and suitable for use in project certification according to IECRE OD-502 /2.1/.

There are no objections against the application of the measurement campaign for the design basis for FEED design for the North Sea 1 offshore wind farm.

Changes in the measurement campaign shall be approved by DEWI-OCC GmbH; otherwise this report loses its validity.

Bremen, 2025-01-02

Expert in Charge



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