# Egina FPSO

## Superior production technologies for the World's largest FPSO

# World's largest FPSO

Total discovered the Egina field offshore Nigeria in 2003, which is one of their most ambitious deep-water projects to date. The field development solution from subsea production to an FPSO (floating, production, storage, and offloading vessel) presented numerous challenges due to the complexity of the field. These challenges included engineering, procurement, construction, installation, and commissioning (EPCIC) of the world's largest FPSO; the high volume of production; and requirement for high local content. NOV provided superior technologies and product solutions that contributed to the success of the project and are ready to help you achieve the same results for your next deep-water project.

**The Egina Field**

- Discovered in 2003
- Water depths between 1,400 m and 1,700 m
- 150 kilometers offshore
- Subsea production system connected to an FPSO
- Egina FPSO World's largest FPSO vessel including:
    - 2.3 million barrels of oil storage, the largest FPSO oil storage capacity
    - 200,000 bpd processing capability
    - 44 subsea wells

*Top left; Wellstream Processing module, top right; BLM fairlead chain stopper, bottom left; Bondstrand GRE composite piping, bottom right; APL's Buoy Turret Loading (BTL) mooring system.*

# Why NOV Offshore?

From front end design and engineering solutions, to superior technologies and integrated systems, we can provide turnkey solutions and dedicated support throughout your entire project – anytime, anywhere. Leveraging decades of experience and competency in risk management, project execution, and delivery, combined with internationally recognized and respected equipment brands, we can be your lifecycle solution partner. Working as your partner we can help you achieve your goals, whether it's optimizing upstream operations, extending the life of your vessel, or providing game-changing technology to help you move the needle.

As the equipment designer and manufacturer, no one understands our systems like we do and how to apply and optimize them for the best possible performance. From topside, to subsea, or a hybrid solution, we help solve our customers challenges whilst simultaneously reducing mark-ups and interfaces and minimizing environmental footprint to maximize return on investment.

**Our value added solutions include:**

### APL Technology, Buoy Turret Loading (BTL) - The Offshore Loading Terminal (OLT) scope

With in-service replaceable wheel bearing system, and the largest buoy ever produced that also assists in avoiding tandem offloading, we provided 100% of the project management, 80% of detailed engineering, and 100% of fabrication in country. The OLT was moored in approx. 1,500 m water depth, weighing approx. 1,000 tonnes with an offloading capacity of 6,000m3 per hour in a dual hose configuration. We also performed 2,000,000 man/hours LTI free. The OLT was installed ahead of the Egina FPSO's arrival and exceeded Nigerian content commitments, setting the standard for future EPC projects in West Africa.

**Safety & reliability**

### Process Packages and Technology

Wellstream Processing provided three key topside process packages for gas, produced water treatment and sand. Our process specialists supported the process package pre-commissioning in the LADOL shipyard and subsequent commissioning offshore Nigeria. The units were later commissioned offshore by local and experienced engineers. These packages were fabricated in South Korea and Singapore, and comprised of:

- Produced water treatment system, sizeable units for 2090m3/h design rate to 15mg/l discharge comprising two double-ended de-oiling hydrocyclones and 3 compact flotation unit (CFU) vessels in parallel
- Glycol dehydration and regeneration skids : Capacity 180MMSCFD of wet gas; process 5.5 m3/h of TEG to a purity of 99.88%
- Sand removal and cleaning: ToreOVD and ToreScrub

**Advanced Technology**

### Bondstrand™ composite glass reinforced epoxy (GRE) pipe, fittings and fiber reinforced polymer (FRP) grating

Aiding lower overall weight in both the hull and the topsides (typically 1/4th the weight of metallic equivalents), and reduced carbon footprint, Fiber Glass Systems provided over 35 km of corrosion resistant composite piping, including 34,000 fittings, 21,500 flanges and over 13,000 spools, prefabricated at the yard for the fire water, ballast water, sea water services, open drains, water injection and caisson piping, all of which last the life time of the project, with little to no OPEX. Engineering services included surge and stress analysis, and site field service to ensure the products were delivered and commissioned to their optimal performance. Extensive quantities of FRP gratings complemented the objective of reducing corrosion and maintenance for the huge vessel.

**Reduced OPEX**

### Fairlead chain stopper and rotary chain tensioner

BLM provided moveable chain tensioners with 600 tonne pulling capacity, hydraulic power units, in-board deck stoppers and a permanent spread mooring system, with a design life of 28 years (proven fatigue tested). In addition, two specially designed and patented pieces of equipment were also developed; fairlead chain stopper (FCS) bending shoe type and connecting links to achieve optimum operation.

We're extremely proud to have played a part in this development, and we continue to partner with Total to provide the necessary after support and services to continue the project's success.

**On-time delivery**

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