Oil and Gas at Atkins

Safe and efficient recovery from existing fields and exploiting new fields in difficult environments and uncertain market conditions present our oil and gas industry with many technical and economic challenges.

We have the breadth and depth of expertise, the intellect and the drive to overcome these challenges and help our clients to realise the full potential of their fields and assets. We strive to help improve lives, protect our planet and ensure prosperity through secure and affordable energy.

Working as part of a global community with our clients, industry partners and academia, we are listening, imagining and co-creating the best solutions in offshore engineering, onshore engineering and operations engineering.
Offshore engineering

We design fixed and floating production facilities from foundation to flare tip, including subsea assets and pipelines, and all associated project services, anywhere in the world.

We embrace the increasingly complex challenges presented by high pressure, high temperature environments, aging assets, process optimisation, marginal fields and oil price fluctuations.

The best engineers

Our teams are made up of experts with deep knowledge of offshore structures, process and safety engineering and floating systems, brought together over 10 years of strategic appointments and acquisitions that have built on Atkins’ 40-year history of technical excellence in oil and gas consulting.

With the recent joining of Atkins and Houston Offshore Engineering, collectively our design and operations experience extends back to the 1980’s with projects executed in the Gulf of Mexico, North Sea, Australia, Brazil, West Africa, South East Asia and the Arctic.

Our experts have worked with clients at the heart of:

- Making critical decisions in countless platform screening studies at feasibility and concept stages
- Detailed design and delivery of 13 deepwater facilities including TLPs, Semisubmersibles, Spars and FPSOs
- Assuring the structural integrity and extending the life of assets worldwide
- The technical assessment of risk for a significant proportion of the world’s FPSO fleet and meeting the new challenges presented by floating LNG

We have over 800 oil and gas specialists combining their intellect, imagination and drive to deliver the very best in:

- Structural engineering of hull and deck
- Naval architecture and global performance
- Process and topsides facilities engineering
- Hull marine systems engineering
- Mooring and foundations engineering
- Subsea and riser engineering
- Safety and reliability engineering

The joining of Houston Offshore Engineering and Atkins in October 2014 brought together Houston Offshore Engineering’s world class skills in deepwater, offshore floating platforms with Atkins’ international expertise in offshore asset integrity and production optimisation. The two now combined as Atkins brings a unique lifecycle offering to the offshore oil and gas market.
An independent view on concept selection

For any project, the most opportune time to make the biggest positive impact on project cost is early in the conceptual phase. Listening and exploring options with our clients, helping identify critical issues for optimising overall project economics at concept stage is where we add value.

We aren’t trying to favor a particular type of structure, process or approach to subsea. We are concept neutral so it’s all about what works best for our client and their success.

Whole asset, whole lifecycle perspective
Drawing on the broad and deep knowledge of our technical experts worldwide means we can take a whole life perspective and provide the best engineering across all aspects of an asset’s lifecycle; from concept through to decommissioning and abandonment.

CONCEPT
Help our clients select the economic, efficient and safe asset to maximise field output

DESIGN
Preliminary, FEED and detailed design to meet the safety, budget, program and operational imperatives

DELIVERY
Supporting classification and regulatory approval, fabrication, transportation, integration and installation

OPERATION
Establish the right maintenance and integrity management plans that minimise downtime and optimise production while maintaining safe operations

EXTENSION
Help extend asset life and safe, efficient production

DECOMMISSIONING
Support the optimum course for decommissioning
Experience with multiple depths, including all deepwater regions worldwide and a broad portfolio of solutions.

DEEPWATER
NAUTILUS SEMI
2000
Depth 2440m

NA KIKA
SEMI
2003
Depth 1950m

MAGNOLIA
TLP
2004
Depth 1425m

TUBULAR
BELLS SPAR
2014
Depth 1250m

KIZOMBA A TLP
2014
Depth 1190m

MARS B TLP
2014
Depth 1190m

URSA TLP
1999
Depth 945m

CONTROL BUOY CONCEPT

MOHO NORD
2016
Depth 880m

SHELL PRELUDE FLNG
2013
Depth 250m

At depths of more than 1000m

At depths between 200 - 500m

Depths are not to scale
With over 800 dedicated oil and gas specialists working across our international hubs in the Middle East, US, UK and Asia Pacific regions.
Thinking like an operator

We know our clients; we’ve been working together for 40 years and understand their goals and can share their vision.

It matters to us that:

- Safe and cost effective constructability and operability is inherent in concept selection, FEED and detailed design
- New assets are future proofed for economic field development at a later stage if required
- All risks and benefits in maintenance programs can be prioritised to optimise operational spend
- Transfer from design, through operations, life extension and decommissioning is seamless
- Lessons learned on asset integrity management are fed back into design to optimise capital spend and reduce operational expenditure.

Industry leading tools

Our advanced modelling and analysis tools provide our clients with the highest levels of accuracy and confidence in our design and engineering deliverables. This certainty and accountability combined with the integrity of our experts means better judgment of priorities, confident decisions and optimisation of spend.

Our analysis procedures are very well established. We have many specialists with experience across all of the established and reliable software tools for fixed and floating structures, including AQWA, SESAM, ANSYS, WAMIT, ABAQUS, and SACS. All configuration and sizing, and global performance software has been verified and calibrated against numerous model test programs. Our engineering methods and tools integrate both hydrodynamic and structural analyses for TLPs, Semisubmersibles and Spars.

Atkins’ drafters and designers work exclusively in AutoCAD and PDMS. For floating systems Atkins has an extensive PDMS library for the integration of hull structure and marine systems into a single detailed model. General arrangement drawings are typically created from a full PDMS model.

Years of participation in world-class deepwater projects has enhanced this core capability to include detailed understanding of all components of various types of floating systems.

We also perform cost and schedule estimating for management, engineering, procurement, fabrication, transportation, integration, installation, and start-up of deepwater facilities. Our cost and schedule databases are regularly updated and consider domestic as well as international project execution.
Delivering as true partners

We work hard to earn and retain our clients’ trust and stand by them when faced with increasing complexity or even adversity. We want to sit side by side with our clients, listening, sharing knowledge, embracing challenges and delivering what we say we will.

Whether engaged as one multidisciplinary delivery team for a major project or embedded as a specialist team for operational support, we work together with our clients and partners to bring different disciplines closer together and ease the managing of multiple suppliers.

“Consulting for specific tasks, teaming with other contractors, integrating with the client design team or within the general contractor; whatever works best for the execution of the project, we flex our role to suit.”
Anywhere in the world

- **OTHER ATKINS OFFICES**
Our engineers work together across our international network of technical hubs in the UK, Middle East, North America and Asia Pacific regions. This means that wherever in the world a project needs to be delivered, our clients benefit from our ability to quickly mobilise a team of industry-leading experts and dedicated local contacts.

We support projects from our hubs, close to our client’s base or through a remote team co-located with our client. Our worldwide presence means we understand the unique characteristics of each region for planning, designing, transporting and installing offshore and onshore projects.
Pushing boundaries

We thrive on the technically challenging, innovative pieces of a project that add real value. We constantly look for new techniques and approaches, future trends and client needs to spot the opportunities where we can transform the seemingly impossible into the possible.

We deal in imagining and realising projects that go beyond code in order to maximise the potential of new and existing fields and to help move new technologies forward.

Industry firsts include:

GULFSTAR 1 SPAR
Industry first: Designing the first Spar hull to be built in the US. Part of the Tubular Bells field development, Gulf of Mexico; Depth: 1220 metres.

Our Houston team delivered the hull and mooring engineering for the Gulfstar 1 Spar, as well as fabrication and installation engineering support. The hull was built in one piece, strakes included, in a graving dock, completely in the US, which has never been done before for a Spar.

The unit has capacity to hold almost 10,000 barrels of dead oil, and has 20 stainless steel tanks for storing flow assurance chemicals and the associated transfer systems. The Gulfstar FPS is owned by Williams, and operated by Hess as part of the Tubular Bells field development.

SOLAN SEABED STORAGE TANK
Industry first: Transforming a remote field into 20,000 barrels a day. Premier Oil, West of Shetland, UK, Depth: 135 metres.

Installed in November 2014 at a depth of 135 metres west of Shetland, UK, the Atkins-designed seabed storage tank (SOST) will enable the previously dormant Solan field to produce 20,000 barrels a day at peak.

Some of the complexities and challenges in the design derive from the fact that the tank is pressurised for offload (a unique feature), and has a 30-year design life.

We worked with our clients every step of the way to help make the development viable. Constructed from 10,000 tons of steel with dimensions equivalent to a seven story office block and storage capacity of 300,000 bbls.

PAIRED-COLUMN SEMISUBMERSIBLE
Industry first: Moving into harsh deepwater environments.

This concept was created by our own team of engineers to make it safer and more financially viable to develop fields in harsh deepwater environments. By adding one additional column per corner to the traditional semisubmersible, platform motions can be significantly reduced.

The Paired-Column Semisubmersible concept is the previously missing piece from a complete portfolio of deepwater platform concepts – a dry tree semi. This new technology brings many advantages to deepwater developments:
- Support of either wet and/or dry trees
- Reduced heave motions that allow conventional off-the-shelf riser tensioning equipment due to low riser stroke
- Full quayside integration
- Conventional structural components
- Efficient deck structure and hull deck interface
- De-coupled dependencies
- Wide column spacing (stability) vs. narrow column spacing (deck support)
- SCR friendly
- Low surge motion
- Improved roll/pitch motion
- Hang-off location close to platform center
- Damage tolerance

Thoroughly engineered, model tested, qualified and approved in principle by DNV for the Gulf of Mexico’s most severe metocean environment - Central Region.

THE COMPACT FPSO (CFPSO)
Industry first: Expanding the flexibility of FPSOs.

We’ve patented a new design for a floating production, storage and offloading (FPSO) structure, specifically engineered for use on marginal, deepwater, or harsh environment fields – the Atkins CFPSO.

Our CFPSO helps our clients to reduce capital and operational costs, and exploit what could otherwise be classed as an uneconomic field. Our patented design is suited to harsh environments where there are no pipeline export routes and where processing and offloading facilities are needed on the smallest platform footprint available.

The CFPSO concept combines an industry standard storage approach; oil over water or wet storage, with the very latest methods for managing safety and environmental risk.

The shape of the hull structure provides benefits in the form of reduced steel weight, lower construction risk, and reduced time from design to delivery. The unique hull form also provides excellent motion characteristics when compared to a traditional FPSO.

It features an integrated conventional topside ranging from 4,500 to 6,000 tons depending on tank storage capacity, stabbed into the hull and can be scaled up from a capacity of 200,000 to 300,000 barrels of oil equivalent, for fields of around 10,000 to 25,000 BOPD.
Extending life on late life assets:

Our worldwide network of engineers have the skills and expertise to extend the operating life of offshore assets decades beyond their original expectancy. Typically, the assets built in the early stages of the UK offshore industry now face complex challenges when operators seek to extend their life. The issues our engineers thrive on are those where ageing assets require significant upgrades which go well beyond the original design scope or where clients need to improve levels of production.

We have a long history of structural engineering globally and have helped clients to realise their ambitions of improved production and life extension. Our structural engineering teams are specialists when it comes to the analysis and strengthening of established structures, enabling operators to modify topsides and improve efficiencies.

PRELUDE FLNG
Industry first: Helping to make the world’s first and largest FLNG project safer.

The Shell Prelude, once operational, will be the world’s largest vessel. Its purpose is to extract offshore gas and refrigerate it to the point where it becomes a liquid, 600 times smaller, and transport it to land. The project, as a world first, had many potential hazards and Atkins was one of very few consultant engineers that had the technology to calculate the risks on a project of this scale.

We were able to apply our great wealth of experience of hazard analysis of offshore platforms to the project. Our teams in the UK could assess the historical accident frequency data and integrate it with computational fluid dynamics of gas flow, fire and explosions to calculate the risks of the project. The critical issue was to ensure that the massively complex plant was designed to minimise potential for hazardous events such as explosions, long duration fires and the cryogenic threats that could damage steel within seconds.

With risks comprehensively and clearly mapped we designed a solution that reduced potential risk to a level acceptable to client and industry.

“We are proud of our pioneer heritage in industry defining innovation.”
Enriching industry learning

We believe that collaboration between operators and suppliers is one of the keys to addressing the cost challenges faced by the industry. It is in our mutual interests to ensure that money is spent most effectively, operations are streamlined safely, production is improved and field life extended to maximise economic recovery.

Committed to sharing industry learning we have been involved in numerous Joint Industry Projects (JIPs) and hold regular lectures that brings industry experts together and encourage pan industry collaboration.

During the last two decades, we have concluded the following seven relevant JIPs:

**JIP Cause-Oriented Inspection System (COINS)**

Our commitment to improving integrity management techniques is demonstrated by our Cause-Oriented Inspection System (COINS) JIP, which applies root cause analysis to all failure modes to develop a more focussed and effective integrity risk assessment approach.

**JIP Strengthening, Modification and Repair**

A design manual has been created covering all strengthening, modification and repair techniques for offshore platforms, delivering new and more robust design procedures for strengthening and repair techniques.

**JIP Carbon Fibre Reinforced Composites**

This four-phase JIP has involved over 500 tests and has led to the creation of a design manual for the strengthening of offshore structural components using carbon fibre composites.

**JIP Neoprene-lined Clamps**

Some 20 ‘slip’ tests conducted on neoprene-lined clamps under various conditions of bolt load and member surface condition. The tests confirmed earlier indications that the slip capacity is not as high as was generally believed. New robust guidance was formulated based on the test data.

**JIP Grouted Joints**

This JIP involved in excess of 150 structural tests, leading to a design manual for the strength, local joint flexibility, SCF and fatigue life design of grouted joints utilising standard API grouts.

**JIP Diverless Repairs**

Full scale underwater demonstration trials were conducted in this JIP of the diverless implementation of grouted repair systems using ROV intervention only. The trials were fully successful and led to the development of installation aids and procedures for diverless implementation.

**SAFEBUCK JIP**

The SAFEBUCK JIP developed methodologies to deliver a safe and effective pipeline design that permits lateral buckling that takes into account the associated pipeline walking phenomena. The design guideline has been utilised on many major projects around the globe.

JIP SAFEBUCK: Finite element analysis of lateral buckle in soft seabed