Floating production and storage vessel capability

Safe, efficient, cost-effective delivery
Amec Foster Wheeler’s track record in delivering FPSOs includes involvement in over 50 global projects, including Shell’s Bonga FPSO, ExxonMobil’s Kizomba A&B FPSOs, Petrobras’ P63 FPSO and the Marine Well Containment System for the Gulf of Mexico.

We have established a world-class reputation for the design and delivery of technically complex projects, in challenging locations and this expertise. We combine this with our technical skills in topsides, subsea and risers design. With our proven proven track record in LNG, we can also deliver floating LNG solutions.

Our skills are focused on the design of the topsides and processing facilities for the floating solution, including feasibility studies, preliminary engineering and concept selection, front-end engineering design, detailed design, procurement, installation management, hook-up and commissioning, plus on-going asset support:

► Floating production storage and offloading systems (FPSO)
► Floating production systems (FPS)
► Floating LNG facilities (FLNG)

We are leaders in ‘front-end’ and project management services and world-class engineering services consistently to deliver major projects successfully, safely and sustainably.
EnQuest Producer FPSO, UKCS

The workscope included detail design engineering, procurement, project management and construction support. The FPSO will be used on the Alma field, previously known as the Argyll field, which was the first oil field to be developed in the UK North Sea.
Our capabilities

Amec Foster wheeler covers all aspects of engineering, procurement and construction contracting

We take control of project definition, estimating & planning, and project controls. We focus on the deliverables at every stage of the project lifecycle, including supply chain management. Committed to delivering excellence, we also provide integrated solutions through additional support and operational readiness.

Our additional support services include:
► Commissioning support through Amec Foster Wheeler’s qedi business using our unique GoTechnology® suite of project management applications
► HVAC engineering support and placement of HVAC package purchase orders
► Construction management support through Blohm & Voss’ ship yards

Our operational readiness programme offers:
► Operations & maintenance, marine and IT strategies development
► Data migration and preservation standards & process development
► CMMS build
► Spares and stock management process and strategy
► Defined operational manning profile and requirements
► Lifecycle costing of all spares
► OPEX development for first years of operation
► Assisted in HAZID, HAZOP, ENVIDs
► Human factors engineering strategy
“Our aim is to deliver real value to our customers.”
Our global FPSO experience
A proven track record

Chevron North Sea Limited Captain Enhanced Oil Recovery (EOR)
UK 2014-
FEED design of the proposed Bridge Linked Platform (BLP) ‘B’ which will be utilised to store, mix and pump polymer. The company will also be responsible for the BLP brownfield tie-ins to the existing facilities as well as works on the Floating Production Storage Offloading (FPSO) unit.

Tullow Oil Kwame Nkrumah
Ghana 2014-2019
Engineering Services for Tullow Oil’s Production Operations, including the MV21 Kwame Nkrumah FPSO and any future facilities within the Jubilee field, for an initial term of five years. The Jubilee field is 60 km offshore Ghana and 130 km southwest of the port city Takoradi.

IHI Corporation Catcher Area Field Development
North Sea 2014-
Using Brazilian (Kromav) expertise for hull basic design for a new-build FPSO vessel planned for the UK Central North Sea’s Catcher area field development.

Bumi Armada Kraken
North Sea 2013-
FEED plus 5-year engineering framework for Amec Larastia in KL.

Teekay Petrojarl, Foinaven FPSO
North Sea 2013
Eight-month contract to install four new freefall lifeboats on the FPSO - deconstruction of previous structure, installation of two new blast walls, pipework modifications, electrical installation and the installation of the new lifeboats.

ExxonMobil Kizomba Satellites
West Africa
Detailed engineering of the topsides and project management assistance including procurement support, delivery of operator training documentation and management of completions and commissioning for the Kizomba A FPSO. A second contract was awarded to Amec Foster Wheeler for the Kizomba B FPSO.

The Kizomba B FPSO was completed three months ahead of schedule and sailed from Korea in January 2005 in a high state of readiness, with all systems complete, commissioned and signed off by the customer.
**Petrobras P-63 FPSO**  
*Brazil*  
Concept basic engineering and detail design services for the P-63 topsides. The P-63 FPSO will have 16 topsides modules with a total weight of over 14,000 metric tons.

**INPEX Ichthys Field**  
*Australia*  
Project management, engineering and other resources necessary to produce the FEED for a large semi-submersible gas production facility, an FPSO, Umbilicals, Risers and Flowlines (URF), and a gas export pipeline.

The offshore development covers an area similar to that of Greater London and is comprised of 50 subsea wells that will produce enough natural gas to provide nearly 10 percent of Japan’s energy needs for the next 40 years.

**Shell Nigeria Exploration Company (SNEPCO) Bonga FPSO**  
*West Africa*  
Project management, engineering, procurement and fabrication for topsides equipment, installation / integration, pre-commissioning and commissioning assistance, and two years of operational support services.

One of the largest FPSOs ever built, it was the first world-scale FPSO successfully installed and commissioned for Shell in Nigeria and the largest offshore hook-up ever to be undertaken in West Africa, peaking at 1,060 offshore personnel.

**Maersk FPSO’s UK Ltd, Design Review and Baseline Survey of Maersk Curlew HVAC System**  
*UK 2012*  
Provision of personnel to perform an onshore design review and offshore baseline survey of Maersk Curlew TR HVAC System.

**Timas Suplindo for ConocoPhillips Indonesia, Eastern Hub Mercury Removal (EHMR) Water Reinjection**  
*Indonesia 2012*  
Detailed engineering of a water reinjection facility for the Belanak FPSO and Well Head Platform A.

**ConocoPhillips Bayu-Undan facilities - O&M extension**  
*Australia/Indonesia 2011-2013*  
Two-year contract extension to provide operations and maintenance services to the Bayu Undan facilities in the Timor Sea (floating storage and offloading facility and three fixed platforms: a remote wellhead platform and a compression, utilities and quarters platform bridge-linked to a drilling, production and processing platform); the scope of work includes implementation engineering, work package preparation, planning, hazard assessment, coordination, offshore field services and implementation (Clough AMEC joint venture - Aus$100m)).
Life of asset services
Amec Foster Wheeler

We deliver projects, from concept to commissioning and beyond.

For any development, we start adding value from day one, helping our customers to evaluate the opportunity, screen options, select the right option, and then realise the revenue as quickly as possible.

Consultancy services
- Environmental
- Marine & coastal
- Geotechnical
- Permitting & regulatory
- Community & social affairs
- Water & wastewater
- Transportation

Project delivery
- Feasibility studies, concept & pre-FEED
- Cost and schedule planning & control
- Technology selection & integration
- FEED design
- Engineering & procurement
- Fabrication & construction
- Project management
- Start-up & commissioning
We deliver value at the front end, then can bring our global EPC skills and experience to bear, developing the right execution strategy, and then delivering on time, safely, cost effectively, and right first time. Right through the life of your asset we can provide the right support, from turnarounds and brownfield projects through to long-term asset support, performance improvements, through to late life planning and decommissioning.

Asset management

► Due diligence & site assessments
► Asset integrity & optimisation
► Operational readiness & implementation planning (OIP)
► Operator training, systems and management
► Operations & Maintenance term services
► Brownfield upgrades & expansions
► Shut-downs / turnarounds
► Dutyholding
► Late life management
► Mothballing & decommissioning
► Remediation
Our global FPSO experience
A proven track record

Enquest Knightsbridge FPSO
UK 2011-2013
FEED Verification, Detail Design and Project Management. The [Knightsbridge] project includes the joint development of the Alma (formerly the Argyll and Ardmore field) and Galia (formerly Duncan field) fields. The development will consist of 7 production wells and 2 water injection / disposal wells, tied back to the modified Usiglue Grom FPSO vessel. The development plan is designed to be capable of processing high water cut levels up to 95%. The fields are in the Central North Sea in a water depth of approximately 80 meters and are approximately 315km south east of Aberdeen.

Maersk Curlew Compression FEED
2010-2011
Appointed by Maersk FPSOs to carry out the FEED for modifications to the Curlew FPSO in the central North Sea.
Amec Foster Wheeler’s FEED scope of work is part of a project to extend the life of the Shell-operated Curlew field and it will focus on the Curlew D gas condensate field located approximately 210 kilometres east of Aberdeen. To maximise recoverable reserves from the Curlew D reservoir, the study is intended to evaluate the feasibility of a reduction in the pressure of the condensate arriving at the Curlew FPSO.

Front End Engineering and Design (FEED) for the Low Pressure Operation Project (LPOP) for Curlew C & D fields. This FEED covered Process reconfiguration to maximise production by reducing the topside arrival pressure and also a Compressor Re-Wheel to accommodate the new process conditions and pressures.

Amec Foster Wheeler provided a full suite of FEED deliverables and estimate covering the full Engineering, Procurement, Construction and Commissioning.

quip P-63 FPSO
Brazil 2010-
Basic engineering services for the topsides of the P-63 floating production, storage and offloading (FPSO) vessel, to be operated on behalf of Petrobras. The FPSO will develop the Papa Terra heavy oil field in the Campos Basin, offshore Brazil.

It will have about 16 topsides modules with a total weight of over 14,000 metric tons, processing 140,000 bpd of oil, 35 million standard cubic feet per day of gas and 325,000 BPD of produced water. Facilities to inject approximately 340,000 BPD of seawater are also included. Three oil processing modules; one gas compression module; three electrical power generation modules; two water
treatin

g modules; one electrical building module; three utilities modules; one flare system module; and two manifold modules. In addition, a pipe rack over 200 metres long will be designed to incorporate a material handling trolley.

**INPEX Browse, Ichthys field development**

Australia 2009-

Project management and engineering for the FEED for a large semi-submersible gas production facility, an FPSO, Umbilicals, Risers and Flowlines (URF) and a 850 km gas export pipeline to the Ichthys LNG Plant in Darwin.

**ConocoPhillips (03-12) Pty Ltd Bayu-Undan offshore oilfield**

Australia/Indonesia 2008-2011

Clough AMEC JV - three-year contract for operations & maintenance services for FPSO and three fixed platforms, a remote wellhead platform, a compression, utilities and quarters platform, bridge-linked to a drilling, production and processing platform: implementation engineering, work package preparation, planning, hazard assessment, coordination, offshore field services and implementation, training and capability development in Timor Leste.

**ExxonMobil Kizomba Satellites Project**

2008-2009

Kizomba A&B FPSOs were designed by AMEC Fluor JV in Houston Texas. The Kizomba Satellites Project is a brownfield development modifying topside process facilities to support the tie-in of new subsea developments.

Brownfield modifications to the topsides of two operating FPSOs in order to support Process modifications required for the tie-in of additional subsea facilities.

**Maersk Contractors Peregrino FPSO**

Offshore Brazil 2007-2010

Hook Up and Commissioning for the Peregrino FPSO, including: Offshore hook up/completion/commissioning of Hydrocarbon Systems, Management/Fabrication Support (Batam/Singapore), FAT witness all equipment. EX Certification, all calibration, PSV’s, Vendor package compliance, installation surveys.

**INPEX Browse, Ichthys field development**

Australia 2007-

Pre-FEED.

**Maersk Oil North Sea UK Ltd, Integrity Review for UK Operations**

UK Jan-March 2006

Three month Integrity Review of 2 FPSOs and 1 Semi-submersible facilities. The review was to identify any integrity issues that could lead to significant safety problems, and/or that could materially affect short-term capital budgets.

**Woodside Integrated Services Contract (ISC)**

2005-

Clough-AMEC JV awarded ESC for project management, integrated engineering, operational maintenance, modification and supply chain integration services for Woodside’s oil assets in Wanaea Cossack Lambert Hermes (Cossack Pioneer FPSO), Enfield, Legendre and Laminaria-Corallina (Northern Endeavour FPSO) fields.
**Bluewater, GTL FPSO Concept Study**  
2005-  
Concept study for installing the Syntroleum GTL process onto a ship shape hull.

**Total Angola/Sonangol Rosa**  
Angola 2005-  
Environment & Infrastructure work on seven new processing modules (70 to 1,400 tonnes) for Girassol FPSO to take production from the Rosa oilfield.

**ConocoPhillips, Bayu/Undan gasfield development**  
Australia/Indonesia 2004-2007  
In JV with Clough, three-year contract for operations and maintenance services for the production facilities (14,000 tonne DPP platform, 11,500 tonne CUQ platform, 1,400 tonne WH platform and FSO vessel).

**ExxonMobil, Marimba North Subsea Tieback**  
2004  
This brownfield project involved topsides modifications to accommodate the tieback of new field into the Kizomba “A” FPSO.

The following scope of work was carried out as a joint team with Fluor Daniel. Overall Project Manager and the majority of the resources: Pre-FEED and FEED, detailed design, procurement support, construction planning and constructability input to design, operations and maintenance input to design.

**ExxonMobil Esso Exploration, “Kizomba” A & B FPSO’s**  
Angola 2004-2007  
Operations and Maintenance support during the first two years of production including onshore engineering support.

The Kizomba A and B are both 285 metres (935 feet) long VLCC based FPSOs to be installed offshore Angola. The Kizomba B topsides dry weight is approximately 36,500 Tonnes. It is designed to produce 250,000 barrels of oil per day. The spread moored hull has the capability to store 2.2 million barrels of oil. The two projects are similar, but not identical. They comprise twin trains of three stage separation, associated gas will be compressed and dehydrated to provide fuel gas and gas lift to aid production. Surplus gas is re-injected into the producing reservoir. Produced water is cleaned-up prior to reinjection.

**Woodside Enfield Oilfield development**  
Australia 2003  
Detailed engineering services for Enfield FPSO (1 m bbl capacity) - in JV with Fluor.

**BP America Production Company, Holstein and Mad Dog deepwater oilfield developments**  
USA 2003-  
Hook-up and commissioning services for floating production facilities.

**ExxonMobil Esso Exploration, “Kizomba” A & B FPSO’s**  
Integrated Operation & Maintenance service contract including operator training. All deliverables necessary for operational readiness. SAP CMMS Build.
The Kizomba A and B are both 285 metres (935 feet) long VLCC based FPSOs to be installed offshore Angola. The Kizomba B topsides dry weight is approximately 36,500 Tonnes. It is designed to produce 250,000 barrels of oil per day. The spread moored hull has the capability to store 2.2 million barrels of oil. The two projects are similar, but not identical. They comprise twin trains of three stage separation, associated gas will be compressed and dehydrated to provide fuel gas and gas lift to aid production. Surplus gas is re-injected into the producing reservoir. Produced water is cleaned-up prior to reinjection.

**ExxonMobil Kizomba A&B Topsides Modifications**

Multiplier-based contract to provide pre-FEED for topsides modifications to the Kizomba A and B FPSOs to allow export of gas to the LNG Plant and to manage movement of gas within Block 15 during planned or unplanned shutdowns of the LNG Plant.

Services Provided: The services related to preliminary designs (pre-FEED).

Primary Contract Holder: Paragon Angola contracted directly with ExxonMobil.

**SNEPCO Bonga field development**

Nigeria 2001-2009

Project management, engineering and procurement, module construction, integration on hull, pre-commissioning and offshore commissioning of 17,000 tonne topsides for FPSO. Topsides Facilities will have storage capacity of 2 million barrels of oil with production of 225,000 barrels of oil per day and 4.5 million standard cubic metres of gas per day.

Integrated Operations & Maintenance service contract. All deliverables necessary for operational readiness including operator training. Offshore Production Operations & Maintenance with full onshore support team for first two years of operations SAP CMMS Build.

**Shell Bonga FPSO**

2001

Detailed design & construction.

**Shell EP Europe Sigma3 Integrated Services Contract (Formerly Northern Business Unit Integrated Services Contract)**

UKCS 1998-


Also includes onshore support for all 17 facilities (including 1 FPSO) in the central, Brent and mature assets, and campaign maintenance.

**Maersk, provision of engineering and technical services for the Curlew FPSO**

North Sea (for Shell/Essco) Dec 1997 - one year initially

Professional and technical engineering advice and recommendations in support of the operation and management of the facilities. Preparation of workpacks to facilitate any additions, modifications or changes to the systems and processes associated with the facilities. Technical investigations and reports to determine the root cause of failures, non-delivery of design capability or feasibility of variations and extensions to design capability. Project management services in support of operator capability. Documentation management services (hard copy & electronic) for the installation. Offshore technical and engineering, supervision, project engineering, construction and commissioning.

Engineering and technical support services onshore and offshore to Maersk’s Curlew operations department.
Our global FPSO experience
A proven track record

R & B Falcon (Caledonia), Iolair
North Sea 1996
Conversion of a semi-submersible emergency support vessel to a new role for well intervention west of Shetland.

Engineering design for conversion work including installation of new workover derrick, accommodation of ancillary equipment, upgrading for hydrocarbons service, additional power.

BP Exploration Operating Co Ltd, Schiehallion field floating production system
West of Shetland 1996
Fabrication of lower turret assembly - 1,315 t - for FPSO.

Texaco North Sea Ltd, Texaco field development
1996-2003
Offshore hook up and commissioning of 7,000 t wellhead production platform; provision of supervision, personnel, operations and maintenance support for FPSO and WPP.

Texaco Captain
North Sea 1996-2001
This contract included the provision of all operations and maintenance personnel in the Captain field including, the Floating Production Storage and Off-take (FPSO) facility and Wellhead Production Platform (WPP).

Services included performance of oil and gas production operations, marine operations and mechanical, structural, instrument and electrical maintenance works. Crew planning, recruitment and logistics and training management.

Personnel supplied include:
► control room operators
► production operators
► marine personnel
► maintenance personnel
► medics
► materials controllers
► communication technicians

Shell Exploration and Production (Shell/Esso) Curlew Field Development
Central North Sea UK block 29/7 1996-1997
The Curlew development was undertaken on an Alliance basis known as the MAS Alliance which consisted of Maersk, AMEC and SBM (Single Buoy Moorings). The contract for the development was an EPIC (engineer, procure, install, commission) with Maersk owning and operating the vessel. We were responsible for the overall engineering and procurement of the topside facilities and utilities, topsides construction, installation, hook-up and precommissioning, installation of the turret and management of the CSO (Coflexip Stena Offshore) subsea contract. SBM designed the turret, swivel stack and the mooring system.

Production: Oil - 45,000 bpd, gas - 100 MMscfd / 2.8 MMscmd
Storage: 560,000 bbls
Water Depth: 90 metres (295 feet)

Our global FPSO experience
A proven track record
Shell/Esso, Teal/Guillemot field development - Anasuria
North Sea 1995-1996

New build, 125,000 tonnes, floating production, storage and offloading system, production 55,000 b/d oil, 850,000 bbls storage, turret mooring.

Amec Foster Wheeler scope: fabrication and installation of 22 topside processing facilities weighing 3,500 tonnes.

Development of Operations & Maintenance management system (SAP CMMS Build) with deliverables for operational readiness.

Manhours - 460,000.

Shell Curlew
1995-1996

FPSO design competition.

Sun Oil UK Ltd, Balmoral floating production system
Central North Sea 1989

Offshore engineering support services.

BP Seillean
North Sea 1984

New build 76,000 tonnes multi purpose floating production, extended well testing and early production system. Production 15,000 b/d oil, 300,000 bbls storage, highly sophisticated DP positioned production system, two moon pools / ROV system. Connection of riser, riser-standard drilling tubulars.

Detailed engineering design, procurement and construction assistance of oil production facilities, flare system, ROV facilities, sub-sea connections and commissioning.

Buchan A
North Sea 1977

Conversion of a Pentagonne semi-submersible drilling rig to floating production status, second FPS in the North Sea. Production 70,000 b/d oil, initial storage / transport to two dedicated tankers, storage capacity 560,000 bbls.

Detailed engineering design and procurement of topside production facilities, construction and project management, and offshore installation services.
Amec Foster Wheeler (www.amecfw.com) designs, delivers and maintains strategic and complex assets for its customers across the global energy and related sectors.

With pro-forma 2014 scope revenues of £5.5bn and over 40,000 people in more than 55 countries, the company operates across the whole of the oil and gas industry - from production through to refining, processing and distribution of derivative products - and in the mining, clean energy, power generation, pharma, environment and infrastructure markets.

Amec Foster Wheeler shares are publicly traded on the London Stock Exchange and its American Depositary Shares are traded on the New York Stock Exchange. Both trade under the ticker AMFW.

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