

REEL VALUE FOR MOORINGS

Decommissioning a redundant loading buoy in the North Sea was probably never going to make the headlines. However, the unusual way that Aquatic managed to recover the buoy's eight mooring lines is certainly worth reporting. Quick, efficient, cost-effective and safe, it is a method that could well become commonplace in future.

Aquatic was asked to become involved in decommissioning Venture Production's Kittiwake loading buoy in 2008 by the project's lead contractor, the Norwegian service provider DeepOcean. The question was whether it would be possible to recover the eight mooring lines, each made up of 765 m of wire rope terminated top and bottom by 265 and 82.5 m, respectively, of 3¼-in. chain, using one of Aquatic's powered reel systems.

Mike Gaskin, Aquatic vice president, projects, takes up the story: "Our reel systems are primarily designed to handle flexible flowlines, mooring wires, umbilicals and power cables. We knew that the chain would require more torque than usual to spool it, especially at the outer limit of the reel, and that for the recovery scenario it would generate high compression forces on the reel's hub.

"Following a design review, we took our standard AQSR-50 reel and reinforced the hub to increase its spooling-on load rating from 10 to the 30 t we calculated would be necessary for this application. We also upgraded one of our AQPR-02 tower drive systems to provide up to 150 t.m of torque: a level that we judged would provide the unit with a reasonable degree of contingency."



Both components of the new system were assembled in Aquatic's Peterhead workshops. Like other Aquatic systems, the reel and drive tower are designed to be compact and easily dismantled so that they can be readily transported by road in standard containers.

In this case, the system was destined for Teesside, UK, where it was fitted aboard the *Volantis*, a DP2 class vessel normally used for jet trenching operations.

The recovery operation went very smoothly. A remotely operated vehicle was used to cut each of the mooring lines 50 m from the touchdown point on the seabed, and rigging was attached to secure them. They were then cut away from the buoy and spooled onto the

reel. Dealing with the last two of the eight chains was slightly more involved, as their recovery had to be carefully coordinated with the movements of two tugs employed to restrain the buoy once it was free from its moorings. In addition to the mooring lines, Aquatic also recovered a 3-in. umbilical consisting of four 3/8-in. hydraulic hoses that had been used to power the valves on a pipeline end manifold during loading operations.

The *Volantis* needed to make only two trips to the field. Four moorings and the umbilical were recovered to the reel on the first trip and four moorings on the second. Once ashore, the lines were easily removed from the reel for further cutting and disposal.

"This exercise would normally have called for a more expensive anchor-handling vessel," says Gaskin. "The lines would have been winched up and stored in chain lockers or on deck for transport to shore: an operation that would probably have involved a good deal more offshore manpower than in this case.

"We are proud to have engineered an elegant alternative solution for recovering the moorings and, equally, to have managed the project offshore without incident."

The next step for Aquatic is to modify the system used for this project to enable greater lengths of mooring chain to be reeled. In future, Gaskin sees mooring recovery as a standard Aquatic offering.

But perhaps the last word for now should go to the customer. Ottar Mæland, senior engineer, DeepOcean, says, "This was a highly successful operation for Venture Production. Although it was Aquatic's first project of this kind, everything proceeded to plan; it is testament not only to the company's expertise but also to the flexibility of its equipment."

Venture Production's Kittiwake field lies in 85 m of water in the North Sea, 135 km east of Peterhead, UK. Oil from the field was initially exported via an exposed-location, single-buoy mooring system – the Kittiwake loading buoy. In 2005, this was replaced by a less weather-dependent, submerged anchor loading system. More recently, a pipeline was run from the field to the BP Unity platform 32 km away to render the Kittiwake loading buoy well and truly redundant.

