The Amplus Versatile Production Unit (VPU™) is a superior breed of DP FPSO which sets new standards in operations efficiency and safety.

Whether it’s early production, marginal field development, or unlocking stranded reserves – the economics and opportunities are now unlimited.
DP FPSO – Well Proven Technology

**Seillean**
DP FPSO

(SWOPS Single Well Oil Production System)

- **1989** BP take delivery of DP FPSO Seillean and operated on Cyrus field. The vessel served on the Cyrus Oilfield in the UK and then the Donan oilfield.
- **1993** BP streamlined business and sold Seillean to Reading and Bates who continued to operate the vessel for BP.
- **1998** Petrobras approached Reading and Bates – while they were negotiating with Premier for development of Chestnut field – with a requirement for an early production vessel. This led to a six-year contract between Petrobras and Reading and Bates.
- **1999** Operated on the Roncador, Jubarte and Golfinho fields.
- **2010** Seillean contracted as oil collection and processing facility on the Macondo oil spill.

In 2008 Petrobras commenced a build of their own version of the Seillean DP FPSO (the Dynamic Producer), which has since been utilised for extended well testing in the Espirito Santo and Campos and Santo basins, in Brazil.

**Helix Producer**
DP FPU

- **2005** Hurricane Rita destroys Typhoon field tension leg platform
- **2008** Helix convert ice class train ferry to dynamically positioned production unit, to redevelop Typhoon field
- **2010** Production commenced from Phoenix field (previously Typhoon)

The Helix Producer was also utilised in the Macondo spill response.

**Munin**
DP FPSO

- **2004** Munin operated on DP for Conoco Phillips on Xijiang field
- **2010** Munin operated on DP for 18 months on Huizhou Field for CACT
Amplus Energy Services

Modular concept allows for building blocks, catering for a full range of options

System designed to handle 30,000 bpd. Option to increase capacity is available

Gas compression can be accommodated

Produced water treated and discharged to sea

Produced gas to be used in engines
**VPU™112**

- Length 144m
- Breadth 26m
- 112,000 bbl oil storage capacity
- +OI 100 A1 Floating Production & Oil Storage Vessel
- Offtake reel
- Accommodation for 65 persons (35 person crew)

**Cost from $175M** (includes Process and DTS costs)

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**VPU™200**

- Length 192m
- Breadth 32m
- 200,000 bbl oil storage capacity
- +OI 100 A1 Floating Production & Oil Storage Vessel
- Offtake reel
- Accommodation for 70 (operating crew 36)

**Cost from $220M** (includes Process and DTS costs)

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- Process Skid
- DTS (Disconnectable Turret System)
Amplus Economics
Existing Solution vs Amplus VPU Solution

<table>
<thead>
<tr>
<th>MOORED</th>
<th>AMPLUS VPU - DP3 DYNAMIC POSITIONING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of the moorings, their installation and</td>
<td>c25M$</td>
</tr>
<tr>
<td>ultimate removal</td>
<td>Economy of re-positioning to each site</td>
</tr>
<tr>
<td>Costs burden on the development schedule</td>
<td>c10M$</td>
</tr>
<tr>
<td>from weather dependencies of mooring</td>
<td>VPU provides maximum positioning efficiency</td>
</tr>
<tr>
<td></td>
<td>in relation to wellheads and flowlines siti-</td>
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</table>

<table>
<thead>
<tr>
<th>EXISTING FPSO</th>
<th>AMPLUS VPU - DTS (Disconnectable Turret System)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connect time</td>
<td>54 days / 5 months</td>
</tr>
<tr>
<td>Disconnect time</td>
<td>2/4 weeks</td>
</tr>
<tr>
<td></td>
<td>Connect time</td>
</tr>
<tr>
<td></td>
<td>3/4 hours</td>
</tr>
<tr>
<td></td>
<td>Disconnect time</td>
</tr>
<tr>
<td></td>
<td>30 seconds / 4 hours</td>
</tr>
</tbody>
</table>

The Amplus VPU is designed to reduce risk, achieve early production, and lower both CAPEX and OPEX.
Resources Used in a Conventional Installation

Pre-Austerity | Pre-Amplus

- Lolair - FTA installation and DMaC tie-Ins
- WellServicer – Risers and dynamic umbilicals
- Maersk Puncher

- Regalia – Manifold and jumper installation
- Discovery – Umbilical lay
- Maersk Mariner

- Smit Semi 2 – Pigging and hydrotesting
- KSS200 – Prelay survey
- Maersk Master

- Norlift – Pipelay
- Maersk Garabus
- Maersk Bona Vista
- Maersk Tackler
- Stril Borg
VPU Operability

The Amplus VPU is designed to operate “Head to Weather” at all times. The VPU is so powerful, with an excess of 20 Megawatts of installed power, we can never envisage a situation of having to dis-connect for anything other than a planned event.

The Modelling we have done shows that the VPU can remain on station in Hurricane Force Sea conditions and still only use around 35% of her installed power.

A previously commissioned Operability Study* for our smaller 100,000 barrel storage option VPU in the Lancaster Field, West of Shetland, determined the vessel could operate 358 days per year in that area. With this basis, we believe an increase to 365 days – at 100% availability – is achievable for the 200,000 barrel storage option VPU.

A limiting factor was the Rigid Riser Tensioner motion. However since the Operability Study* was carried out, we have improved the VPU operational capability by replacing the Rigid Riser with our Dis-Connectable Turret Buoy System, offering full 360 degree rotation flexibility.

* Naval architects (Houlder Ltd) carried the Operability Study (Report Number B/355/002 – Preliminary Operability Study (copy available on request)