DEEPWATER

DEEPWATER INSTALLS ICCP RETROFITS TO REPLACE FAILING CP ON GERMAN WIND FARM

Multiple RetroBuoy™ Jr systems installed, each requiring less than 24 hours to complete

The offshore wind farm in question comprises 80 tripod structures in water depths of 30-40m supporting the turbine. These were protected by an ICCP system using a number of close-mounted anodes. On 33 tripod structures, the existing anodes were beginning to deteriorate and the levels of cathodic protection current was failing to adequately protect the structures' submerged steel surfaces. We recommended a modified version of the RetroBuoy™ ICCP anode sled.

Many offshore wind farms utilise sacrificial anode cathodic protection (SACP) systems, but in many areas of the world SACP systems are not allowed for environmental reasons and impressed current cathodic protection systems (ICCP) are specified instead. When this is the case, cathodic protection companies have historically supplied close-mounted anode systems based on marine designs which are not ideal for this application. Marine, or ship systems, rely on the fact that the hull of the vessel is coated and every 5 years the vessel is dry docked and the coating repaired. This is not possible with an offshore wind farm structure which, in any case, usually has a large area of uncoated steel.

A CP modelling study proved that CP could be provided by one or more remote ICCP anode sleds. The model also confirmed the optimum remote location for the anode sled. In this instance, an ICCP system with remote anodes was considered the safest economical solution, i.e. lowest involvement of divers. Close-mounted impressed anodes would require significant installation time in addition to the risks associated with cable routing and cable protection. Therefore, an ICCP system utilising remote anode sleds was considered the only practicable solution to meet the current demand. The proposed retrofit, including a monitoring system, was based on the successfully tried and tested remote ICCP RetroBuoy™ Jr.

Up to four complete ICCP retrofit systems were taken to the field on the installation vessel at a time. Specially designed installation and deployment equipment was used to speed up the installation process, including a mattress deployment frame. All subsea equipment was designed to be installed by ROV without the need for diver involvement. Topside equipment was transferred from the vessel onto the turbine and a new cable access hatch was installed. The power supply unit, junction boxes and topside cabling was installed by teams on the tower whilst teams on the vessel prepared the subsea equipment. The subsea cable protection clamp was located on the turbine and secured by the ROV.

On the vessel, the cable was connected to the RetroBuoy™ Jr anode system using a dry-mateable connector and the cable protection system was installed. The RetroBuoy™ Jr was then lowered to its final position on the seabed. The subsea cable and cable protection system was pulled through the clamp, secured and terminated topside.

Cable stabilisation mattresses were deployed around the RetroBuoy™ Jr and along the full cable route. The buoyant anode floats on the RetroBuoy™ Jr were deployed, the power supply was energise and the system was commissioned. Cathodic protection was restored to the turbine structure - the whole process taking less than 24 hours from deployment to commissioning.

More info at www.stoprust.com

PUTTING IT TOGETHER
The subsea cable clamp is lowered and attached to the diffuser plate.

SIGNIFICANT PROBLEM
33 monopiles in a field of 80 had failing CP systems.

KEEPING TABS
Each retrofit included a monitoring system to log CP performance.