Auxiliary Oilers

Wave Knight and Wave Ruler

Complete Supply of Power, Propulsion and Automation

The Wave Class Fast Fleet Replenishment Tankers are operated by the Royal Fleet Auxiliary (RFA), and are designed to support Royal Navy warships worldwide. Built to a commercial standard with military requirements only where required, their primary role is Replenishment At Sea (RAS'ing); however, with a large helicopter flight deck, ability to deploy small boats and being fitted with Close in Weapons systems, they are truly versatile vessels.

The Wave Class vessels were ordered to replace the Olha and Olwen, two fast fleet tankers built at Swan Hunters in the 1960s.

GE’s power Conversion business was involved throughout the project from the early stages of design studies, through design, build and commissioning and into after sales service.

After the main ship award, Power Conversion won the follow on power and propulsion competition and was awarded the contract in 1996 by Vickers Shipbuilding in Barrow, now part of BAE Systems. The Diesel Electric Architecture offered was developed from similar commercial Power Conversion designs for offshore shuttle tankers.

Power Conversion set up a common team for the Auxiliary Oilers and Landing Platform Dock (LPDs) in Rugby which then included the Platform management team when they were awarded the contract for the Complete Platform management System in late 1997. A close working relationship with the team and the shipyard developed and carried on all the way through sea trials and beyond.

Power Conversion was the power and propulsion contractor responsible for the whole HV system, with the exception of the HV compressors that were added later. The single line diagram shows the system, with four main and one auxiliary generator, two 6.6 kV high voltage switchboards, port and starboard. Generation and propulsion is almost symmetrically split across the two boards, including feeding two electrically separate but close coupled LCI fed synchronous motors on a single shaftline.

There are two tunnel thrusters, supplied by LCI Fed Synchronous motors as well as a large number of ship service, cargo and RAS transformers. The whole system is managed by a Power Conversion Integrated Platform management system which includes a Joystick system for simultaneous operation of all the propulsors.

The close integration of the power and platform management system was possible and greatly assisted by the common team and the contract award for both Power and propulsion, and automation. Platform management PLCs were able to be incorporated within the drives and switchboards considerably reducing cabling and installation costs.

Wave Knight was built at Barrow and Wave Ruler was built on the Clyde at Govan. Power Conversion had to simultaneously support two sites, and two different shipyards as the build progressed. Wave Knight was dynamically launched in Barrow in Sept 2000, with Wave Ruler the following February. Power Conversion undertook all the plant commissioning and attended the sea trials which took place in March 2003 for the first vessel, with the second only a month later.

Main Propulsion Motor Stator Winding
Power and Propulsion Single Line Diagram

**Key Facts**

<table>
<thead>
<tr>
<th>OPERATOR</th>
<th>RFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHIPYARD</td>
<td>BAE Systems</td>
</tr>
<tr>
<td>IN SERVICE</td>
<td>2002</td>
</tr>
<tr>
<td>LENGTH</td>
<td>190 M</td>
</tr>
<tr>
<td>DISPLACEMENT</td>
<td>30000 T</td>
</tr>
</tbody>
</table>

**Complete Power and Propulsion**

- 2 x 6.6 kV MV Switchboards
- 4 off 4.7 MWe Diesel Generators
- 1 off 1.6 MWe Diesel Generator
- 6.6 kV/440 V Ship Services/RAS Tx
- 2 x 7 MW LCI Main Propulsion
- Tandem Configuration on 1 shaft
- 24 Pulse Transformer Fed
- 2 x 1320/855 kW LCI Thrusters
- 2 x Harmonic Filters

**Complete Automation System**

- Fully Integrated PMS inc UMS
- Joystick Control

**GE Power Conversion**

Boughton Rd, Rugby
Warwickshire CV21 1BU - United Kingdom

Tel: +44 (0)1788 563 563
Fax: +44 (0)1788 560767

France Tel: +33 3 84 98 10 00
Germany Tel: +49 30 76 22 0
USA Tel: +1 412 967 0765
Brazil Tel: +55 31 3330 5800
China Tel: +86 21 6416 6080
India Tel: +91 44 6611 5800
Norway Tel: +47 67 83 82 50
Russia Tel: +7 (499) 270 27 11

© 2012 General Electric Company. All rights reserved.