Oceaneering Route Preparation System Clears the Way for Cables at Scotland’s Largest Offshore Wind Farm

Seabed system provides boulder clearance for array cable routes

**Project Overview**

A wind farm located off the Moray coast of Northeast Scotland became Scotland’s largest offshore wind farm upon its completion in 2019. The wind farm consists of 84 wind turbines and provides power to approximately 450,000 homes.

An Oceaneering team operated its 49.2-ft-wide (15m-wide) Route Preparation System throughout the wind farm array, future clearing lay and trench corridors between turbine locations.

The Oceaneering Route Preparation System is a well-established, highly efficient, and economical method of clearing and preparing the seabed as the first stage of major wind farm construction projects.

**Issues**

Previously acquired survey data had identified significant boulder fields within the wind farm array lay and trench corridors, which would impact many of the planned cable routes. To allow the cable installation and jet trenching campaign to be performed, these boulders had to be removed.

Each wind turbine location was protected by an exclusion zone in which the 15m Route Preparation System was unable to enter. This created a potential issue from the frontal berm on the system, which includes a mixture of displaced boulders and seabed material that would be deposited at the intersection of the route centerline and exclusion zone on completion of the boulder clearance run, given there was no “run-off” area.
The lay and trench corridors within the array were a pre-existing design based on the minimum bend radius (MBR) of the cable to be laid and the turning circle of the small tracked jet trenching system to be used. A number of tight bends (164-ft / 50m radius) had been included within the array design, which the towed Route Preparation System would have to negotiate.

The Oceaneering Solution
To ensure that no frontal berm would be left within the lay and trench corridors, the Oceaneering team proposed a “double first end” solution to the client. This solution relied on the ability to accurately land the Route Preparation vehicle on the design route, slightly outside the first exclusion zone area, with a heading corresponding to the design route centerline.

The 15m Route Preparation System would then be towed along the design route to a suitable point near the end of the route and purposely driven off the design route centerline, knowingly creating a berm across the lay and trench corridor.

Next, the system would be lifted clear of the seabed and moved toward the second exclusion zone on the same route. The system would again be landed accurately on the design route just outside of the exclusion zone, with a heading corresponding to the design route centerline. The system would then be towed a short distance back along the design route, clearing boulders as it progressed up to the berm wall of the initial clearance run, now crossing the route.

Utilizing ultra-short baseline (USBL) positioning, installed attitude sensors, and high-resolution sonar, as well as support from a work class remotely operated vehicle (WROV), the 15m Route Preparation System would break through the created berm, clearing the contents out to the edges of the required corridor, locating itself within the berm of the initially cleared corridor. The system would then progress along the design route for a suitable distance to ensure that no boulders remained within the required corridor.

The tight bends present in the lay and trench corridors were assessed by the Oceaneering team and, following a review of previous operations and test data along similar bends, the team was able to assure the client that it was possible to tow the system to the tolerances required in these areas.